Original Article

Knowledge, attitudes and perceptions on doping among university students in physical education and sport science related degree programmes

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ABSTRACT

Doping cases have in the recent past (second decade of 21st century) tainted the Kenyan athletes' dominance in long distance running. The purpose of this study was to examine the knowledge, attitudes and perceptions (KAP) on doping among university students pursuing sport related courses. It was postulated that KAP on doping will be mediated by year of study, age, gender, sporting experience and degree programme. Data were collected through self-administered questionnaires from university students (n=179) drawn from four universities that offer sport-related courses in Kenya. Results revealed that there were significant differences between year of study (first vs fourth) in knowledge on performance enhancing substance (PES) (Mean Ranks; 68.16 vs 94.22, p=.013) and perceptions about doping (109.98 vs 86.14, p=.023). Sport Science and Health Promotion students showed significantly higher scores on attitudes towards doping (p=.003) than those in Physical Education courses. There were significant differences ($p < .05$) in KAP on doping in favour of those students who had previous participation in sport competitions. It is concluded that KAP of university students on doping is differentiated based on the selected variables of year and programme of study, and previous participation in sport competitions. It is recommended that the unpacking of doping education should take these variables into consideration. Universities need to partner with anti-doping agencies to expose students to both theoretical and practical applications of doping knowledge. Further investigation in needed on the possible factors that contribute to less negative perceptions with higher knowledge on doping among university students. **Keywords:** Performance enhancing substance; Sports related courses; Student athletes.

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INTRODUCTION

Doping cases have been reported among Kenyan athletes in the recent past, tainting the country's global reputation as a powerhouse in middle- and long-distance races worldwide (Andrén-Sandberg, 2016; Gambaccini, 2015; Nabiswa, 2016). Some studies have attributed the use of performance enhancing substances (PES) among athletes in Kenya to the need for excelling (Boit et al., 2014; Government of Kenya [GOK], 2014), lack of awareness (Kamenju 2014; Sigei, 2014), external pressures (Boit et al., 2014) and to enhance performance (GOK, 2014). In order to prevent doping, there is need to the assess knowledge, attitudes and perceptions of university students studying sports related courses so as to understand their orientation towards PES use in sports. If the graduates in sports related courses are aware of the negative effects of doping, they are likely to change/or influence others to have better perceptions and attitudes towards doping. Consequently, a student who is aware of the negative effects of drugs is likely to have his/her perception and attitudes towards performance enhancing substances (PES) changed for better (Kamenju, 2014). In this regard, Bucher and Wuest (1999) suggested that physical education (PE) graduates have a duty to pursue programs that develop commendable values such as co-operation, self-discipline, hard work, fair play, emotional control and teamwork among others. Similarly, PE teachers are important in guiding high school athletes in making decisions in sport competitions (Zelli, Lucidi& Mallia, 2010). This is not remote as graduates from PE and sports related courses will occupy various decision and opinion-making positions in their future professional life such as sport officers, coaches, officials of ADAK, gym instructors and related careers. To function as a role model, coaches and teachers must prove their knowledge and ethically correct attitudes towards doping (Fung & Yuang, 2006). Knowledge about doping may prevent athletes from developing pro-doping attitudes and aid formation of correct attitudes (Blank et al., 2014).

Eagly and Chaiken (1993) defined an attitude as a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour. Attitude refers to the preferences and evaluations (or likes or dislikes) that people form in relation to specific objects of their thought (Banaji & Heiphetz, 2010). Previous studies have shown that attitudes correlate to doping behaviour intentions and sometimes these intentions predicted subsequent use of doping substances among both non-athletes and professional athletes (Alaranta et al., 2006; Jalleh & Dohovan, 2007; Lucidi et al., 2004; Petroczi, 2007; Petroczi, Aidman, & Nepusz, 2008; Wiefferink et al., 2007). For example, Lucidi et al., (2004) opined that attitudes were the strongest predictors of intention to use banned substances. Among sport science students there is the belief that using doping can lead to better sports results and development of muscles (Bassoli et al., 2004; Bondarev, Galchinskiy, Ajitskiy & Labskir, 2008). Also, sport-oriented students consider that doping does not impact on health negatively if it is used in a reasonable way. This affirms that a good proportion of students lack knowledge on doping in terms of side-effects, sources of information and testing procedures.

In regard to gender and doping, studies have reported that male athletes are more likely than females to dope (Adegboyega, 2014; Bassoli et al., 2004; Corbin, Corbin, Welk & Lindsey, 2004; Kirby, Moran, Guerin, & Macintyre, 2008; Lucidi et al., 2008; Molebe, 2012; Peretti-Watel, Guagliarddo, Mignon, Pruvost, & Obadia, 2004; Peter, et al., 2005; Petroczi, 2007; Scheneider & Morris, 1993; Zelli et al., 2010). For male athletes the reasons for doping are mainly to enhance performance, importance attached to winning, coaches and peer encouragement (Peter et al., 2005). To buttress the above sentiments, Peretti-Watel et al., (2004), Lucidi et al. (2008) and Kirby (2008) reported that male athletes have more positive attitudes towards PES than female counterparts. On the other hand, Collins, MacNamara, Collins and Bailey (2012) opined that female athlete's feelings of shame and guilt in the event of being caught may deter female athletes than male athletes from doping. The age of the player and playing experience are expected to correlate with anti-doping attitudes, especially if they are accompanied by positive experiences. Corluka, Gabrilo and Blazevic (2011) reported

that age and sport experience are significantly related to knowledge of doping. The contention is that doping knowledge increases with age and level of competition (Bassoli et al., 2004). Singhammer (2012) opined that older people appear to hold more negative attitudes towards doping.

Doping prevalence has been reported among high school students (Kindludh, Isaacson, Berglund & Nyberg, 1998; Melia, Pipe & Greenberg, 1996; Nolte, Steyn, Kruger & Fletcher, 2014). For example, Melia et al. (1996) found that most of the high school students in Canada used banned substances and other substances to improve their sport performance. In a related study, Kindludh et al. (1998) found that among high school adolescents, 2.7% boys and 0.4% of girls used the drugs at some time in their lives to improve physical appearance and athletic performance. However, majority of students had a negative attitude towards doping and 57% of them did not know the list of prohibited substances and drugs. In South Africa, Nolte et al. (2014) found that 42% of high school athletes as having knowledge on doping with coaches as their major source of doping information. From the above three studies it appears that high school students use banned substances, have knowledge on illegal substances though they have negative attitudes towards doping.

A number of studies have been conducted on doping among university students in different countries. For example, Lorente (2003) examined substance use and experimentation among sport science students (n = 331) in France and found some gender differences in the modes of consumption of several substances such as cannabis, psycho-active compounds and alcohol consumption with males consuming more than females. In the same country, Perretti-Watel et al. (2004) study among elite student athletes' attitudes towards doping found that athletes who dope pursue legitimate goals with illegitimate means but justify their behaviour with illegitimate rationale. Lubna et al. (2008) found among Jordanian college students and athletes that attitudes, access and exposure to performance enhancing drugs (PED) drastically change between ages 12 and 13 years and a third of athletes have used drugs before the age of 15 years. Lucidi et al. (2008) showed that intention to use PES among Italian students increased with stronger attitudes about doping and a lowered capacity to resist situational pressure or personal desires to dope. Secondly, they found that stronger intentions and moral disengagement contributed to a greater use of doping substances.

In Jordan, Tahtamouni et al., (2008) found that anabolic androgenic steroids (AAS) use was 26% for the body builders and 4.2% in university students. The reasons for using AAS were to improve performance or enhance their physique, and 77% of users had used more than AAS at any given time. The sources of AAS were mainly friends and coaches. Vangrunderbeek and Tolleneer (2010) sought the opinions on doping in elite sports from students in human movement studies. They found that students seemed to develop a more diffuse ethical attitude on the doping issue as they had shifted from the zero-tolerance principle towards a more lenient attitude towards doping in elite sports. Therefore, it appears that university students in human movement sciences criticize the rigid and the internationally promoted "Zero tolerance" policy on doping. Papadopoulos et al. (2006) examined the prevalence and predictors of doping use among tertiary education students in 6 countries (Finland, France, Germany, Greece, Italy and Israel) and found that 2.6 % admitted using some doping agents with no differences between the countries. Students using nutritional supplements and student-athletes were more likely to report doping in comparison with non-athletes. Doping was higher among males and lower among students in biomedical students. In related studies, Pavlovic and Pupils (2013) and Pavlovic and Idrizovic (2013) tested the level of knowledge and attitudes about the use of illicit substances (drugs) in sports among PE and sport students in East Sarajevo and found that the students' knowledge and awareness about negative effects of doping were insufficient. In regard to perceptions towards doping, Kumar and Jyoti (2013) found that majority of university students believed that doping is cheating, and majority of respondents were in agreement that a complete ban on doping in sports is necessary. This is contrary to the findings from Petroczi et al. (2008) that college students' opinion that doping

is useful for one's athletic performance. Among Japanese university students Masato et al. (2013) found that 79.1% of the participants had negative attitudes towards doping while 20% approved of the drug's use in sports and a further 10% were reported to have used drugs to enhance sports performance. In Spain, Sanchez et al. (2013) reported that orientation on doping among sport science students, footballers and technical officials in football had developed negative attitudes towards doping. Blank et al. (2016) evaluated the motives, attitudes and beliefs of legal and prohibited substance use in university students (n = 571) and found that 24.9% of the university students used legal nutritional supplements and 9.4% used prohibited PES. The motives for use of PES were staying awake and enhancing physical performance. From the above studies it can be deduced that university students from the other parts of the world have low levels of knowledge on doping, use PES, have differentiated attitudes and wrong perceptions towards doping. Therefore, it was apt to find out the knowledge, attitudes and perceptions of PE and sport science students towards doping in Kenya.

A few studies have been in Kenya conducted on doping knowledge, attitudes, perceptions, possible users, sources of information on doping and sources of PES among athletes in selected sport and different levels of competition (Kamenju, 2014; Sigei, 2014; GOK, 2014; Boit et al., 2015). Among teacher-trainees, Kamenju (2014) found that college athletes had low knowledge and awareness on doping, and they had wrong perceptions on doping except for track and field athletes but their attitude towards doping was positive. Among elite athletes in middle and long distances Sigei (2014) found that Kenyan athletes had moderate knowledge on doping, 82.3% had negative attitude towards doping, 96% denied having used PED's, 38% admitted knowing athletes who used PED's, 21.4% admitted using herbal and nutritional supplements with differences based on athletes' age, gender and experience. In a similar study, Boit et al. (2015) found that athletes' in middle and long distances had moderate knowledge on doping and doping test procedures, 4.4% admitted having used PES while 95.6% denied ever using PES, 38% admitted knowing someone who uses PES, 15% reported knowing sources or outlets of PES, 38% attributed use of PES to excelling, 22% cited lack of awareness of banned substance, 32% reported not knowing the factors influencing doping and 4% felt it was due to external pressures.

The Government of Kenya (GOK) found that 20.5% of athletes knew colleagues who used drugs and the commonly used drugs in team sports were Cannabis sativa (bhang, khat (miraa) and stimulants (kuber) while in athletics the commonly used drugs included anabolic steroids, EPO's and other sophisticated drugs to enhance performance. The taskforce recommended enhancing doping education and awareness, anti-doping regulations, medical/health professionals undergoing training on anti-doping activities and enactment of specific anti-doping legislation (GOK, 2014). From the foregoing, there are no studies which have been conducted on doping among university students in Kenya, yet they are central in the fight against doping. In order to enhance knowledge on doping through doping education then it will be prudent to take stock of the knowledge levels, attitudes and perceptions of doping among sport science students in Kenyan universities. Secondly, Anti-doping agency of Kenya might find the results of the study useful so that they can partner with universities offering sport related courses to enhance training of students on anti-doping activities. Therefore, the purpose of this study was to find out the knowledge, attitudes and perceptions towards doping among students pursuing sport related courses in Kenyan universities. It was predicted that the above variables will be mediated by selected variables of gender, age, year of study and sport experiences.

METHODS

Research Design and Study participants

This was a cross-sectional analytical survey. Data was collected from 179 students purposefully sampled from 4 universities namely, Kenyatta University, University of Nairobi, Masinde Muliro University of Science and Technology, and Laikipia University. The selection criterion targeted students who were pursuing sport related courses (Physical and Health Education, Recreation and Sport Management, Exercise & Sport Science, and Health Promotion & Sports Science) in Kenyan universities, either in 1st or 4th (final year) of study. Participation in the study was voluntary. In terms of gender, 90(50.3%) were females while 89(49.7%) were males. Regarding year of study, 150 (83.9%) were in their fourth/final year while 29 (16.2%) were in their first year of study. In terms of age, 22(12.3%) were less than 20years of age, 122 (68.2%) were aged between 21 and 23 years and 35 (19.6%) were older than 23 years. For the study programme, 72 (40.2%) were pursuing Bachelor of Education in Physical Education, while 69 (38.5%) were pursuing Bachelor of Science in Exercise & Sport Science, 21 (11.7%) Bachelor of Science in Recreation & Sport Management, and 17 (9.5%) Bachelor of Science in Health Promotion & Sport Science. Over a half 91(54.7 %) of the respondents were representing their universities in sport competitions, 134 (74.9%) had been taught some topics on doping in the university and 76 (42.5%) had attended other courses/seminars on doping.

Instruments

Data was collected through a self-administered questionnaire which had four sections. Section one sought the demographic details of the respondents (age, gender, sports participation, year and programme of study). Section two of the questionnaire had items on knowledge on doping such as general knowledge on substances that enhance performance, anabolic steroids and stimulants. Other aspects included sources of information on doping and consequences of the use of PES. Items in this section were weighted on the options of Yes, Not Sure, and No. Section three sought information on attitudes towards doping. The athletes' attitudes towards doping in sport were assessed using a modified version of Performance Enhancement Attitude Scale (PEAS) (Petroczi & Aidman, 2009). The scale consisted of 20 items for measuring self-declared attitudes towards doping. Section four covered participants' beliefs/perceptions about doping in sports. Participants responded to each item on a 5-point Likert type scale ranging from strongly disagree to strongly agree. Acceptable reliability indices of the scale have been reported in previous studies involving college and elite athletes (Moran, Guerin& Kirby, 2008; Petroczi & Aidman, 2009). The 5-point Likert scale data was transformed to linear Percentage of Maximum Possible (POMP) scores as recommended by Cohen, Cohen, Aiken and West (1999).

Data analysis

Data was coded and analysed through SPSS using IBM SPSS Version 20. Reliability and normality tests were conducted. Descriptive values of means, standard deviations were calculated as well as inferential statistics such as Correlation (Spearman rho), Mann Whitney U and Kruskal-Wallis test of differences of the values across different categories of respondents.

RESULTS

Reliability test on the study questionnaire yielded Cronbach alpha value of 0.6 which was considered adequate for psychological studies as recommended by Shaughnessy, Zechmeister, & Zechmeister (2003). The normality test on data using Shapiro-Wilk indicated that most of data sets (except scores on perceptions about doping) were significantly different from a normal distribution ($p < .05$) thus informing the choice of non-parametric statistical procedures.

The means Percentage of Maximum Possible (POMP), standard deviations and median scores on knowledge, attitudes and perceptions on doping of the students are presented in Table 1. The results (in Table 1) show that university students had higher mean POMP and median scores on attitudes towards doping followed by sources of information on doping and knowledge on stimulants. The variables with lower mean POMP and median scores were knowledge on substances that can enhance sports performance, perceptions about doping and knowledge on anabolic steroids.

Table 1. Means, Standard deviations and Medium percent of maximum possible (POMP) scores on Knowledge, Attitude and Perceptions on doping (n = 179).

Variable	*Mean*	*Std. Dev.*	*Median*
General Knowledge on substances that can enhance sports performance POMP	54.95	18.99	57.14
Knowledge on anabolic steroids as a PES POMP	57.27	17.51	62.50
Knowledge on stimulants as a PES POMP	63.02	17.64	66.67
Attitude towards doping -scores POMP	66.29	17.79	70.00
Perceptions about doping -scores POMP	56.05	16.96	57.14

Table 2. Summary of Mann Whitney U test on knowledge, attitudes and perceptions on doping based on students' year of study, gender and participation in sport competitions (n = 179).

Variable	Year of Study (1st vs 4th)			Gender (F vs M)			Participation (No vs Yes		
	Mean Ranks	*Stat.*	*Sig.*	*Mean Ranks*	*Stat.*	*Sig.*	*Mean Ranks*	*Stat.*	*Sig.*
General knowledge on PES	57.45 96.29	3119.0	.000**	86.66 93.38	4305.5	.383	102.09 80.01	2990.0	.004**
Knowledge on anabolic steroids as a PES	81.22 91.70	2429.5	.318	90.32 89.68	3976.5	.934	95.25 85.66	3544.0	.217
Knowledge on stimulants as a PES	82.64 91.42	2388.5	.400	87.38 92.65	4240.5	.494	99.10 82.48	3232.0	.032*
Overall Knowledge on PES	68.16 94.22	2808.5	.013*	86.89 93.14	4284.5	.420	103.33 78.98	2889.5	.002*
Attitude towards doping	101.34 87.81	1846.0	.198	89.09 90.92	4086.5	.814	99.79 81.91	3176.0	.021*
Perceptions about doping	109.98 86.14	1595.5	.023*	95.58 84.36	3503.0	.147	101.02 80.89	3076.5	.010*

**. Mean difference is significant at the .05 level.*
***. Mean difference is significant at the .01 level.*

The study was interested in establishing on whether there were differences in the above aspects based on selected demographic variables of the students and the results are presented in Table 2. The results (in Table 2) show that year of study (1st vs 4th) returned significant differences on general knowledge on substances that can enhance sport performance (Mean Ranks; 57.45 vs 96.29, $p < .001$), overall knowledge on PES (68.16 vs 94.22, $p = .013$) and perceptions about doping (109.98 vs 86.14, $p = .02$). In the aspect of the general knowledge on substances that can enhance sport performance and overall knowledge on PES, the First-Year students had lower mean ranks than Fourth Years. However, the First-Year students had higher mean ranks on perceptions about doping. Results in the same table show that there were no differences on knowledge, attitudes and perceptions about doping across gender. Knowledge, attitudes and

perceptions about doping returned significant differences ($p < .05$) with respect to previous participation in sport competitions except in knowledge on anabolic steroids as a PES.

In regard to age categories, Kruskal Wallis test returned significant differences in knowledge on substances that can enhance sport performance ($p = .009$) and in perceptions about doping ($p = .018$). Pairwise comparisons showed that those university students who were younger than 20 years of age had significantly lower mean rank (58.89) than those aged between 21 and 23 years (95.69) on knowledge on substances that can enhance sports performance. On the perceptions about doping pairwise comparison showed that university students who were younger than 20 years had significantly higher (better) mean rank (116.66) than those who were older than 23 years (77.29). In terms of degree programmes, knowledge and perceptions about doping did not register significant differences. However, there was a significant difference on attitudes towards doping ($p = .003$). In this case pairwise comparisons showed that students in BSc (Exercise & Sport Science, and Health Promotion & Sport Science) programmes had significantly higher values / better attitudes towards doping than BEd (i.e. Physical & Health Education, and Physical Education & Sports) programmes.

Correlation analysis ($n = 179$) between doping knowledge, attitudes and perceptions about doping showed a strong correlation ($rho = 0.256$; $p < .001$) between knowledge on PES and attitudes towards doping, as well as between attitudes towards doping and perceptions about doping ($rho = 0.456$; $p < .001$). However, the results show no significant relationship between knowledge on PES and perceptions about doping ($rho = 0.140$; $p > .05$).

DISCUSSION

The purpose of this study was to establish the Physical Education and Sport Science students' knowledge, attitudes and perceptions about doping. This was apt as these students will play pivotal roles in anti-doping crusade based on anticipatory socialization. Over half of the students had represented their universities in sport competitions. This is encouraging as these students have the necessary exposure to doping knowledge outside the classroom set-up. Secondly, this presumes that the student appears to have both theoretical and practical knowledge on the content taught under their different degree programs. About 75% of the students had been taught a course/unit on doping in the university. Therefore, it is expected that the participants have the necessary knowledge, attitudes and perceptions about doping. It also appears that doping as a course may be cross-cutting in all the degree programs offered in the different universities. It is notable that doping as a topic may be taught in sports nutrition, training methods, biochemistry among others.

Only 43% of the students had attended other courses/seminars on doping. This is worrying and Anti-doping Agency of Kenya (ADAK) may need to partner with universities housing sport related courses to offer regular courses/seminars on doping to the university students. This will definitely improve the students' knowledge, attitudes and perceptions towards doping.

The sources of information on doping among the university students were varied. The sources included college, parents, seminars, internet, radio, newspapers, television and lecturers. Kamenju (2014) found that the sources of doping information among college athletes were television, newspapers, radio and magazines. She opined that these sources were not credible and reliable. Findings of the current study revealed that most of the students had their source of information as lecturers followed by the university/ college. This is contrary to Kamenju (2014) whose findings indicated that the media are major sources of information on doping among college athletes. However, the current study population was slightly different in that they were undertaking sports related courses. The findings also differ on similar account with Sigei (2014) whose

findings indicated that the major sources of information on doping among elite athletes in Kenya was Athletics Kenya (AK). These findings suggest that university students need to have more and available sources of information on doping such as WADA website, reports and journal articles.

Findings indicated that the university student athletes had above average knowledge on the substances that enhance sport performance, anabolic steroids and stimulants. University students pursuing sport related courses are expected to have higher knowledge on doping if they are expected to empower students or athletes who will be under their tutorage. They eventually become coaches or sport administrators of integrity and are responsible for guiding and protecting young athletes from the negative effects of PES (Kamenju, 2014). The students' attitudes and perceptions towards doping were negative and right respectively. This is supported in Masato et al., (2013) and Sanchez et al., (2013) where sport science students in Japan and Spain had negative attitudes towards doping respectively.

It was predicted that knowledge, attitudes and perceptions towards doping will be mediated by the selected variables of gender, year of study, previous participation in sport competitions and age categories. The lack of significant differences on attitudes towards doping based on gender of respondents is contrary to findings of other studies who opined that males have more positive attitude towards doping than females (Peretti-Watel et al., 2004; Lucidi et al., 2008; Kirby et al., 2008). On the other hand, knowledge towards doping was differentiated based on the year of study. Fourth Year students had higher scores on knowledge on substances that can enhance sport performance and stimulants than First Year students. Furthermore, it was found that students who were younger than 20 years had the wrong perceptions about doping in comparison to the other age categories. Corluka et al., (2001 and Singhammer (2012) had opined that knowledge and attitudes towards doping change with age and playing experience.

Knowledge on doping differed between those university students who had previous participation in competitive sport and those who had not. This is contrary to Kamenju (2014) findings where there was no significant association of college athlete's awareness of PES to competition experience. The university students who had not participated in sport had higher means on knowledge on substances that can enhance sport performance and stimulants. This is an interesting finding of this study as it was expected that students who had participated in sport competitions would be more knowledgeable. This clearly showed that ADAK may need to heighten their awareness on doping campaigns. Secondly, the same students (who had/not) participated in sport had more positive attitude towards doping and right perceptions about doping. This is corroborated by Kamenju (2014) findings that teacher-trainees in college had low knowledge and awareness on doping, wrong perceptions on doping and positive attitudes towards doping.

It was predicted that the degree programme in which the students are enrolled will influence their knowledge, attitudes and perceptions towards doping. However, there were no differences based on degree programme on knowledge and perceptions about doping, but differences emerged on attitudes towards doping. In this regard students who were enrolled in Physical and Health Education and Physical Education and Sport had significantly lower pro-doping attitudes than those enrolled in Bachelor of Sport Science and Health Promotion. This possibly shows that those enrolled in Sport Sciences are exposed to more content on doping. It is recommended that PE students need more exposure to doping knowledge as based on anticipatory socialization they will work with schools or handle young athletes. Masato et al., (2013) found that PE university students were not aware of the chemical composition of the drugs they were using yet students had attended lectures about illegal drugs.

Findings showed that there was a strong correlation between knowledge on PES and attitude towards doping as well as between attitudes towards doping and perceptions about doping, but no significant relationship between knowledge on PES and perceptions about doping. The first-year students had lower mean ranks than fourth years in overall knowledge on PES. However, the first-year students had significantly higher (better) mean ranks on perceptions about doping.

Pairwise comparisons across age categories showed that those university students who were younger than 20 years of age had significantly lower mean rank (58.89) than those aged between 21 and 23 years (95.69) on knowledge on substances that can enhance sports performance. On the perceptions about doping, pairwise comparison showed that university students who were younger than 20 years had significantly higher (better) mean rank (116.66) than those who were older than 23 years (77.29). This is corroborated by Petroczi, et al. (2008) who reported on college student's perception to doping that 66% were of the opinion that doping is useful for one's athletic performance. The findings however contrast Kumar and Jyoti (2013) assertions that majority of the students believed that doping is cheating, and that health problems related to hard training and injuries are just as a result of doping side-effects. It can be postulated that the finalist's students may have started questioning the relevance of anti-doping campaigns, yet numerous athletes continue to fail doping control processes. Secondly, Vangrunderbeek, and Tolleneer, (2010 had reported that sport science students were shifting their thoughts on doping from zero tolerance principle to a more lenient attitude towards doping. The possible cause of less positive perceptions about doping among 4th year students compared to first year students should be investigated. It should be of concern as the students proceed to graduate in their courses are likely to go out and influence and shape the wider society in this regard.

CONCLUSIONS

Based on the findings of the study, it is concluded that university students pursuing sports related courses get doping information from diverse and different sources, leading of which is their lecturers. The university students have moderate knowledge on doping and substances that enhance sport performance. The university students have positive attitudes towards doping but less positive perceptions about doping than secondary school leavers. In addition, knowledge, attitudes and perceptions of university students is differentiated based on the selected variables of year of study, age categories and previous participation in sport competitions. Consequently, the unpacking of doping information should take these variables into consideration.

RECOMMENDATIONS

Based on the conclusions of the study, it is recommended that there is need to integrate doping education in all the courses offered in different degree programs which are sport related. There is need to explore how doping information can be disseminated through social media. There is need to put in place memorandum of understanding/agreement between universities offering sport related courses and Anti-Doping Agency of Kenya on training and practical application of doping issues. It is important for the lecturers or facilitators of sport education in universities to incorporate WADA website and resource as reference material during instruction. Future studies can be done on KAP doping with university students in all years of study and those enrolled non-sports related courses. The possible factors that lead to less negative perceptions with higher knowledge on doping among university students should also be investigated further.

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Both the co-authors contributed to the research work and development of this manuscript from the inception to publication stages.

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DISCLOSURE STATEMENT

The study procedures complied with the current laws of the country where the study was conducted.

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