IOSR Journal of Sports and Physical Education (IOSR-JSPE)
e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 10, Issue 4, (July. – August. 2023), PP 07-13
www.iosrjournals.org

Doping Knowledge, Attitudes and Practices of Athletes in Sri Lanka

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Abstract
This study aimed to assess the knowledge level, attitudes and practices of Sri Lankan national athletes towards doping and to study the influence of selected demographic factors on athletes' knowledge, attitudes and practices toward doping. A total of 308 athletes in national-level teams participated in the study. A self-administered questionnaire was used to gather data. Mean knowledge and attitude scores of athletes representing different sex, sports categories, age groups, achievement levels and education levels were compared. Pearson correlation was utilised to investigate the relationship between athletes' knowledge and attitudes toward doping. The overall mean scores for knowledge and attitudes of participants toward doping were 41.1% and 48.1, respectively. Mean knowledge scores of athletes were significantly affected by sports types, chronological age, highest sports achievement and education level ($p<0.05$). Athlete's sports types, highest sports achievement and education level had a significant effect ($p<0.05$) on attitudes toward doping. There was a weak negative correlation between athletes' knowledge level and performance enhancement attitude scale score. It can be concluded that the participants' knowledge of doping is inadequate, especially in the areas of prohibited substances, side effects, methods and practices, testing procedures and supplement quality. Further, the participants showed less permissive attitudes towards doping. The sports type, educational level and highest sports achievement significantly influenced athletes' doping knowledge as well as attitudes toward doping. Doping educational programmes targeting athletes belonging to different sports, education levels and achievement levels are needed to enhance the doping knowledge of national-level athletes while improving their attitudes toward doping.

Keywords— *Doping, Doping Attitude, Doping Knowledge, Doping Practices, Doping in Sri Lanka, PEAS*

Date of Submission: 26-06-2023 Date of Acceptance: 06-07-2023

I. INTRODUCTION

The use of various substances to enhance athletic performance can be traced back to the 3rd century BC (Chiang et al., 2018). Empirical studies reveal that between the 1970s and 1990s, certain countries administrated programmes to dope their athletes to win more medals at international competitions. Human growth hormone, amphetamines, and testosterone were the most frequently used substances under such programmes (Kim & Kim, 2017; Morente-Sánchez et al., 2014; Morente-Sánchez & Zabala, 2013; Pitsch et al., 2007). According to the World Anti-Doping Agency (WADA), the total percentage of adverse analytical findings (AAF) in 2020 was 0.67% (1,009 AAFs from 149,758 samples tested). However, studies suggest that WADA figures underestimate and the extent of doping in sports could be 25% or higher(Houlihan et al., 2019).The use of illicit substances in sports has been recorded in Sri Lanka since 1995. From 2013 to 2017, out of the 665 Sri Lankan cases that were tested, 20(2.9%) were reported as positive for Anti-doping Rule Violations (ADRV) (Sri Lanka Anti-Doping Agency, 2020).

World Athletics became the first international sports body to ban performance-enhancing substances (PES) use in sports in 1928. Later, in the 1936 Olympic Games, an athlete was disqualified due to using alcohol during the competition (Kim & Kim, 2017). In the 1960 Rome Olympic Games,one athlete died and he was under amphetamines(Chebet, 2014; El-Hammadi & Hunien, 2013; Kremenik et al., 2006). This led the International Olympic Committee (IOC) to bring forward a policy to control PES in sports (Morente-Sánchez & Zabala, 2013).Consequently, the World Anti-Doping Agency (WADA) was established in 1999 to promote and coordinate the activities against doping in sports internationally. In its attempts to create a doping-free sporting environment, WADA oversees several key activities including scientific research, education, development of anti-doping capacities, and monitoring of the World Anti-Doping Code (WADA, 2019). Sri Lanka Anti-Doping Agency (SLADA), which was established through the Convention against Doping in Sport Act, No. 33 of 2013, serves as the national authorized institute that acts against doping practices in Sri Lanka.

It has been suggested that doping prevention strategies should address the root cause of the problem through proper education. Hence, dopingeducation programmes conducted by WADA are thought to play an

important role in creating a doping-free sports culture. Athletes' current doping knowledge level could be used as the baseline for developing effective education programmes. Moreover, doping attitudes and behaviour have been identified as strong predictors of athletes' intention to use doping(Chiang et al., 2018; Morente-Sánchez et al., 2019; Morente-Sánchez & Zabala, 2013). Thus, it is important to have an understanding of athletes' knowledge, attitudes and practices toward doping to develop effective doping prevention programmes.

Several studies have been carried out worldwide focusing on athletes' knowledge, attitudes and practices of doping(Chebet, 2014; Chiang et al., 2018; Kim & Kim, 2017; Morente-Sánchez & Zabala, 2013; Vankhadlo & Planida, 2013). Although there is a positive trend toward athletes seeking to increase their knowledge of PES and doping, their knowledge is inadequate, especially in the areas of doping substances and methods, their potential negative side effects and ADRV(Ama et al., 2003; Anshel & Russell, 1997; Blank et al., 2015; Butryn, 2012; Jurisic & Sattler, 2015; Siswa, 2014). Further, it has been reported that athletes tend to use PES if they knew they would not get caught(Chiang et al., 2018).

However, only a limited number of studies have been carried out in Sri Lanka focusing onPES and doping. To devise effective doping prevention mechanisms, it is important to have a comprehensive understanding ofthedoping knowledge,attitudes and practices of athletes representing different demographic segments. Therefore, the present study aimed to assess the knowledge level, attitudes, and general practices of doping among Sri Lankan athletes representing national teams,and to study the influence of sport type, chronological age, gender, achievement level, training age and the education level on athletes' knowledge and attitudes toward doping.

II. METHODOLOGY

Participants

This study was conducted as a cross-sectional survey involving athletes representing national-level teams of Sri Lanka. If a national team did not exist for any given sport, the National Championship-winning team was considered. The sports teams included in the study were: Athletics, Badminton, Basketball, Bodybuilding, Cricket, Football, Gymnastics, Judo, Karate, Netball, Rugby, Swimming, Table Tennis, Taekwondo, Wrestling, Weightlifting and Powerlifting. A total of 453 athletes were approached of which, 308 athletes provided complete responses, resulting in a response rate of 68%.

Instruments

A self-administered questionnaire consisting of four parts was used for data collection. Part I of the questionnaire focused on demographic data of participants such as sports, chronological age, sex, the highest sports achievement during 2014-2018, training age and the highest educational qualification. Part II was developed by combining a questionnaire from a previous study (Jurisic & Sattler, 2015) and WADA Quiz (WADA, 2018), and comprised questions constructed under a dichromatic scale (1-Correct, 0-No idea/incorrect) to assess the participants' knowledge about doping. Part II comprised five sub-categories related to doping knowledge: testing procedures, athletes' rights and responsibilities, supplement quality trust, sanctions, and prohibited substances, side effects, methods, and practices. Part III had questions about general practices whereas Part IV contained questions from the Performance Enhancement Attitude Scale (PEAS) which measured the participants' attitude towards doping. PEAS is a standard questionnaire of a 6-point Likert scale (1-Strongly disagree, 2-Thorough disagree, 3-Slightly disagree, 4-Slightly agree, 5- Agree, 6- Strongly agree)(Petróczi & Aidman, 2009).Petróczi and Aidman (2009) examined the reliability of PEAS using nine independent studies and reportedthat Cronbach's alpha values ranged from 0.71 to 0.91, which is indicative of good internal consistency.

Data Collection

Permission from the Ministry of Sports and the particular National Sports Federations was obtained to approach National players to gather data for the study. The anonymity of the participants was guaranteed and the approval of each participant was obtained through a written informed consent form before data collection. The participants were then interviewed individually and were instructed to fill out the questionnaire.

Statistical Analysis

An Independent sample T-test was used to compare the mean knowledge and attitude scores of male and female athletes. One-Way Analysis of Variance (ANOVA) was used to compare the mean knowledge and attitude scores of athletes based on the sport type, chronological age, training age, highest sports achievement and educational level. Whenever there were significant differences among mean values, Tukey's posthoc test was utilised to separate mean scores. The Pearson correlation test was utilised to investigate the relationship between athletes' knowledge and attitudes towards doping. The significance level was set at 5% for all analyses.

SPSS version 22.0 was utilised for the statistical analysis of the study. As the General Practices questions consist of polar questions (Yes/No), descriptive analysis is presented.

III. RESULTS AND DISCUSSION

Results

The overall mean knowledge score of participants was 41% which is below the mid-point of 50%. Thus, the overall knowledge of athletes about doping is inadequate. Table 1 summarises the overall mean knowledge scores obtained by the participants for each of the five sub-categories focused on different areas of doping knowledge. Results show that the participants have inadequate knowledge about testing procedures, supplement quality and prohibited substances, side effects, methods and practices (mean scores <50%). Table 2 summarises the mean doping knowledge scores of the participants based on demographic characteristics.

The knowledge scores of athletes did not differ significantly ($P>0.05$) based on gender and training age (Table 2). However, there were significant differences ($P<0.05$) in the mean knowledge scores of athletes representing different sports, chronological ages, levels of achievements, and education levels. Concerning the type of sport, the doping knowledge score of gymnasts and weight-training sports athletes were significantly greater than that of athletes representing all other sports ($P<0.05$). It was also evident that the doping knowledge of athletes improved with the increase in their chronological age. The highest knowledge scores were recorded in athletes of 35 years or above, whereas no differences were observed among athletes of all other age categories. Concerning educational level, the knowledge scores of Diploma and/or other professional qualification holders were greater ($P<0.05$) than those of athletes who have completed their education up to Grade 13 or below. Furthermore, only the Olympians obtained a doping knowledge score above 50%.

The Cronbach's internal consistency coefficient for the PEAS of the present study was 0.845, indicating an acceptable level of reliability. Concerning the participants' attitudes toward doping, the overall mean PEAS score of the subjects was 48.1. Table 3 summarises the mean PEAS scores of the participants based on demographic characteristics. Greater PEAS scores are indicative of more permissive/lenient attitudes toward doping. The mean PEAS score did not differ significantly ($P>0.05$) based on sex, chronological age and training age (Table 3). However, there were significant differences ($P<0.05$) in PEAS scores of athletes representing different sports, levels of achievements, and education levels (Table 3). Athletes representing gymnastics showed lower ($P<0.05$) PEAS scores compared to those representing athletics, ball games, martial arts, swimming, weight-training sports and cricket. It was also evident that athletes' attitudes toward doping improved with the level of achievements and education level. Olympians had significantly lower PEAS scores compared to athletes who competed in South Asian Championships, South Asian Games and Asian/Commonwealth Championships. Further, athletes who completed their tertiary education showed significantly lower PEAS scores compared to athletes who continued their education up to Grade 11 and Grade 13.

A Pearson correlation analysis was carried out to determine the relationship between the doping knowledge scores and the attitudes of the participants. Results revealed that there is a weak negative correlation between knowledge scores and PEAS scores ($r=-0.209$, $P=0.000$) of the participants.

Participants' responses to questions on doping practices and doping awareness programmes are summarised in Table 4. Of the athletes who participated in this study, 26.3% participated in a doping test. Only 6.8% of the participants admitted that they have used banned PES/methods or had an intention to use doping. Furthermore, 32.8% of athletes reported that they either know or suspect athletes in their communities who have used doping substances/methods. However, of the participants who knew/suspected athletes exposed to doping, only 15.8% reported having attempted to make a complaint to SLADA about the incidence of doping (Table 4).

Mean PEAS scores of athletes who answered "Yes" and "No" to the question "Have you ever used banned PES/methods or had the intention to use doping?" were calculated and the scores were 57.2 and 47.5, respectively. Similarly, the mean PEAS scores of athletes who answered "Yes" and "No" for the question "Do you know or suspect about any athletes in your sport/event who have used doping?" were 49.2 and 47.6, respectively (Table 4).

Concerning the awareness programmes, 58.8% of athletes have participated in awareness programmes out of which, the majority (92.8%) thought that the awareness programmes helped to improve their knowledge of doping. The mean knowledge score of athletes who have participated in SLADA awareness programmes was 42.6% whereas the mean knowledge score of those who have not participated in awareness programmes was 39.1% (Table 4). The different numbers of athletes in each sports group may affect the findings. However, the majority of groups contained large sample sizes, One-Way Variance of the Analysis test was fair to examine the statistical differences(Bonett, 2002).

Table 1. Mean doping knowledge scores of Sri Lankan National team sports athletes

Sub-category	**Mean knowledge score (%)**
Testing procedures	38.6
Athletes'rights and responsibilities	63.8
Supplement quality trust	41.2
Sanctions	66.9
Prohibited substances, side effects, methods and practices	33.9

Table 2. Mean doping knowledge scores of Sri Lankan National team sports athletes based on different demographic factors

Category	**N**	**Knowledge Score (%)***	***P*-value****
Sport Type			0.000
Athletics	123	43.8 ± 19.7[a]	
Ball games	43	29.7 ± 21.5[a]	
Martial arts	39	41.2 ± 15.7[a]	
Swimming	36	35.7 ± 13.6[a]	
Racket sports	22	37.5 ± 16.9[a]	
Weight training sports	18	61.1 ± 14.6[b]	
Cricket	18	33.7 ± 18.3[a]	
Gymnastics	9	63.2 ± 11.9[b]	
Gender			0.174
Female	106	41.0 ± 18.6	
Male	202	41.1 ± 20.4	
Chronological Age			0.000
Age 19 ≥	95	38.4 ± 19.1[a]	
Age 20-24	104	39.0 ± 17.5[a]	
Age 25-29	74	41.6 ± 20.9[a]	
Age 30-34	22	47.7 ± 24.4[a]	
Age 35≤	13	62.5 ± 10.8[b]	
Training Age			0.069

Year 5≥	74	39.5 ± 19.5	
Year 6-10	80	46.1 ± 17.9	
Year 11-15	80	39.1 ± 21.1	
Year 16≤	74	39.2 ± 19.9	
Highest Sports Achievement			0.029
Nationals	71	41.8 ± 21.9[a,b]	
South Asian Championships	95	36.4 ± 19.7[a]	
South Asian Games	20	42.2 ± 18.2[a,b]	
Asian/Commonwealth Championships	40	46.4 ± 17.8[a,b]	
Asian/Commonwealth Games	29	45.0 ± 15.7[a,b]	
World Cup/ Championships	47	39.8 ± 19.8[a,b]	
Olympic Games	6	57.3 ± 11.5[b]	
Education Level			0.000
Below Grade 11	11	37.0 ± 18.0[a]	
Up to Grade 11	34	34.0 ± 17.3[a]	
Up to Grade 13	149	37.8 ± 19.7[a]	
Diploma/Professional qualification	41	52.0 ± 18.3[b]	
Bachelor's Degree or higher	73	45.7 ± 19.0[a,b]	

[*]Values are expressed as Mean ± Standard Deviation.

[**]*P*-value (ANOVA) obtained for comparison of subgroups among each category

[a,b,c]Dissimilar superscripts indicate differences (*P<0.05)* in mean values within the same category.

Table 3. Mean Performance Enhancement Attitude Scale (PEAS) scores of Sri Lankan National team sports athletes based on different demographic factors

Category	**N**	**PEAS Score***	***P*-value**[**]
Sport Type			0.001
Athletics	123	48.5 ± 13.4[b,c]	
Ball games	43	46.8 ± 9.3[b,c]	
Martial arts	39	50.2 ± 13.4[b,c]	
Swimming	36	49.3 ± 15.9[b,c]	
Racket sports	22	42.9 ± 16.8[a,b]	
Weight training sports	18	57.3 ± 9.6[c]	
Cricket	18	46.6 ± 11.0[b,c]	

Gymnastics	9	33.8 ± 14.3[a]	
Gender			0.664
Female	106	44.7 ± 13.0	
Male	202	50.0 ± 13.3	
Chronological Age			0.060
Age 19 ≥	95	51.2 ± 12.4	
Age 20-24	104	45.8 ± 14.7	
Age 25-29	74	47.7 ± 12.7	
Age 30-34	22	45.5 ± 12.1	
Age 35≤	13	51.4 ± 13.8	
Training Age			0.143
Year 5≥	74	50.5 ± 11.6	
Year 6-10	80	45.5 ± 13.7	
Year 11-15	80	48.8 ± 13.8	
Year 16≤	74	47.8 ± 14.3	
Highest Sports Achievement			0.000
Nationals	71	46.0 ± 13.4[a,b]	
South Asian Championships	95	52.7 ± 11.0[b]	
South Asian Games	20	49.7 ± 13.9[b]	
Asian/Commonwealth Championships	40	49.5 ± 13.5[b]	
Asian/Commonwealth Games	29	41.3 ± 12.1[a,b]	
World Cup/Championships	47	46.0 ± 15.5[a,b]	
Olympic Games	6	35.7 ± 12.9[a]	
Education Level			0.015
Below Grade 11	11	48.0 ± 10.5[a,b]	
Up to Grade 11	34	50.7 ± 10.1[b]	
Up to Grade 13	149	50.0 ± 12.7[b]	
Diploma/Professional qualification	41	47.0 ± 12.8[a,b]	
Bachelor's Degree or higher	73	43.7 ± 16.0[a]	

[*]Values are expressed as Mean ± Standard Deviation.

[**]*P*-value (ANOVA) obtained for comparison of subgroups among each category

[a,b,c]Dissimilar superscripts indicate differences (*P<0.05)* in mean values within the same category.

Table 4. Sri Lankan National team sports athletes' responses to questions on doping practices and awareness programmes

Have you ever participated in a doping test? (n = 308)	
Yes	81 (26.3%)
No	227 (73.7%)
Have you ever used banned performance-enhancing substances/methods or had an intention to use doping? (n = 308)	
Yes (Mean PEAS score = 57.2)	21 (6.8%)
No (Mean PEAS score = 47.5)	287 (93.2%)
Do you know or suspect any athlete in your sport/event is doping? (n= 308)	
Yes (Mean PEAS score = 49.2)	101 (32.8%)
No (Mean PEAS score = 47.6)	207 (67.2%)
Have you ever informed/complained to SLADA/your Sports Federation/Organization about athletes in your sport/event who have used doping? (n = 101)	
Yes	16 (15.8%)
No	85 (84.1%)
Have you participated in educational awareness programmes conducted by SLADA? (n = 308)	
Yes (Mean knowledge score = 42.6%)	181 (58.8%)
No (Mean knowledge score = 39.1%)	127 (41.2%)
Do you think SLADA programmes helped to improve your knowledge? (n = 181)	
Yes	168 (92.8%)
No	13 (7.2%)

Discussion

The present study revealed that the doping knowledge of Sri Lankan National-level athletes is insufficient. Previous studies have reported that the mean knowledge scores of Ugandan, Polish and Kenyan athleteswere 37.7%, 45.2% and 46.4%, respectively. Therefore, it can be assumed that the athletes' knowledge about doping ranges from 35% to 47% in general (Chebet, 2014; Muwonge et al., 2015) and insufficient knowledge about doping is common (Kim & Kim, 2017).

The present study showed that the type of sport had a significant effect on the doping knowledge of athletes. Similarly, some studies have shown that there were significant differences between the doping knowledge of individual and team sports athletes (Kim & Kim, 2017). The knowledge score of athletes engaged in gymnastics and weight-training sports was significantly higher than that of athletes representing other sports. Athletes other than gymnasts and weight-training sports athletes who participated in this study had insufficient knowledge of doping (mean scores of less than 50%).

This study further revealed that athletes' sex does not significantly affect the doping knowledge of athletes. The reason for this observation may be because all athletes train together and both male and female

athletes receive similar attention and opportunities from authorities to become educated about doping. In the Sri Lankan sporting context, female athletes have the same competitive environment as male athletes, which may be the reason for similar knowledge scores observed for both groups. A similar result was recorded by(Fürhapter et al., 2013), where gender does not affect the knowledge of Austrian junior athletes about doping. However, two studies carried out in Kenya note that male athletes score higher in doping knowledge compared to female athletes(Blank et al., 2015; Chebet, 2014; Reardon & Creado, 2014).

In this study, athletes aged 35 years or above were identified as the highest knowledgeable category about doping. This observation could be explained by the fact that with age, the athletes are getting better exposed to more information, resulting in increased awareness. Similarly, Austrian elite junior athletes report that their knowledge about doping is at a moderate level and it shows that when athletes become mature, their age has a positive influence on doping knowledge (Fürhapter et al., 2013). The training age did not have a significant effect on the knowledge scores of athletes who participated in this study. In contrast to these results, a Canadian study reveals that there is a knowledge gap between neo-pro triathletes and seasoned triathletes. Neo-pro players have shown lesser knowledge about doping compared to seasoned players(Butryn, 2012). Similarly, a Polish study notes that athletes with training ages over 5 years show a slightly higher mean knowledge score compared to athletes who have been training for less than 5 years (WADA, 2018).

The study shows Olympians had higher scores on doping knowledge (57.3%) compared to other athletes. Further, no significant differences were observed among athletes participating in National and International-level competitions other than the Olympics (P>0.05). A study on Croatian athletes reports that Olympic Games sailing athletes and their coaches have higher knowledge scores compared to non-Olympic level sailors and coaches(Jurisic & Sattler, 2015), which is in agreement with our findings. Further, a Kenyan study states that the knowledge about PES is significantly different among athletes representing different competition levels. However, another Kenyan study reports contradictory results showing that the experience does not significantly affect athletes' knowledge of doping (Chebet, 2014; Reardon & Creado, 2014). Concerning educational qualifications, athletes who have a higher education background possessed greater mean knowledge scores compared to athletes who have completed only secondary studies. Previous studies have also shown that the educational level has a significant effect on the knowledge of athletes about doping. In Kenya, the importance of educating school-level athletes about doping and its prevalence has been extensively discussed because school-level athletes will become elite athletes in the future (Chebet, 2014).

The PEAS measures the respondents' attitudes toward doping. High PEAS scores reflect more permissive attitudes toward doping (Petróczi & Aidman, 2009). The overall mean PEAS score of the subjects who participated in this study was 48.1, which was below the theoretical mid-point of 59.5. However, the mean PEAS score of the athletes who participated in this study was slightly higher compared to the results of several previous empirical studies. A study on South Korean athletes reveals that their overall PEAS score is 39.1±12.8 whereas, in a study conducted using professional Ugandan athletes, the overall mean PEAS score is 39.8 ± 14.8(Kim & Kim, 2017; Muwonge et al., 2015). Another study of German competitive athletes reports a mean PEAS score of 44.2 (Brand et al., 2014). Hence, the result of this study shows that the Sri Lankan elite athletes who participated in the study show more permissive attitudes toward doping compared to the above studies. Aidman and Petro (2009) mention that doping is rarely an accident. According to Robert (1968), athletes try to fulfil societal goals somehow to be highlighted in society. Hence, athletes tend to use illegal methods to become successful in the field and society (Robert, 1968).

This study further revealed that the PEAS scores of athletes were significantly affected by the type of sports they are engaged in, with weight-training sports athletes having the highest PEAS scores (57.3±9.6) and gymnasts having the lowest PEAS scores (33.8±14.3). A previous study conducted using bodybuilders and handball players reports that their PEAS scores are 56.2 and 44.2, respectively, which are comparable to the findings reported in the present study (Brand et al., 2014). In the present study, no significant differences in PEAS scores were observed among athletes representing athletics, ball games, martial arts, swimming, racket sports, weight training sports and cricket. Similarly, a Kenyan study identifies that the PEAS scores of athletes doing athletics and ball games are not significantly different (Siswa, 2014). In contrast, several previous studies have shown a significant effect of sports type on athletes' attitudes toward doping. Kim and Kim (2017) conclude that adolescent athletes in motor skill-dominant sports such as badminton, fencing, golf and martial arts are more permissive to doping than athletes in the team sports such as football and handball (Kim & Kim, 2017). An Australian study reports that cycling, athletics, rugby and football players have more permissive attitudes towards doping compared to other athletes(*Knowledge of Doping : How Athletes Learn about Doping Rules and Practices Knowledge of Doping : How Athletes Learn about Doping Rules and Practices*, 2014). Similarly, a Ugandan study concludes that there is a difference in mean PEAS scores among athletes engaged in individual sports and team sports (Muwonge et al., 2015). Overall, it can be observed that team sports athletes' attitudes are less prone to doping compared to individual sport athletes and the reason for this observation could be winning orientation is a team effort in team sports.

The current study further revealed that the doping attitudes of athletes were not influenced by gender, which is in agreement with the findings of the majority of previous studies. A study based on parents of Austrian athletes notes that gender does not influence doping attitude (Blank et al., 2015). In studies done on Kenyan, Ugandan, and American athletes, it is reported that gender has no impact on the doping attitudes of athletes (Muwonge et al., 2015; Siswa, 2014). In contrast, Kim and Kim (2017) report that South Korean elite adult and adolescent female athletes had higher (P<0.05) PEAS scores compared to their male counterparts and conclude that female athletes are more prone to doping compared to male athletes (Kim & Kim, 2017).

Both the chronological age and the training age did not significantly affect the PEAS scores of athletes who participated in the present study ($P>0.05$). In support of these findings, Fürhapter et al. (2013)show that age does not influence the doping attitudes of Australian athletes and suggest that this could be because winning is a goal common to athletes of all ages (Fürhapter et al., 2013). In contrast, Kim and Kim (2017) states that South Korean elite adult athletes (PEAS = 40.22) are more permissive to doping attitudes compared to elite adolescent athletes (PEAS = 37.66) (Kim & Kim, 2017). The training age reflects an athlete's maturity in the sport. Our findings suggest that the training age had no impact on the doping attitudes of athletes. In contrast, astudycarriedoutinGermanyreports that bodybuildersengagedincompetitive bodybuildingforan averageof 12.9 yearsaremorepermissivetodopingattitudesthanhandball players engagedin competitive handballforan average of 14years, suggesting that training age may affect doping attitudes of athletes (Brand et al., 2014).

The present study showed significant differences in the doping attitudes of athletes representing different achievement levels. Olympians showed less permissive attitudes toward doping (P<0.05) compared to athletes who participated in South Asian and Asian/Commonwealth Championships. In support of this finding, a qualitative study shows that athletes become more vulnerable to doping during the "transition" period in which they transfer into professional athletes (Butryn, 2012). However, a separate study revealed that Kenyan athletes' doping attitudes are not affected by the level of competition they participated (Siswa, 2014). This study also showed that education level has a significant effect on the doping attitudes of the participants. Athletes who continued tertiary education were less permissive to doping compared to athletes who completed only secondary education. Contradictory to this observation, a previous study on United States athletes shows thatmaleathletes'attitudes become morelenienttowarddopingwhenadvancingincollege(Backhouse et al., 2007).

Pearson's correlation results showed that there is a weak negative correlation between doping knowledge scores and PEAS scores of the participants. Since higher PEAS scores are indicative of more permissive attitudes toward doping, results reveal that athletes with inadequate knowledge of doping are likely to have more permissive attitudes toward doping. WADA has identified the importance of creating awareness about banned substances and methods to prevent doping in sports. Hence, one of the key functions of WADA is to educate young athletes, parents and sports professionals on doping (WADA, 2019).However, the findings of two Kenyan studies suggest that increased knowledge about doping does not always result in favourable changes in the doping attitudes of athletes (Siswa, 2014).

Regarding doping practices, 6.8% (n = 21) of the participants admitted that they have used or had the intention to use banned substances or methods. Based on studies conducted using questionnaires, it has been reported that the percentage of athletes using banned substances/methods worldwide ranges from 1.3% to 39.2% (Muwonge et al., 2015; Perera et al., 2020). According to SLADA reports, 19 cases were found positive for ADRV from 2013–2017 out of which, 10 cases were between 2016 and 2017 (SLADA, 2019). Thus, the values reported for the usage of intention to use doping substances in the present study could be considered as a possible threat to SLADA's vision to create a dope-free Sri Lankan sports industry (SLADA, 2019). Further, the mean PEAS scores (57.2) of athletes who admitted to having prior doping experience/intention to dope indicate that they exhibit more permissive attitudes toward doping. Similar results were recorded in studies conducted in Korea and Uganda, where athletes who had prior experience with banned PES show more lenient attitudes toward doping compared to those who had no prior experience in doping (Kim & Kim, 2017; Muwonge et al., 2015).Also, 38% of the study sample stated that they knew someone who was using doping substances and the average PEAS score of these athletes was 49.2.Blank *et al.* (2015) reported that7.1% ofAustrian elite junior athletes are willing to dope if their rivals do the same. This may be because athletes tend to develop lenient attitudes and become more tempted to doping when they know that their peers or rivals are already using banned substances and/or methods.

Although there are many doping awareness programmes conducted worldwide, ADRV incidents are recorded in every county. The present study results showed that although a considerable portion of the participants (58.8%) have participated in doping awareness programmes conducted by SLADA, their knowledge has not been improved, which is reflected by their lower mean knowledge scores (42.6%).

When discussing the significance of the study, the WADA vision: "A world where all athletes can compete in a doping-free sporting environment" (WADA, 2019)and the Sri Lankan government's initiatives to kerb doping through the passing of the Convention against Doping in Sport Act, No. 33 of 2013 cannot be neglected. This study endorses the current situation in Sri Lanka on doping knowledge, attitudes and practices

among national-level athletes. Although similar studies have been carried out worldwide, research focused on doping knowledge, attitudes and practices of Sri Lankan athletes is scarce. The present study was carried out with the participation of 308 athletes who represent 17 National sports teams. Therefore, the findings of this study can be used as a base for future research. Further, this study can be used as a tool to educate sports stakeholders on doping. Additionally, this study tries to identify the areas which can be improved in educational programmes aimed at cultivating a doping-free sporting environment in Sri Lanka. Despite numerous educational programmes conducted by SLADA targeting different levels of athletes and sports professionals around the country, ADRV incidents are still recorded. The findings of this study help to uncover the weak areas and strengthen such educational/awareness programmes. Also, stakeholders of the Sri Lankan sports industry will be able to understand the factors related to doping among Sri Lankan athletes and take preventive measures to eradicate these unethical practices while preserving sportsmanship.

IV. CONCLUSION

To conclude, the results of this study reveal that elite athletes in Sri Lanka do not possess adequate knowledge of doping, especially in the areas of prohibited substances, side effects, methods and practices, testing procedures and supplement quality (mean knowledge score of participants was below 50%). With higher PEAS scores reflecting pro-doping attitudes, since the mean PEAS score (48.1) of participants was below the theoretical mid-point, it can be concluded that the participants of this study had less-permissive attitudes toward doping. It can also be concluded that the sports type, the chronological age, the highest sports achievement and the educational level significantly influence the doping knowledge of Sri Lankan athletes representing National Teams whereas athlete's sport types, highest sports achievement and education level significantly influence athletes' attitudes toward doping. Further, the doping knowledge and attitudes of the participants were not affected by gender or training age. There was a weak negative correlation between athletes' doping knowledge and PEAS scores. There is a need for improved doping educational programmes targeting various groups based on factors such as sport type, age, and educational background. Such programmes must focus on creating awareness about doping as well as improving athletes' attitudes toward doping.

The authors recommend that SLADA and future researchers evaluate the effectiveness of different types of educational programmes. Similar research should be carried out targeting other sports, other levels of athletes and other stakeholders such as coaches, parents and sports administrators to get comprehensive knowledge about doping in the Sri Lankan sports arena.

ACKNOWLEDGMENT

We take this opportunity to express gratitude to the participants of the study, Sri Lanka Anti-Doping Agency, and also the officials representing the Sports Federations.

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