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EFFECTIVENESS OF ADAMAS ANTI-DOPING PROGRAM: A PERCEPTION STUDY OF MALAYSIAN ATHLETES

Nurul Hidayana Mohd Noor[1*], Mazlan Che Soh[1], Mahazril 'Aini Yaacob[1], Zulkefli Saref[2]

[1]Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Seremban Campus, 70300 Seremban, Malaysia
[2]Malaysian Anti-Doping Agency (ADAMAS), Ministry of Youth and Sports, 62570 Putrajaya, Malaysia

**Corresponding Author Email: hidayana@uitm.edu.my*

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Abstract

Sports are recognized as an instrument for development and peace. However, the use of drugs in sports exceptionally competitive sports is alarming. The International Olympic Committee (IOC) initiated the World Anti-Doping Agency (WADA) as an international independent agency to lead a collaborative worldwide movement for doping-free sport. The use of doping among athletes can harm the athletes themselves, especially in health, both physical and mental health. As for Malaysia's doping, the Anti-Doping Agency of Malaysia (ADAMAS) is responsible for training and awareness programs. This study aimed to examine the influence of knowledge, awareness, and education on the effectiveness of the ADAMAS anti-doping awareness program. The study used questionnaire data from 62 athletes involved in several sports. The study found a positive relationship between knowledge, awareness, and education towards and the effectiveness of the ADAMAS anti-doping educational program. The findings also show that awareness explains a high degree of the effectiveness of the ADAMAS anti-doping educational program. The study suggests that awareness programs such as e-learning or seminars are meaningful for young and new athletes to train and educate them early on the effects of substance abuse in sports and increase vigilance about the latest information on doping.

Keywords*: Athletes, anti-doping program, awareness, education, knowledge.*

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INTRODUCTION

Malaysian National Sports Vision (2030) emphasizes fostering a continuous sports culture to empower social integration and the spirit of national identity among Malaysians (Ministry of Youth and Sports of Malaysia, 2021). The government focuses on cultivating athletes with solid personalities and embodying Malaysia's values. The National Sports Vision 2030 canvas was launched by the former Minister of Youth and Sports, Dato' Sri Reezal Merican Naina Merican. National Sports Vision 2030 is mapping sports development toward a progressive and sustainable country. In line with the principle of "from community to community," National Sports Vision 2030 has considered the best views, suggestions, and approaches from all levels of sports bettors. National Sports Vision 2030 fully supports the efforts of the World Anti-Doping Agency (WADA) in the fight against substance abuse among athletes (Ministry of Youth and Sports of Malaysia, 2021). This was supported by appropriate education and necessary measures focused on doping matters. In addition, it also encourages the participation of athletes in international anti-doping programs. Competitive competition in a specific type of sport usually causes high anxiety among athletes (Rice et al., 2019). A high level of concern is usually associated with the deterioration of a person's achievement (Johnston et al., 2021). Many studies found that high anxiety levels reduce athletes' achievements (Tamminen et al., 2021). Coping involves cognitive and behavioral changes to deal with external and internal demands or conflicts that erode one's source of strength (Kaplánová, 2019). Coping techniques include hypnosis, progressive relaxation, imagery, biological feedback, autogenic training, and meditation (Fogaca, 2021). However, athletes often use negative actions, such as recruiting drugs, to reduce anxiety (Rice et al., 2019).

Many cases of athlete drug abuse have been reported in Malaysia. For instance, at the 20th Malaysian Games (SUKMA), athletes from Perlis and Terengganu were confirmed positive for doping by the Malaysian Anti-Doping Agency (ADAMAS). ADAMAS announced that three athletes were found to be using the banned substances Metandienone, Terbutaline, and Oxymetholone. The incident forced the Malaysian Weightlifting Federation to withdraw from SUKMA. The ruling states that if there are athletes from affiliates or state associations who test positive for doping, they will be suspended from SUKMA 2022. The weightlifter will also be banned from participating in local and international tournaments for two years (Aizawati, 2022). Prevention from the beginning can be done when there is awareness and seriousness in the meaning of sports and competition. As sportsmen, athletes must use their potential without having to use doping (Gilberg et al., 2020). Preventive participation is based on the athlete's awareness and government prevention efforts and must involve all parties. The coach acts as a role model for athletes in implementing discipline development. Then, the sports manager should provide motivation and instructions based on sportsmanship standards (Barkoukis et al., 2019). Finally, society in general or sports lovers have a role in supervising deviant athlete behavior by providing contributions and information to the policymakers. In Malaysia, the Malaysian Anti-Doping Agency (ADAMAS) has been responsible for implementing comprehensive anti-doping tests at all levels. They are also responsible for developing comprehensive educational programs and cultivating awareness of the principles of doping-free sports in society. ADAMAS has established strong working relationships at the national and international levels and contributes to the government's initiative to strengthen the integrity of sports in Malaysia.

Therefore, this study aimed to examine the effectiveness of the ADAMAS anti-doping program by looking at the three main determinants: knowledge, awareness, and education. Even though there is much evidence showing which factors protect athletes from doping or prevention factors, many studies have been done in Western countries, and studies conducted in Malaysia about the anti-doping educational program among athletes are limited. With the continuous development of the Malaysian sports environment and achievements in international events, more

athletes can be susceptible to doping. Nevertheless, information about doping awareness, knowledge, and educational practices among athletes in Malaysia still needs to be made available. Moreover, there is still the problem of putting research into practice. Currently, evidence-based prevention is lacking, and the evaluation of agency effectiveness in combating doping among athletes still needs to be made available. In this study, the researchers propose a roadmap of possible solutions to improve the effectiveness of the anti-doping program in three areas: improving the translation of research findings into practice, increasing knowledge, awareness, and education of athletes regardless of their background, and acknowledging the athlete's perception and evaluation. This study contextualizes the factors that could help to improve ADAMAS anti-doping strategies, which will bring a greater understanding of the limitations of present anti-doping practices. As such, this study is believed to fill the gap and benefit the practitioners, athletes, and those stakeholders involved in doping. Thus, in this research, the main research question is guided by the following questions:

1. To what extent do knowledge, awareness, and education influence the effectiveness of the ADAMAS anti-doping educational program?
2. What aspects of current factors are likely to have the most impact on the effectiveness of the ADAMAS anti-doping educational program?
3. What implications can be offered to ADAMAS management and policies?

RESEARCH BACKGROUND

Overview of Malaysian Anti-Doping Agency (ADAMAS)

In 2003, Malaysia's Ministry of Youth and Sports signed the Copenhagen Declaration on Anti-Doping in Sport. This declaration acknowledges the duties and responsibilities of the World Anti-Doping Agency (WADA) and the World Anti-Doping Code. In November 2006, the Ministry of Foreign Affairs ratified the UNESCO International Convention against Doping in Sport 2005 after receiving cabinet approval. In May 2007, the Ministry of Youth and Sports signed the World Anti-Doping Code acceptance document. The Malaysian Anti-Doping Agency (ADAMAS) was launched under the supervision of the National Sports Institute as an Anti-Doping Unit. ADAMAS officially operates as a National Anti-Doping Organisation (NADO). In mid-2016, ADAMAS was separated from the National Sports Institute and came under the supervision of the Ministry of Youth and Sports of Malaysia, which was named the Anti-Doping Unit. The vision of ADAMAS is to create a sports environment that is free from doping, and the mission of ADAMAS is to maintain the integrity of sports that are free from doping, diligently work towards creating fair and healthy competition, and dignify the spirit of genuine sportsmanship among athletes.

An example of ADAMAS's activities is the Anti-Doping Briefing for Athletes and Coaching Staff of Malaysian Shooting Sports at the National Sports Institute, Bukit Jalil (23 July 2020). Nineteen participants, consisting of elite athletes and national backers, coaching staff, and sports science officers, were involved in this briefing. The second activity was an Anti-Doping Talk with 16 and 17-year-old Mokhtar Dahari Academy (AMD) athletes in Gambang (25 August 2020). Forty-two trainees and 10 AMD trainers attended this briefing. Although the Covid-19 pandemic continues to spread, ADAMAS continues its involvement in education. The World Anti-Doping Code 2021 and ADAMAS Anti-Doping Rules 2021 Engagement Webinar sessions were successfully implemented on 3rd November 2020 and 10th November 2020. This webinar was held virtually, and the participants joined it through the Zoom application. Figure 1 shows some activities and programs organized by ADAMAS.

Figure 1: Activities and Programs Implemented by the ADAMAS

Table 1 shows the five leading sports with the highest number of urine tests carried out by the ADAMAS. These include Cycling (53), Badminton (44), Aquatics (32), Field Hockey (19), and Pencak Silat (15).

Table 1: Number of Urine Tests in Sports

Sports	In Competition	Out of Competition	Total
Aquatics	5	27	32
Badminton	21	23	44
Body Building	0	11	11
Boules Sports	10	0	10
Boxing	0	4	4
Cycling	51	2	53
Field Hockey	14	5	19
Football	9	0	9
Gymnastic	0	8	8
Karate	0	5	5
Muay	0	2	2
Netball	0	5	5
Pencak Silat	0	15	15
Rugby	0	10	10
Sailing	0	3	3
Squash	6	0	6
Taekwondo	0	14	14
Tchoukball	2	0	2
Triathlon	5	0	5
Water-skiing	10	0	10
Weightlifting	0	10	10
Wushu	0	5	5

(Source: Anti-Doping Agency of Malaysia (ADAMAS), 2022)

The ADAMAS has highlighted 11 anti-doping rule violations. First, the presence of a prohibited substance. Second, an athlete's use or attempted use of a prohibited substance or method. Third are evading, refusing, or failing to submit to sample collection. Fourth is whereabouts failures, which consider any combination of three missed tests and filling failure within 12 months by the athlete. Fifth is tampering or attempting to tamper with any part of doping control. Sixth, possession of a prohibited substance. Seventh is trafficking or attempted trafficking in any prohibited substance or prohibited method. Eighth is administration or attempted administration to any athlete of any prohibited substance or method. Ninth, assisting, encouraging, aiding, abetting, conspiring, covering up, or any other type of international complicity involving an Arrhythmogenic Right Ventricular Dysplasia (ADRV) or any attempted ARDV. Tenth, associating in a professional or sport-related capacity with a person such as a coach, doctor, physio, or trainer who is serving a ban or has been found guilty of a criminal or disciplinary offense equivalent to a doping violation. The eleventh act threatens or seeks to intimidate another to discourage them from sharing information about doping (also called whistleblowing) or retaliate against another for doing so.

The ADAMAS has followed several steps of the decision management process for anti-doping offenses. First is the initial review, which verifies doping test forms, laboratory reports, TUEs, and athlete records and ensures that analysis procedures follow established standards. The second is a fault notice and show cause letter. A notice is sent to the athlete stating the offense committed, the laboratory report, and the prohibited substance/offense, and the athlete must respond with a letter showing the reasons. Third is an option to open sample B. The athlete is given the option to open the B sample. While opening the B sample, the athlete has the right to attend the laboratory in person, appoint a representative, or authorize the laboratory to appoint an independent witness. The athlete bears the cost of opening the B sample. Fourth is the temporary suspension, which depends on the type of offense and the type of prohibited substance/method involved. The athlete will be suspended from participating in any tournament/competition until the investigation of the case is fully completed. Fifth is the hearing session. Case hearings are held internally by authorities (national/international sports associations) to consider oral and written arguments and case evidence. The sixth step is the decision stage, where the hearing panel or committee will decide on the punishment or action after considering all parties' evidence, arguments, and testimony. The punishment imposed varies according to the facts of the case. The final step is an appeal. The athlete has the right to submit an appeal to the appeals panel/committee for review of the case.

Based on the World Anti-Doping Code, a four-year suspension will be imposed if the act is done with intent. Article 10.2.1.2 explains that the suspension period is four years for the specified substance if it can be proven that the act was done with intent. If the act is done without intention, the suspension period is for two years, with the condition that the athlete must explain how the substance was obtained and the purpose for which it was taken. Article 10.2.2 explains that the suspension period is two years if Article 10.2.1 does not apply. To determine the athlete's intention, some benchmarks to consider whether a prohibited substance or method is taken with intent are as follows: 1) an athlete is an experienced person, 2) the athlete has competed in many tournaments, 3) the athlete has participated/attended anti-doping seminars, 4) athletes have been tested several times before, 5) the substance can improve the performance of athletes, and 6) the material contains prohibited substances.

LITERATURE REVIEW

Doping in Sport

Doping in English means a mixture of opium and narcotics for stimulants. Doping is a prohibited substance or method used to improve performance (Schneider & Hong, 2020). The word doping was first used in England in 1869 for horse racing in England, where horses were doped to become champions. The value of sportsmanship in some sports is often tarnished using doping drugs (Henning & Dimeo, 2022). Moreover, some trainers desire to improve athletes' performance in various ways, such as giving drugs to improve the athlete's performance (Aljaloud et al., 2020). The issue of drug abuse or doping is not new in the local or international sports arena. Sports tournaments like the Olympics, Commonwealth Games, and Asian Games are tarnished by the issue of doping

among athletes. World-leading athletes like Ian Thorpe, Usain Bolt, and Ryan Lochte have also been involved in doping issues. Ben Johnson, the 1988 Olympic gold medalist in Seoul, South Korea, was found guilty of using anabolic steroids (stanozolol). He was suspended from participation for two years, and in 1993, he was suspended for life for doping offenses, that is, excessive testosterone levels (Montague, 2012). There is pressure for athletes to achieve excellent performance, especially in international sports. Therefore, it is not surprising that an athlete uses prohibited substances to improve performance. In 2019, Russia was banned from participating in any international sports championships for four years because the country has been punished by the World Anti-Doping Agency (WADA) due to the doping issue that plagued the country (He, 2022).

The use of prohibited substances or doping, such as steroids, is no stranger among amateur, semi-professional, or professional athletes. The issue of doping has been fervently discussed, and this polemic has no solution. Among the frequent sports events associated with doping issues include weightlifting, badminton, and swimming. The most often used drugs by athletes are anabolic drugs, including androgenic steroid hormones (e.g., androstenedione, nandrolone, and stanozolol). There are six groups of drugs commonly used by athletes (Aguilar-Navarro et al., 2020).

First, stimulants. Stimulants are drugs that increase physical activity and alertness by increasing heart rate and breathing. Stimulants can be mentally and physically stimulated by working on the central nervous system. Examples are adrafinil, cocaine, modafinil, pemoline, and selegiline. It is prohibited because it can stimulate the mind or body, thus increasing performance and giving athletes an unfair advantage. Second is tranquilizers, which are often called "No-Go Pills." It is used by people who engage in high activity, which drains energy and the mind. Third, Anti-Nausea Drug is a type of drug that reduces nausea symptoms. Fourth, beta blockers are drugs used to treat heart disease and high blood pressure. The same drug is also used to treat anxiety because it can reduce extreme restlessness and trembling. Boxers and military soldiers widely use the fifth, Pain Reliever, as it relieves pain caused by open or damp wounds. Finally, Diuretics are drugs used to increase the rate of fluid production and electrolytes from the body. It is usually taken by weightlifters, boxers, bodybuilders, and martial artists (Aguilar-Navarro et al., 2020).

Doping has several positive and negative effects. The positive effects of doping, in general, can increase stamina, self-confidence, body strength, and courage and relieve pain during menstruation (Docter et al., 2020). In addition, it can increase calmness, reduce shaking hands, and lower heart rate (Kabiri et al., 2019). The adverse effects of doping can cause muscle spasms, nausea, headache, and fainting. Excessive use can cause kidney and heart problems. If the substance is injected, local infection can occur, and the wrong injection can cause an embolism, which can also carry the hepatitis C virus or the HIV/AIDS virus (Hurst et al., 2020). When inhaled through the nose, inflammation can occur in the nose.

Moreover, smoking a cigarette can cause lung infections and heart infections. The drug abusers will look dirty and malnourished and disturb the reproductive organs, causing miscarriage and the most fatal overdose and death (Kabiri et al., 2019). Drug abuse also affects mental and leads to unwanted behavioral changes such as being easily offended, aggressive, grumpy, absenteeism, and lowering learning ability and performance (Adami et al., 2022). In some cases, it also led to mental disorders, paranoia, and attempted suicide. Almost every year, the media reports on this doping issue by focusing on the offense and its impact on athletes and their careers. Athletes are advised to be more careful when taking medicines or supplements to avoid getting involved with doping issues. Athletes can consult and get advice from experts such as doctors or physiologists or get information on the Internet to increase their knowledge about doping.

The Influence of Knowledge, Awareness, and Education on Adamas Anti-Doping Program

The first factor that influences the effectiveness of the anti-doping program is knowledge. Athletes need to be more alert and aware of the medicines or supplements sold online because the content found in the product cannot be verified. The ADAMAS has planned many educational programs about the dangers and effects of doping.

ADAMAS implements various forms of education according to the age categories of athletes with various methods. The ADAMAS education program focuses on applying noble values and integrity in sports. Athletes must be exposed to the practices of consuming prohibited substances to improve their knowledge. However, Engelberg, Moston, and Blank's (2019) study has found that most coaches and athletes need more knowledge of anti-doping control systems. There needs to be better communication on doping between coaches and athletes or with other coaches. The study also has concluded that the state of knowledge of doping will affect the commitment to anti-doping education. The study also suggests focusing on strict compliance legislation that obliges all parties to participate in the anti-doping educational program and preventive measures.

Similarly, Nicholls et al. (2020) suggested that the intervention effort increased coaches' knowledge of doping and highlighted the usage of mobile applications for delivering information on banned substances and the adverse effects of doping. Next, based on Chiang, Shamsuddin, and Mahmood's (2018) study, the knowledge of drugs in sports was modest. Surprisingly, 12% of the respondents had been offered doping agents, and 4.4% had used them for other purposes. Therefore, young athletes should be better equipped with appropriate knowledge of the dangers of doping. Next, Anshel and Russell' (1997) study discovered that knowledge and attitude toward steroid ingestion reduce the inclination to adopt prohibited substances.

The second factor that influences the effectiveness of the anti-doping program is awareness about the abuse of drugs or prohibited substances and the importance of anti-doping in sports. Public awareness of anti-drug campaigns is a method of information in delivering the message to the community. It aims to provide awareness and knowledge on the effects of drug abuse. Awareness needs to be felt by all levels of society so that the fight against dangerous drug abuse can be achieved. In order to deliver awareness messages, mass media is essential to reach many targeted users. However, most results showed that athletes were not sufficiently considerate and aware of using these drugs. Samira and Shima (2014) and Lim et al. (2018) found that young athletes have low consciousness levels of doping, adversely impacting their performance. This pointed out the need to improve the limited knowledge of athletes, and it can be done by establishing more educational courses (Rintaugu & Mwangi, 2021). Qvarfordt et al. (2021) discovered that limited doping information could restrict athletes' compliance. Krishnan et al.'s (2022) study found that athlete awareness regarding anti-doping agencies and anti-doping rule violations was poor; less than 40% reported receiving anti-doping updates. One-third of these athletes reported not having been tested for banned substances.

The third factor is education. Anti-doping education has been conducted to increase the understanding of doping as a part of the sport's rules (Murofushi et al., 2018). Some examples of educational approaches are an educational booklet, a teaching book, an education presentation kit, and others. The World Anti-Doping Agency (WADA) has declared that education is central to its anti-doping strategy. This is evident in the expansion of Article 18 of the 2021 World Anti-Doping Code, which focuses on education. Furthermore, they launched the International Standard for Education at the 2019 World Conference on Doping in Sport. International standards are technical documents harmonizing anti-doping efforts, which Code signatories must follow for compliance (Woolf, 2020).

Barkoukis et al. (2022) and Masucci, Butryn, and Johnson (2019) found that anti-doping education could support anti-doping policies. In addition, the athletes who received anti-doping education reported significantly higher levels of perceived acceptability, fidelity, and compliance. Pöppel (2021) suggests that anti-doping agencies such as ADAMAS must focus on heterogeneous target groups for doping prevention. In addition, the agencies are encouraged to extend the program into educational settings in schools. For instance, anti-doping education is compulsory in Germany for those wishing to continue studying at the university level. There is also an effort to integrate anti-doping education into the German curricula. Without the educational program, athletes relied upon coaches and managers as information sources, which opened avenues for athlete exploitation (Juma et al., 2022). Based on the argument, there are three hypotheses tested as follows:

H1: There is a relationship between knowledge and the effectiveness of the ADAMAS anti-doping educational program
H2: There is a relationship between awareness and the effectiveness of the ADAMAS anti-doping educational program
H3: There is a relationship between education and the effectiveness of the ADAMAS anti-doping educational program

A conceptual framework is formed that relates knowledge, awareness, and education to the effectiveness of the ADAMAS anti-doping educational program. Figure 2 illustrates this study's conceptual framework.

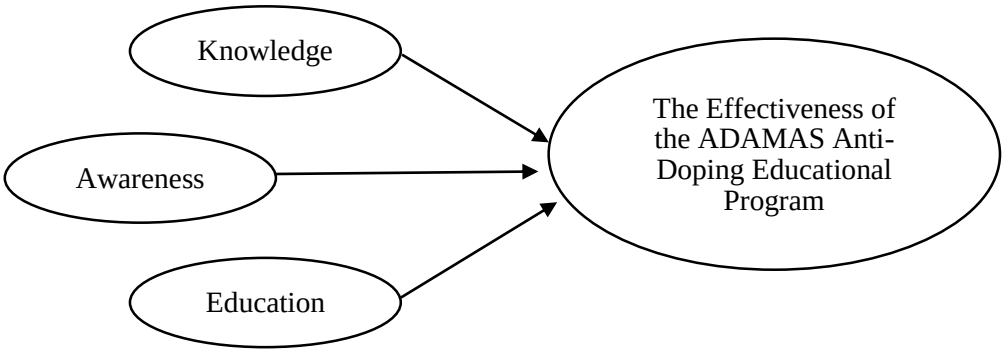

Figure 2: Conceptual Model

METHODOLOGY

A quantitative survey study was conducted, and the population of this study was Malaysian athletes who have been involved with the ADAMAS anti-doping program. Convenience sampling was employed to select the respondents. Data were collected during the 2022 SUKMA Games. SUKMA Games was a multi-sport event held in Kuala Lumpur from 16 September until 24 September 2022. The SUKMA Games were considered for this study. Its multi-sports approach is the best avenue for gathering different athletes from different sports. The collection of data on athletes during the SUKMA Games 2022 was chosen because it is easier for the researchers to collect data and meet with athletes due to the large number of athletes that can be reached during the Games.

The selection of athletes during the Games is also coincidental because they have been screened for anti-doping tests before competing in the Games. Thus, most of the athletes have experienced ADAMAS doping tests as well as their educational programs. Green (1991) recommends a formula $N \geq 50 + 8$ m calculation for the regression analysis, where m is the number of predictor variables in determining the appropriate sample size. Based on the formula, this study's minimum sample size is (50 + 3X5) = 65 respondents. A final valid data of 62 athletes representing various states and universities have been obtained, representing a response rate of 95.4%.

This research adapted the 19 question items from Murofushi et al. (2018) and Backhouse and McKenna (2012). The questionnaire used in this study had two main sections: Section A was about respondents' demographic background, and Section B collected data on the study's independent and dependent variables. Questions in Section B were designed on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Data were

analyzed using IBM Statistical Packages for Social Sciences (SPSS) version 26.0 software. To test the normality of the data, the researchers depend on the value of skewness and kurtosis.

According to Kline (2005), the skewness value should fall within the range of -3 to +3, while for kurtosis, the range of -10 to +10 needs to be assumed. Then, the reliability of the instruments was measured based on Cronbach's Alpha, where when the Cronbach Alpha value is between 0.6 and 1, it shows that all items have high reliability (Sekaran & Bougie, 2016). Pearson correlation was used to test the hypothesis and determine the relationship between the dependent and independent variables. Finally, multiple regression is run to determine the primary determinant influencing the effectiveness of the ADAMAS anti-doping educational program.

RESULTS AND DISCUSSION

Table 2 shows the frequencies and the percentage of respondents. This study's total number of participants was 62, whereby 36 (58.1%) were female and 26 (41.96%) were male. The frequency and percentage of age show that the highest number of respondents in this study were aged 18 to 23, with 42 (67.7%), followed by 24 to 29 years old, 20 (32.3%). An examination of the highest level of education showed that most respondents received a Diploma qualification (n=30, 48.4 %), followed by Secondary School, 24 (38.7%), and bachelor's degree, 8 (12.9%). Next, in terms of the level of sports participation, the highest at the international level, with 32 respondents (51.6%), followed by the National level, 26 (41.9%), and the State level, 4 (6.5%).

Table 2: Profile of the Respondents

Profile		Frequency (n)	Percent (%)
Gender	Male	26	41.9
	Female	36	58.1
Age	18-23	42	67.7
	24-29	20	32.3
	30 and above	0	0
Highest educational level	Secondary School	24	38.7
	Diploma	30	48.4
	Bachelor's Degree	8	12.9
	Master's degree	0	0
	Certificate	0	0
Level of sport participation	State	4	6.5
	National	26	41.9
	International	32	51.6

The normality test of the data distribution was measured using the criteria of skewness and kurtosis, and the analysis results found that the skewness and kurtosis values were normally distributed (see Table 3). The reliability test results also found that the instrument reached a reasonable and acceptable level of reliability, exceeding 0.60 (Sekaran & Bougie, 2016).

Table 3: Normality & Reliability Results

Variable	Mean	SD	Skewness	Kurtosis	Cronbach's Alpha
Independent Variable:					
Knowledge	3.59	0.81	-0.20	0.12	0.64
Awareness	3.99	0.65	-0.61	0.55	0.83
Education	4.13	0.61	-0.71	0.42	0.87
Dependent Variable:					
Effectiveness of ADAMAS anti-doping educational program	4.95	1.02	-0.29	-1.280	0.98

Table 4: Pearson Correlation Results

		Effectiveness of ADAMAS Anti-Doping Educational Program
Knowledge	Pearson Correlation	0.252*
	Sig. (2-tailed)	0.048
	N	62
Awareness	Pearson Correlation	0.547**
	Sig. (2-tailed)	.000
	N	62
Education	Pearson Correlation	0.541**
	Sig. (2-tailed)	0.000
	N	62

Based on Table 4, correlation analysis discovered that there is a significant relationship between knowledge (r =0.252, p < 0.05), awareness (r =0.547, p < 0.000), and education (r =0.541, p<0.000) towards the effectiveness of ADAMAS anti-doping educational program. Therefore, all hypotheses were accepted.

Table 5: Regression Results

Variable	Beta *(β)*	Sig. *(p)*	Tolerance	VIF
Knowledge	0.110	0.324	0.897	1.115
Awareness	0.343	0.018	0.549	1.822
Education	0.277	0.064	0.508	1.968
R^2	0.365			
Adjusted R^2	0.333			
F Change	11.132			
Sig	0.000			

Based on Table 5, the tolerance value and variance inflation factor (VIF) value calculation show no element of multicollinearity between independent variables. Then, regression analysis showed that independent variables significantly predicted the effectiveness of the ADAMAS anti-doping educational program with an adjusted R^2 value of 33.3%. The ANOVA generated in this test also shows a significant probability value (p=0.000) and signifies that knowledge, awareness, and education significantly affect the effectiveness of the ADAMAS anti-doping educational program. Table 3 also depicts that awareness (β=0.343, p=0.018) explains a high degree of the effectiveness of the ADAMAS anti-doping educational program.

Sport is a medium that can foster community unity. The abuse of prohibited substances or doping among athletes often dominates the sports landscape. Athletes should not be involved in doping because it will profoundly impact their careers. Every athlete, coach, and medical group should be aware and not be involved in abusing banned substances. Based on correlation analysis, this study finds significant relationships between knowledge, awareness, and education toward the effectiveness of the ADAMAS anti-doping educational program. The study also found that awareness explains a high degree of the effectiveness of the ADAMAS anti-doping educational program. The results were consistent with those of previous studies, such as Samira and Shima (2014), Lim et al. (2018), and Rintaugu and Mwangi (2021).

As implications, the researchers suggest that the government and ADAMAS raise the issue of doping among athletes by expanding to other mediums such as social media, radio, and television. Athletes are advised to seek the advice of a certified sports medicine practitioner if they need help with any health issues. Moreover, this study also advises the ADAMAS to divide educational programs into three main groups, namely, 1) those who have never abused drugs, 2) those who sometimes abuse drugs, and 3) those who are drug addicts. ADAMAS anti-doping education programs must also be based on knowledge, attitude, and value approaches. The scare tactics strategy, such as posters, brochures, and pamphlets on the effect of using doping, could be employed to create a feeling of fear towards drug use. This strategy delivers knowledge about drugs and their effects, focusing on the adverse effects of drug use. In addition, the description and awareness of drug abuse can be conveyed through lectures, small discussions, film screenings, exhibitions, and mass media. Furthermore, ADAMAS also needs to cooperate with the National Library of *Dewan Bahasa and Pustaka* to offer a variety of valuable and reliable materials, such as print and electronic books on substance abuse issues.

Moreover, the public society, as well as sports peers and coaches, also need to be alert and aware of the several marks or symptoms of drug abuse, such as 1) attitude mark (e.g., absence without explanation or decreased performance, and extreme or frequently changing emotions mood), 2) physical signs (e.g., unusual health issues, chronic fatigue, poor body coordination, and red eyes or runny nose), and 3) environmental indications (e.g., unusual containers or packages that looks like a drug, and unusual odor from clothes or breath). ADAMAS has welcomed any report on doping misconduct that occurs among athletes. This whistleblower policy aligns with the initiatives of the World Anti-Doping Agency. The sports association and council, coaches, public authorities, and NGOs are encouraged to support ADAMAS programs. For instance, the Physiotherapy Unit of the Terengganu State Sports Council has organized a briefing on Anti-Doping Awareness for the SUKMA XX 2020 contingent. This program aims to provide early awareness and education about the current issue of doping among athletes. In summary, anti-doping education programs are necessary to cater to athletes, sportspersons, and various layers of society.

CONCLUSION

Doping or drug abuse in sports is the use of drugs or prohibited substances to improve the performance of sports athletes. This issue is not new and has been haunting the community of members and sports fans for a long time.

Abuse of prohibited substances or methods in sports can cause harm to various parties, especially to individuals who abuse the substance. Several factors lead to the use of prohibited substances among athletes, including increasing energy and controlling emotional stress during competition. The Malaysian Anti-Doping Agency (ADAMAS) is an agency that carries out anti-doping tests at all sports levels. Athletes participating in sports tournaments must undergo doping tests throughout the tournament. Failing a doping test not only results in an athlete's victory revocation. Athletes can also be suspended from participating in sports tournaments if they are found guilty of using banned substances.

Hence, ethical issues should not be taken for granted because only athletes who have honesty and sincerity in the competition can perform competitively without being contaminated by illegal drugs. Managerially, the findings deliver insight to the ADAMAS and practitioners on reasonably employing educational approaches such as advertising, seminars, and campaigns to maximize athletes' understanding of anti-doping. However, some limitations need to be improved in this research. First, the study conducted used a cross-sectional design. Hence, the relationship pattern only portrays a moment describing relationships during data collection. It is recommended that future research be conducted using the longitudinal method to determine the proposed model's stability. Second, this study used an online survey to collect data on a small-scale sample. Therefore, further investigation should consider a large-scale sample size to improve generalization. Third, future research is encouraged to extend the current model since the current model limits the comprehensive view of the literature on anti-doping programs.

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REFERENCES

Anti-Doping Agency of Malaysia (ADAMAS) (2022). Jumlah Ujian Urin Dalam Sukan. Retrieved from https://www.adamas.gov.my/ms/ujian/jumlah-ujian-urin-dalam-sukan.html

Adami, P. E., Koutlianos, N., Baggish, A., Bermon, S., Cavarretta, E., Deligiannis, A., ... & Papadakis, M. (2022). Cardiovascular effects of doping substances, commonly prescribed medications, and ergogenic aids about sports: A position statement of the sport cardiology and exercise nucleus of the European Association of Preventive Cardiology. *European Journal of Preventive Cardiology, 29*(3), 559-575.

Aguilar-Navarro, M., Salinero, J. J., Muñoz-Guerra, J., Plata, M. D. M., & Del Coso, J. (2020). Sport-specific use of doping substances: Analysis of World Anti-doping Agency doping control tests between 2014 and 2017. *Substance Use & Misuse, 55*(8), 1361-1369.

Aizawati, A. (2022). Kes Doping Sukma: Skrip Lama Berulang Lagi. Retrieved from https://www.utusan.com.my/sukan/2022/09/kes-doping-sukma-skrip-lama-berulang-lagi/

Aljaloud, S. O., Khoshhal, K. I., Al-Ghaiheb, A. A., Konbaz, M. S., & Almasaed, A. A. (2020). The prevalence of doping among Saudi athletes: Results from the National Anti-Doping Program. *Journal of Taibah University Medical Sciences, 15*(1), 19-24.

Anshel, M. H., & Russell, K. G. (1997). Examining athletes' attitudes toward using anabolic steroids and their knowledge of the possible effects. *Journal of Drug Education, 27*(2), 121–145.

Backhouse, S. H., & McKenna, J. (2012). Reviewing coaches' knowledge, attitudes, and beliefs regarding doping in sport. *International Journal of Sports Science & Coaching, 7*(1), 167–175.

Barkoukis, V., Brooke, L., Ntoumanis, N., Smith, B., & Gucciardi, D. F. (2019). The role of the athletes' entourage on attitudes to doping. *Journal of Sports Sciences, 37*(21), 2483-2491.

Barkoukis, V., Mallia, L., Lazuras, L., Ourda, D., Agnello, S., Andjelkovic, M., ... & 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.

Chiang, L. M., Shamsuddin, A. F., & Mahmood, T. M. T. (2018). Knowledge, attitude, and practice on doping of Malaysian student athletes. *Asian Journal of Pharmaceutical and Clinical Research, 11*(5), 72–76.

Docter, S., Khan, M., Gohal, C., Ravi, B., Bhandari, M., Gandhi, R., & Leroux, T. (2020). Cannabis use and sport: A systematic review. *Sports Health, 12*(2), 189-199.

Engelberg, T., Moston, S., & Blank, C. (2019). Coaches' awareness of doping practices and knowledge about anti-doping control systems in elite sport. *Drugs: Education, Prevention and Policy, 26*(1), 97-103.

Fogaca, J. L. (2021). Combining mental health and performance interventions: Coping and social support for student-athletes. *Journal of Applied Sport Psychology, 33*(1), 4-19.

Gilberg, R., Breivik, G., & Loland, S. (2020). Anti-doping in sport: The Norwegian perspective. In *Doping in Sport* (pp. 158-177). Routledge.

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research, 26*, 499–510.

He, E. (2022). What does ROC stand for? And why did Russia get banned from the Olympics? Retrieved from https://www.nbcolympics.com/news/what-does-roc-stand-and-why-did-russia-get-banned-olympics#:~:text=In%202019%2C%20the%20World%20Anti,%2C%20state%2Dsponsored%20doping%20scheme.

Henning, A., & Dimeo, P. (2022). *Doping: A Sporting History*. Reaktion Books.

Hurst, P., Schipof-Godart, L., Szabo, A., Raglin, J., Hettinga, F., Roelands, B., ... & Beedie, C. (2020). The placebo and nocebo effect on sports performance: A systematic review. *European Journal of Sport Science, 20*(3), 279–292.

Johnston, S. A., Roskowski, C., He, Z., Kong, L., & Chen, W. (2021). Effects of team sports on anxiety, depression, perceived stress, and sleep quality in college students. *Journal of American College Health, 69*(7), 791-797.

Juma, B. O., Woolf, J., & Bloodworth, A. (2022). The challenges of anti-doping education implementation in Kenya: Perspectives from athletes and anti-doping educators. *Performance Enhancement & Health, 10*(3), 100228.

Kabiri, S., Shadmanfaat, S. M., & Donner, C. M. (2019). Using control balance theory to examine sports doping among professional athletes in Iran. *Journal of Drug Issues, 49*(3), 493-511.

Kaplánová, A. (2019). Self-esteem, anxiety, and coping strategies to manage stress in ice hockey. *Acta Gymnica, 49*(1), 10-15.

Kline, R. B. (2005). *Principles and Practice of Structural Equation Modelling* (2nd ed.). New York: Guilford Press.

Krishnan, A., Datta, K., Sharma, D., Sharma, S. D., Mahajan, U., Jhajharia, S., & Yadav, M. (2022). Survey of anti-doping knowledge, attitudes, and practices amongst elite Indian sportsmen and the way forward. *Medical Journal Armed Forces India, 78*(1), 88–93.

Lim, M., C., Ahmad, F., S., & Tuan, M., T., M. (2018). Knowledge, attitude, and practice on doping of Malaysian student athletes. *Journal of Pharmaceutical and Clinical, 5*(2) 1-10.

Masucci, M. A., Butryn, T. M., & Johnson, J. A. (2019). Knowledge and perceptions of doping practices and anti-doping education among elite North American female triathletes. *Performance Enhancement & Health, 6*(3-4), 121-128.

Ministry of Youth and Sports of Malaysia (2021). Visi Sukan Negara 2030 (VSN 2030). Retrieved from https://vsn2030.my/pdf/VSN2030-Blueprint.pdf

Montague, J. (2012). Hero or Villain? Ben Johnson and the Dirtiest Race in History. Retrieved from https://edition.cnn.com/2012/07/23/sport/olympics-2012-ben-johnson-seoul-1988-dirtiest-race/index.html

Murofushi, Y., Kawata, Y., Kamimura, A., Hirosawa, M., & Shibata, N. (2018). Impact of anti-doping education and doping control experience on anti-doping knowledge in Japanese university athletes: A cross-sectional study. *Substance Abuse Treatment, Prevention, and Policy, 13,* 1-15.

Nicholls, A. R., Fairs, L. R., Plata-Andrés, M., Bailey, R., Cope, E., Madigan, D., ... & Chanal, B. (2020). Feasibility randomized controlled trial examining the effects of the Anti-Doping Values in Coach Education (ADVICE) mobile application on doping knowledge and attitudes towards doping among grassroots coaches. *BMJ Open Sport & Exercise Medicine, 6*(1), e000800.

Pöppel, K. (2021). Efficient ways to combat doping in a sports education context. A systematic review on doping prevention measures focusing on young age groups. *Frontiers in Sports and Active Living, 3*, 673452.

Qvarfordt, A., Ahmadi, N., Bäckström, Å., & Hoff, D. (2021). Limitations and duties: Elite athletes' perceptions of compliance with anti-doping rules. *Sport in Society, 24*(4), 551-570.

Rice, S. M., Gwyther, K., Santesteban-Echarri, O., Baron, D., Gorczynski, P., Gouttebarge, V., ... & Purcell, R. (2019). Determinants of anxiety in elite athletes: A systematic review and meta-analysis. *British Journal of Sports Medicine, 53*(11), 722–730.

Rintaugu, E., G., & Mwangi, F., M. (2020). Knowledge, attitudes, and perceptions on doping among university students in physical education and sport science-related degree programs. *Journal of Human Sport and Exercise, 1*(1),1-13.

Samira, A., & Shima, H. (2014). The relation between awareness, attitude, and the amount of doping substances and illegal supplements in bodybuilders of Sanandaj, Iran. *Journal of Business and Management, 4*(3), 1-9.

Schneider, A. J., & Hong, F. (Eds.). (2020). *Doping in Sport: Global Ethical Issues*. Routledge.

Sekaran, U., & Bougie, R. (2016). *Research Methods for Business: A Skill Building Approach*. John Wiley & Sons.

Tamminen, K. A., Kim, J., Danyluck, C., McEwen, C. E., Wagstaff, C. R., & Wolf, S. A. (2021). The effect of self-and interpersonal emotion regulation on athletes' anxiety and goal achievement in competition. *Psychology of Sport and Exercise, 57*, 102034.

Woolf, J. J. R. (2020). An examination of anti-doping education initiatives from an educational perspective: Insights and recommendations for improved educational design. *Performance Enhancement & Health, 8*(2-3), 100178.