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Examining coaches' experiences and opinions of anti-doping education

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Abstract

Although global policy states that coaches are a key stakeholder group for anti-doping education, very little is known about how performance and participation coaches develop their understanding of anti-doping policy and practice. Therefore, 292 UK-based coaches completed an online survey exploring their experiences of anti-doping education (i.e., topics covered, how and by whom the programmes were delivered and how knowledgeable and well-equipped coaches felt to deal with doping-related matters). The results showed that almost a quarter of the surveyed coaches reported never learning about anti-doping. Only a third had engaged with a formal anti-doping education programme and coaches typically received information on detection-deterrence related topics (e.g., banned substances, testing procedures). Many coaches perceived themselves as only having ‘a little’ knowledge about anti-doping and declared themselves as ‘a little’ equipped to work with their sportspeople on doping-related matters. Nonetheless, 96% of coaches were inclined to learn more about anti-doping in the future. Given the World Anti-Doping Code states that anti-doping education for coaches should be compulsory, it is crucial that insights from coaches are made public to inform the development of evidence-informed anti-doping programmes that are tailored and targeted.

Athlete support personnel; coach development; coach education; drugs in sport; doping prevention

Introduction

The importance of education in the prevention of doping behaviours has been emphasised by both research (e.g., Backhouse, McKenna & Patterson, 2012) and policy (e.g., the World Anti-Doping Code [WADC], 2015). Moreover, the global organisation responsible for coordinating anti-doping efforts, the World Anti-Doping Agency (WADA), has deemed their education programme central to fostering a lasting anti-doping culture (as cited in Bloodworth & McNamee, 2010). While sportspeople are the primary target for education activities, the need for anti-doping education to engage parents, sports officials, medical practitioners and coaches has long been recognised (Council of Europe's Anti-Doping Convention, 1989). This was not surprising considering the evidence that emerged in the 1980s implicating athlete support personnel in doping practices. Coaches were specifically highlighted in these historical investigations because they had been involved in doping behaviours at a number of levels, from condoning and promoting to administering and supplying banned substances (e.g., Dubin, 1990; Ungerleider, 2001; Fainaru-Wada & Williams, 2006). To the present day, coaches continue to be implicated in doping cases (e.g., McClaren, 2016) and so global anti-doping policy (i.e., the WADC) continues to reinforce the need for education to reach coaches and other athlete support personnel.

To satisfy this need, many anti-doping and sporting organisations have taken steps to deliver anti-doping education programmes to coaches. For example, at a global level WADA launched the Coach's Tool Kit in 2007 to assist stakeholders, such as anti-doping organisations, sports federations, coaching associations, and universities, in the facilitation of a face-to-face anti-doping education workshop for coaches (WADA, 2016). In 2010, WADA complemented this resource with an online programme, CoachTrue, which they proposed could help cater for the various learning styles and demanding schedules of coaches (WADA, 2010). In the UK in 2012, the United Kingdom Anti-Doping Agency (UKAD) also

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developed an anti-doping education programme for coaches – Coach Clean. Similar to CoachTrue, this is an online programme ‘designed to give coaches the knowledge and understanding to help guide athletes in clean sport’ (UKAD, 2012a, 2012b).

Although such national and global programmes are in place, emerging evidence suggests that the uptake of these programmes is relatively low. Specifically, Patterson, Duffy and Backhouse (2014) were given access to user data for both WADA CoachTrue (Elite) and UKAD Coach Clean and found that a very small proportion (approx. 0.2%) of the national (UK) and global coaching population had used these programmes. Low engagement with formal anti-doping education has also been demonstrated through other coach-based anti-doping research (e.g., Allen, Morris, Dimeo & Robinson, 2017). Studies typically show that no more than half of coaches in a sample have engaged in formal education (Fjeldheim, 1992; Mandic, Peric, Krzelj, Stankovic & Zenic, 2013; Sajber, Rodek, Escalante, Olujić & Sekulic, 2013; Rodek, Sekulic & Kondric, 2012). A similar rate of engagement with formal learning has been found across National Governing Body-led coach education (North, 2009).

In the absence of formal education opportunities, many coaches report that they learn about doping and anti-doping through self-directed means, such as searching the internet/websites, newspapers/TV, books and other literature/documents (e.g., Engelberg & Moston, 2016; Mandic et al., 2013; Rodek et al., 2012). This is in stark contrast with findings in the general coach education literature. For instance, Erickson et al. (2008) surveyed a sample of Canadian coaches and found that learning by doing and interaction with other coaches were the most commonly accessed sources of knowledge. Access to printed and electronic materials was limited for this population. However, in this study, this type of self-directed learning was more relevant for coaches who aspired to progress to higher competitive levels. This predilection for self-guided learning at later stages of development has been corroborated in recent studies of high performance coaches (Lara-Bercial & Mallett, 2016).

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Notwithstanding the above, it can be argued that coaches learn about anti-doping through both mediated (i.e., aided by another person) and unmediated (i.e., coach-driven) methods (ICCE, ISOIF & LBU, 2013), but that the method chosen may depend on their developmental stage, aspirations, the populations they coach and personal learning preferences (Callary, Rathwell & Young, 2018; Estâvão Correia & Bertram, 2018).

It has been suggested that low engagement with formal anti-doping education programmes could be underpinned by low awareness (Patterson et al., 2014). Indeed, some coaches have recently reported having no awareness of anti-doping-related learning opportunities (Allen et al., 2017; Vankhaldo & Planida, 2013) and have attributed the lack of opportunities to the dominance of athlete-centred programmes (Allen, Dimeo, Morris, Dixon & Robinson, 2014; Mazanov, Hemphill, Connor, Quirk & Backhouse, 2015) and working at ‘sub-elite’ levels of competition (Mazanov et al., 2015). North (2009) found a similar trend in the UK’s coaching population where those working at what are perceived as ‘lower levels’ of the participation spectrum (i.e., working with children or recreational participants) tended to not have any qualifications or lower level qualifications than those working at the high-performance end of the spectrum. However, there is also emerging evidence to suggest that coaches’ low engagement with anti-doping-related activities might be due to a perception among coaches that anti-doping is ‘not relevant’ to them because doping is not prevalent in their context (Allen et al., 2017; Mazanov et al., 2015). Therefore, there is a need to further explore coaches’ awareness and engagement with programmes and the factors that might influence this, including coaching context/domain.

Moreover, research that will aid us in understanding coaches’ engagement with anti-doping education programmes is particularly pertinent given that many coaches have, or at least perceive themselves to have, only low to moderate doping/anti-doping related knowledge (e.g., Fjeldheim, 1992; Fung & Yuan, 2006; Sajber et al., 2013). Additionally,

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coaches have reported feeling ‘ill-equipped’ or ‘badly trained’ to undertake anti-doping roles and responsibilities (e.g., Engelberg & Moston, 2016; Laure, Thouvenin & Lecerf, 2001; Vankhaldo & Planida, 2013). This situation leads many coaches to not readily/actively engage in anti-doping actions (Allen et al., 2017; Laure et al., 2001; Patterson & Backhouse, 2018). However, given that several studies have shown that coaches have called for further training in anti-doping (Laure et al., 2001; Peters et al., 2009; Vankhaldo & Planida, 2013), it seems reasonable to assume that coaches may engage with, and could benefit from, anti-doping education programmes if they were seen as attractive, and were effective in facilitating knowledge and skill development. At this time, very little is known about if coach anti-doping education programmes are attractive or effective as there is no evaluation information regarding these resources in the public domain.

With this in mind, the purpose of this cross-sectional survey study was to investigate coaches’ experiences and opinions of anti-doping education. To meet this purpose, the following research questions were formed: 1) Are coaches aware of, and do they engage with, opportunities to learn about anti-doping? 2) What do the experiences accessed by coaches involve? (such as topics covered, delivery methods, which organisations provide learning opportunities), 3) Are coaches interested in learning more about anti-doping in the future? And, if so, what are their preferences for learning opportunities? (including topics, delivery methods, providers, and integration into general coach development processes), 4) How knowledgeable and well-equipped do coaches feel to deal with doping-related matters? 5) Does anti-doping perceived competence differ between coaches who have and have not engaged in formal learning about anti-doping? 6) Are there any differences in coaches’ experiences and opinions of anti-doping learning opportunities across coaching domains and contexts?

Method

Recruitment and Participants

A cross-sectional convenience sampling approach to recruitment was initiated upon ethical approval from the University Research Ethics Committee. Specifically, study information was disseminated to UK-based National Governing Bodies (NGBs) representing sports whose International Federation is a World Anti-Doping Code (WADC) signatory. Of the 84 organisations that were contacted, 27 (32%) agreed to distribute the study information to coaches via their networks or by posting a message on their website. Invitations to participate in the study were also circulated on the social networking site Twitter. The only inclusion criterion for coaches was to be currently coaching in the UK, which they had to confirm during the online survey. No incentives were offered to respondents and the survey remained open for a period of three months.

Of the 314 individuals who began the online survey, 22 cases were removed prior to data analysis because the respondent did not answer any questions beyond their demographics (e.g., gender, age and years of coaching experience) leaving a total remaining sample of 292 coaches. Due to the design of the survey, the number of respondents varied for each question; the exact number of respondents is stated in relation to all data presented. Out of 288 participants who reported gender, 77% ($n = 224$) were male and 22% ($n = 64$) were female. Almost all participants who reported ethnicity ($n = 232$) identified themselves as white ($n = 224$, 97%), including white-British ($n = 210$), white-Irish ($n = 10$) and white-other ($n = 4$). The remaining 3% of individuals identified themselves as “mixed black African and white” ($n = 3$), “other ethnic group” ($n = 2$), “Asian or Asian British – Indian” ($n = 1$), “black or black British – Caribbean” ($n = 1$) and “other mixed” ($n = 1$).

Table 1 shows that respondents ($n = 291$) represented 31 different team and individual sports and the most frequently represented sports were archery ($n = 49$, 15%), field hockey ($n = 41$, 13%), rugby league ($n = 31$, 10%) and cycling ($n = 27$, 9%). Coaches identified the

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domain in which they spent the majority of their time coaching using the categories presented in the International Sport Coaching Framework (ISCF) (ICCE, ISOIF, LBU, 2013). Of the 254 coaches who reported their context, representation was: emerging athletes in performance sport ($n = 38$, 15%), performance athletes ($n = 22$, ~9%), elite athletes ($n = 12$, 5%), children's participation sport ($n = 38$, 15%), adolescents in participation sport ($n = 22$, ~9%) and adults in participation sport ($n = 34$, 13%). Thirty-five percent ($n = 88$) of coaches did not state their primary domain or stated that their time was split equally across domains and were considered to work in a "blended" role.

On average, respondents ($n = 289$) were 43.45 (± 13.82) years old (range 17-88 years) and had 12.58 (± 10.14) years of coaching experience ($n = 288$, range < 1-40 years). Individuals who reported their level of coach certification ($n = 250$) held or were working towards Level 1 ($n = 28$, 11%), Level 2 ($n = 111$, 44%), Level 3 ($n = 68$, 27%) and Level 4 or 5 ($n = 29$, 12%), with 14 individuals (6%) selecting "not applicable". With regard to current coaching involvement, 68% of coaches ($n = 199/246$) worked part-time (< 30 hours) and 16% ($n = 47$) worked full time (30+ hours). Coaches' employment statuses varied from volunteer ($n = 162/244$, 55%) and paid hourly ($n = 46$, 16%) to salaried ($n = 36$, 12%), with a number of coaches explaining that they are in a position that crosses these boundaries (i.e. are volunteers but are sometimes paid hourly).

INSERT TABLE 1 HERE

Survey Instrument

All participants were provided with study information and were asked to give consent on the opening page of the online survey. A demographics section gathered details of coaches' age, gender and ethnicity, as well as the main sport in which they worked, their

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years of coaching experience, level of coach-related certification, type of performers that they work with (e.g., children, adolescents or adults in participation or performance sport) and the terms of their current coaching position (i.e., salaried, paid hourly, voluntary and part-time or full-time). The survey was anonymous, as no information was collected that would identify individuals.

Due to the dearth of research exploring coaches' experiences and opinions of anti-doping education, no existing survey instrument could capture the data required to answer the research questions. Therefore, the main body of the survey instrument utilised in this study was developed based on a review of previous research and policy in the fields of anti-doping and coaching. Table 2 presents details of each question, including the type/format, response options and what sources they were informed by.

INSERT TABLE 2 HERE

The majority of questions were closed because information on potential responses was available in existing research or policy. For example, when asking coaches which topics were covered within the anti-doping education they received, a list could be drawn from the World Anti-Doping Code. Several closed questions were binary (including yes/no and selecting all that apply from a predetermined list) when coaches were asked to report information that was unambiguous (i.e., education did or did not cover content on prohibited substances, the NGB did or did not deliver education). Likert scales were used to explore coaches' ratings of knowledge and preparedness to deal with doping-related matters, as this format is widely employed to explore opinions, beliefs and attitudes (DeVellis, 2017). Likert scales had four responses that sought to discriminate meaningfully between options and were ordered accordingly (i.e., on a continuum of differing strengths, specifically *not at all* to *very*)

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(DeVellis, 2017). Notably, an even number of options (in this case four) was employed to eradicate equivocation or uncertainty of neutral choices (i.e., forcing commitment in one direction or another) (DeVellis, 2017).

In addition to the closed questions, several open questions were used to give coaches the opportunity to provide general recommendations for how anti-doping education could be provided in the future and to investigate the feasibility of integrating anti-doping into broader coach education and development processes. Furthermore, even for closed questions, coaches were given the opportunity to suggest 'Other' options and add details in a space provided (excluding question 6) to ensure that nothing significant was missed. Combining closed and open questions to gain both quantitative and qualitative data at the same time was deemed necessary to understand the 'problem' and answer the research questions. This approach is reflective of the researchers' 'pluralistic pragmatist' worldview (Cresswell & Cresswell, 2018), whereby the researchers valued the insight that quantitative data was able to provide into 'what' is happening, as well as the important depth, context and individualised insights that the qualitative data contributed, with the two types of data being integrated to provide a comprehensive understanding of coaches' experiences and opinions of anti-doping education.

Following initial development of the survey by the lead author, other members of the research team (who are experienced in the fields of anti-doping and coach education research) reviewed the content and format of the survey. Prior to nationwide distribution, the survey was then examined for face and content validity by eight individuals working in a coaching context within the university (i.e., researchers, coaches and coach educators). Based on feedback from and discussions with these individuals, several minor amendments were made to the wording and formatting of the survey, as well as the removal of one question that did not directly relate to the research questions.

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As shown in Table 2, the main body of the survey contained 14 questions to investigate coaches' experiences and opinions of anti-doping education. Early questions aimed to establish coaches' awareness of and engagement with existing national and international anti-doping education programmes, including coach-specific programmes such as UKAD's Coach Clean and WADA's CoachTrue. Coaches were then asked to provide information regarding how and from whom they had previously received anti-doping education or doping-related information, as well as the topics that were covered within these programmes. Whether they had received anti-doping education previously or not, coaches were also asked to provide a rating (from 1 = *not at all* to 4 = *very*) of how knowledgeable they thought they were with regard to a number of doping-related topics and how well equipped they felt in relation to working with their sportspeople on doping-related matters. To ensure that coaches' perceived needs and wants are considered in future anti-doping provision, coaches were asked to indicate (from 1 = *not at all* to 4 = *very*) if they were interested in learning more about doping-related topics and how and from whom they would prefer future anti-doping education to be provided.

Data Analysis

The dataset was screened and cleaned to ensure the accuracy of the file, including ensuring values were within range, checking for repeat responses/duplicate cases (i.e., demographic matches) and identifying any instances of missing data (Tabachnick & Fidell, 2013). As stated previously, 22 cases were deleted prior to data analysis because the respondent did not answer any questions beyond their demographics. Due to the design of the survey (e.g., discrete items that did not contribute to any composite scales), all other cases could be maintained in the dataset and the exclude cases pairwise function was utilised. The number of respondents varied for each question and the exact number of respondents is stated in relation to all data presented. Data was categorical (i.e., nominal and ordinal) and was not

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normally distributed (i.e., skewness and kurtosis were evident), which renders parametric testing inappropriate. Therefore, descriptive statistics comprised frequencies and medians and non-parametric tests (e.g., Kruskal-Wallis, Mann Whitney) were conducted to identify possible differences between subsets of the sample (e.g., coaching domain, individuals who had engaged with learning opportunities or not). All data analysis processes involved the use of SPSS (Version 24.0) and statistical significance was set at $p \leq .05$.

Qualitative data gleaned from open-ended questions was analysed using deductive and inductive thematic analysis (Braun & Clarke, 2006; Braun, Clarke & Weate, 2017). In particular, the deductive component of the analysis came from being mindful of possible responses to the closed questions (e.g., learning via mediated and unmediated methods, topics covered) and the inductive component involved being open to other options and insights (e.g., details, explanations) that had not been considered or captured in the quantitative questions. Thematic analysis involves the researchers identifying patterns in the codes, including ‘clusters’ where several codes appeared to represent the same or similar concepts. While there are a number of instances (i.e., evidence) of each theme across the dataset, themes are not dependent on quantities (Braun & Clarke, 2006). Instead, themes are justified if they represent patterned responses that have important meaning relevant to the research questions.

It is important to note that themes do not ‘emerge’ from data (Braun, Clarke & Weate, 2017). Rather, the researchers actively created the themes, and this interpretative process was influenced by their personal autobiographies, thoughts and feelings. With this in mind, reflexivity and critical friends played a key role in enhancing the quality of the qualitative component of the study (Smith & McGannon, 2017). Reflexivity involved the researchers paying close attention to how they were impacting the interpretations of the coaches’ accounts. Moreover, the lead authors’ initial interpretations of the data were discussed with, and

‘challenged’ by, the co-authors who served as ‘critical friends’ to shape the narrative within each theme.

Results

Quantitative Data

Awareness of and engagement with anti-doping education.

To address the first research question, related to establishing coaches’ awareness of and engagement with opportunities to learn about anti-doping, the data showed forty per cent of the coaches were not aware of any existing anti-doping education programmes. Of those who were aware of at least one programme (55%), Figure 1 shows that coaches were mostly aware of the UK’s national sportsperson-centred programme, 100% ME. Even fewer coaches were aware of ‘coach-specific’ programmes, with only 17% aware of UKAD’s Coach Clean and only 7% aware of WADA’s CoachTrue (Elite or Recreational).

INSERT FIGURE 1 HERE

Indicating limited conversion from awareness of programmes to engagement with them, Figure 1 also shows that only a third of coaches had engaged with one of the anti-doping education programmes listed in the survey. Aligned with the awareness findings, the 100% ME programme had received the most engagement, with a quarter of coaches having engaged with this programme. Coaches’ engagement with ‘coach-specific’ programmes was minimal; only 6% had engaged with Coach Clean and only 3% had engaged with CoachTrue.

Descriptively, across the listed programmes, awareness and engagement was higher among coaches who worked in the three performance domains (awareness: 74%, engagement: 50%) than the three participation domains (awareness: 53%, engagement: 21%). Awareness

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(51%) and engagement (31%) among coaches in blended roles were also less than coaches working in performance-oriented domains only.

Anti-doping education delivery mechanisms.

With regard to the second research question, concerned with determining what the anti-doping learning experiences of coaches involve, Figure 2 shows the current and preferred anti-doping education methods. Corroborating the awareness and engagement data, it highlights that almost one in four coaches ($n = 64/280$, 23%) had never learned about anti-doping. Among the individuals who had previous doping-related learning experiences ($n = 216/280$, 77%), both mediated and unmediated learning opportunities were reported. In terms of mediated experiences, 39% of coaches having learned about anti-doping within certifications, qualifications, degree courses, conferences, workshops and/or seminars. Unmediated experiences included 44% of coaches engaging in self-directed learning (e.g., via the internet and books, newspapers and journals) and 37% of coaches undergoing experiential learning (i.e., through the process of being a coach or athlete).

Coaches working in performance-oriented domains were more likely to have learned about anti-doping than those in participation domains. All coaches in the performance and elite domains ($n = 34/34$), and almost all ($n = 34/38$) coaches working with emerging sportspeople (i.e., talent identified and development) had learned about anti-doping in some way (i.e., learning not limited to formal anti-doping education programmes). It should be noted that coaches were able to select more than one option. Therefore, percentages are out of 100% per method rather than 100% in total (cumulatively) across all methods.

INSERT FIGURE 2 HERE

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In terms of future educational preferences, Figure 2 demonstrates that a higher proportion of coaches (67%) would like to learn about anti-doping through online, electronic or printed materials than are currently learning about anti-doping via this method (31%). Similarly, a higher proportion of coaches (60%) would like to learn about anti-doping via mediated learning experiences (e.g., via qualifications, seminars and workshops) than are currently learning about anti-doping through this method (39%). A higher proportion of coaches (42%) also expressed a desire to learn about anti-doping through interaction with others (e.g., observing others, mentoring and general discussions) than are currently learning about anti-doping in this way (28%). In contrast, less coaches (29%) would prefer to learn via self-directed methods in the future than currently rely on this method (44%).

When comparing the organisations that currently provide anti-doping education and coaches' preferred providers for future education, NGBs were the predominant source of anti-doping education for those who had received it (64%), and they were also the preferred source of anti-doping education for two thirds (64%) of the sample. However, across all other organisations the values indicated that a higher proportion of coaches would prefer anti-doping learning opportunities to be provided than the proportion of coaches who currently receive anti-doping education from these sources: coaching organisations (preferred: 41%, current: 31%), NADOs (i.e. UKAD) (preferred: 35%, current: 26%), IFs (preferred: 17%, current: 10%), and WADA (preferred: 25%, current: 22%). Some coaches reported no preferences for the future ($n = 57$, 23%).

Content of anti-doping education and its impact.

Also related to the second research question focussed on understanding what the anti-doping learning experiences of coaches involve, the topics that coaches had learned about to date are displayed in Table 3. It shows that the most common topics were prohibited

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substances and methods, doping control procedures and the consequences of doping. The least commonly reported topic was applicable whereabouts¹ requirements.

INSERT TABLE 3 HERE

Although substances and methods on the prohibited list were the most common topics that coaches had learned about to date, Table 4 shows that the coaches felt most knowledgeable on the topics harm of doping to the spirit of sport and consequences of doping. In contrast, the coaches felt least knowledgeable of applicable whereabouts requirements.

INSERT TABLE 4 HERE

Addressing the fourth research question, which related to how knowledgeable and well-equipped coaches feel to deal with doping-related matters, Table 4 shows that the majority of coaches perceived themselves to have limited knowledge across the 10 doping-related topics. Furthermore, Mann Whitney U tests revealed a significant difference in median knowledge ratings between coaches who had been learning about anti-doping ($n = 199-209$) and coaches who had not ($n = 57-60$) for all 10 topics: harm of doping to the spirit of sport ($n = 205/n = 57$, $U = 4110.5$, $z = -3.6$, $p < 0.001$), consequences of doping ($n = 208/n = 58$, $U = 3624.5$, $z = -4.9$, $p < 0.001$), doping control procedures ($n = 208/n = 59$, $U = 3944.5$, $z = -4.4$, $p < 0.001$), prohibited substances and methods ($n = 209/n = 60$, $U = 2601$, $z = -7.4$, $p < 0.001$), athletes' rights and responsibilities ($n = 207/n = 59$, $U = 3502.5$, $z = -5.3$, $p < 0.001$), anti-doping rule violations ($n = 206/n = 59$, $U = 3406.5$, $z = -5.5$, $p < 0.001$), athlete support

¹ Whereabouts refers to information that a limited number of elite athletes must provide about their location (i.e., where they will be for one-hour per day for each day of the year) if they are in the registered testing pool of their International Sport Federation (IF) or National Anti-Doping Organization (NADO).

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personnel rights and responsibilities ($n = 208/n = 59$, $U = 3516$, $z = -5.3$, $p < 0.001$), Therapeutic Use Exemptions ($n = 209/n = 59$, $U = 3251$, $z = -5.9$, $p < 0.001$), managing the risks of nutritional supplements ($n = 209/n = 59$, $U = 3400.5$, $z = -5.6$, $p < 0.001$) and applicable whereabouts requirements ($n = 199/n = 59$, $U = 3701$, $z = -4.8$, $p < 0.001$).

INSERT TABLE 4 HERE

Beyond coaches' perceptions of their anti-doping knowledge, the impact of programmes was explored by asking coaches to report how well equipped they felt in working with their sportspeople on doping-related matters. Table 5 shows that almost half of coaches (41%) rated themselves as 'a little' equipped. The remaining coaches were relatively evenly divided between feeling 'not at all' equipped (22%) or 'fairly well' equipped (30%). Only 19 coaches (7%) rated themselves as 'very well' equipped. Table 5 also demonstrates that coaches who had learned about anti-doping reported themselves to be significantly better equipped than individuals who had not ($U = 3427$, $z = -6.45$, $p < .001$). This provides insights relevant to the fifth research question, investigating if there are differences in perceived competence between coaches who have and have not engaged with anti-doping learning opportunities.

In line with this, a Kruskal-Wallis test revealed a significant difference between the ratings of being equipped across the coaching domains ($\chi^2 = 27.58$, $p < .001$). Post-hoc Mann Whitney U tests revealed a significant difference between ratings from coaches working in an elite domain (who felt better equipped) compared to coaches working in all three participation domains and in blended roles (Elite/Children: $U = 92.5$, $z = -3.2$, $p = 0.001$, Elite/Adolescents: $U = 66$, $z = -2.5$, $p = 0.013$, Elite/Adults: $U = 85.5$, $z = -3.1$, $p = 0.002$, Elite/Blended: $U = 226$, $z = -3.4$, $p = 0.001$). Mann Whitney U tests also demonstrated a significant difference

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between coaches working in a performance domain (who felt better equipped) compared to coaches in all three participation domains and in blended roles (Performance/Children: $U = 231.5$, $z = -3.0$, $p = 0.002$, Performance/Adolescents: $U = 160$, $z = -2.1$, $p = 0.039$, Performance/Adults: $U = 212.5$, $z = -2.9$, $p = 0.004$, Performance/Blended: $U = 557$, $z = -3.2$, $p = 0.001$). Beyond this, coaches working with emerging athletes gave significantly higher ratings than those working in adult and children's participation sport and those in blended roles (Emerging/Children: $U = 497.5$, $z = -2.3$, $p = 0.02$, Emerging/Adults: $U = 437.5$, $z = -2.3$, $p = 0.019$, Emerging/Blended: $U = 1168$, $z = -2.7$, $p = 0.008$).

INSERT TABLE 5 HERE

Providing insights in relation to the third research question, which focussed on exploring if coaches are interested in learning about anti-doping in the future, the majority of coaches were 'fairly' (37%) or 'very' (34%) keen to learn more about anti-doping topics. To further evidence the potential impact of anti-doping education among coaches, when differentiating between those who had engaged in learning about anti-doping and those who had not, data showed that those who had learned about anti-doping previously were more predisposed to learn about anti-doping in the future than those who had not.

Qualitative Data

Five main themes were identified from coaches' responses to open-ended questions. They represented calls for anti-doping learning opportunities to 1) be integrated into the coach education and development process, 2) comprise of interactive activities, 3) raise coaches' awareness of fundamental issues, 4) not over-burden coaches, and 5) keep coaches up-to-date.

1. "It should be more forcibly included"

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Coaches stated that anti-doping learning opportunities should be a “compulsory”/“mandatory” component of the broader coach education and development process. Indeed, there was a strong sense that anti-doping education should be “integrated” into the coach development process via coach qualifications/certification, licensing and/or accreditation procedures. For example, one coach said:

Everything I know about doping has been through what I learnt as an athlete rather than what I've learnt as a coach. It might be good to add a bit into coaching qualifications about drugs and testing etc., so that everyone knows about it, as if I hadn't been an elite athlete I wouldn't know half the stuff I do.

Corroborating the quantitative data that indicated coaches' preference for mediated learning opportunities related to anti-doping, coaches specifically recommended the use of workshops and seminars. Illustrating this, one coach discussed “the need for all coaches to attend specific anti-doping workshops, which are compulsory if they wish to retain their coaching qualification.”

2. “Allow discussion, debate and practicals”

In line with coaches' calls for anti-doping learning opportunities to involve workshops and seminars (discussed in the previous theme), coaches indicated that they would like to receive interactive education that enables them to “learn about case studies” and “gain practical experiences” through the use of scenarios, question and answer activities, and “facilitated group discussions.” Referring to his experiences in the past, one coach recalled “Anti-doping seminars and workshops tend to be monotonous and dull, trying to make them more interactive and less lecture-like would make them more engaging.” Making recommendations for the future, another coach suggested “Sport specific scenario-based case studies: What should you do if...your athlete is selected for a random drug test but they have a second event to complete later that day?” Notably, several coaches emphasised the

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importance of 'interactivity' meaning having the opportunity to "share experiences", including "examples of good practice" and "challenging each other's beliefs and practices."

3. "Making sure coaches are aware of issues"

A number of coaches suggested that anti-doping education should aim to raise coaches' awareness of the topic to ensure coaches have "base knowledge." Topics that were specifically highlighted by coaches included banned substances and the consequences of taking them, as well as minimising the risks of medication and nutritional supplement use. Beyond this "basic information", coaches suggested that they should be signposted towards relevant resources should they need further information. One coach explained:

It should be a part of Level 2 certificates, to ensure coaches have the basic knowledge before being able to work alone/as lead coach, and also to be sure they are set up with the information on where to find out more if it becomes an issue for the [sportspeople] they work with.

4. "It should only be very basic"

Importantly, several coaches raised issues with anti-doping education providing them with too much content or taking time away from other topics. Several coaches commented that anti-doping learning opportunities should be "short", "quick", "brief", "easy" and "a small element." One coach said "basic info to allow coaches to research further. Too much info which doesn't apply will make us sleepy!" and another commented:

Why should a coaching course contain much about anti-doping when far more benefit for the majority would be gained by spending more time on good technique. Based on this, my recommendation would be to spend no more than 15 minutes on the subject, to make coaches aware of the issues, the medical consequences, and the punishment for the [sportsperson] which would also bring their sport into disrepute. The candidates should then be supplied with some basic literature they can refer to, but

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more importantly an individual within their organisation who they can refer to for specific and up to date advice.

This coach, among others, indicates that anti-doping is not of the utmost relevance when considered alongside the other components of his coaching practice and learning needs. Time appeared to be an underpinning factor, as one individual commented that “many coaches and players either do not have the time or the desire to go and attend courses.” Another suggested that if “you don't want to put people off or find that people are not renewing [their licenses], don't burden them with more things to do.” Therefore, coaches emphasised the importance of finding “the right balance that equips coaches without burdening them with more boxes to tick.” Interestingly, there was a sense that coaches saw anti-doping as most relevant (or only relevant) to coaches working in high performance domains. For example, one coach suggested “The higher level the coach, the more information should be required.”

5. “Keeping yourself up to date is difficult”.

Although coaches wished for anti-doping education that is brief to avoid it becoming burdensome, they stressed the importance of anti-doping education being delivered “regularly” and described their need for “updates” and “refreshers.” For instance, one coach called for “Regular seminars to keep us updated on current best practice” and another commented “I think email updates on the newest banned supplements and substances needs to happen.” A number of coaches explained that “up to date and consistent information” is necessary due to “the ever-changing landscape.” Coaches put forth suggestions ranging from “when needed” (i.e., when “significant changes” or “revisions” to process or substances occurs) to “annually” and every “few” years.

Taken together, the qualitative data provides several insights that expand our understanding of coaches’ experiences and opinions of anti-doping education. Specific to the

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research questions, information was gleaned related to coaches' previous experiences of learning about anti-doping (research question 2) and their preferences for future (research question 3). In particular, the data highlights that coaches would prefer to learn about core topics (i.e., substance and their effects) within anti-doping via mediated methods, such as workshops and seminars, as they enable interaction (i.e., discussion, role-play). The qualitative data has also provided insights into coaches' engagement with anti-doping-related learning opportunities (research question 1). Specifically, it illuminates the challenges coaches might face in engaging with anti-doping learning opportunities, including limited time and competing priorities.

Discussion

The purpose of the study was to investigate coaches' experiences and opinions of anti-doping education. The findings demonstrated that coaches' awareness of and engagement with existing anti-doping education programmes is low and approximately one in four coaches had never learned about anti-doping. Furthermore, those who have learned about anti-doping have typically engaged in self-directed learning, or experiential learning as an athlete and/or coach. Consequently, many coaches do not feel knowledgeable about anti-doping, and therefore perceive themselves to be ill-equipped. The coaches who had engaged in some form of anti-doping education – and were therefore better equipped to respond to doping-related issues – were more likely to be working in performance rather than participation domains. Going forward, coaches called for more learning opportunities, including the chance to interact with others, an increased provision of online, electronic and paper-based resources, and the integration of anti-doping into formal coach education and development pathways. They also suggested that learning opportunities should be interactive and facilitative of developing good practice. At the same time, coaches also emphasised the need for brevity and regularity.

Awareness of and engagement with anti-doping education

A key finding was that current anti-doping education is not fully reaching its target audience. This supports previous findings from coach-based anti-doping research (e.g., Fjeldheim, 1992; Mandic et al., 2013) and general coach education (North, 2009; European Commission, 2016). However, going beyond previous research, the current study found that coaches were most aware of, and had most often engaged with, the UK's national anti-doping education programme for athletes, 100% ME. It is worth noting that over a third of coaches had learned about anti-doping through their experience and therefore may have engaged with 100% ME as an athlete themselves – or through their athletes. In contrast, there was low awareness and engagement with 'coach-specific' programmes (i.e., WADA CoachTrue and UKAD Coach Clean). This supports previous research showing low engagement with these national and international resources (Patterson et al., 2014). Taken together, these findings signal a need to examine the mechanisms for the delivery of coach anti-doping education from a global to a local level, including investigating how sporting and anti-doping organisations promote their own and others' programmes. This is particularly important because the findings signal a misalignment between anti-doping policy and practice. Specifically, anti-doping policy directives state that education must reach athlete support personnel including coaches and this does not appear to be being fulfilled.

The current study provided unique insights into coach awareness and engagement with anti-doping education programmes across performance and participation domains, an issue previously highlighted in broader coach development literature by Erickson et al (2008). Specifically, coaches working in performance-oriented domains had learned about anti-doping more often than coaches working in participation domains. While doping issues might appear to be most relevant to sportspeople and coaches in performance domains, coaches working in participation sport are also subject to anti-doping rules and regulations.

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Additionally, research has shown that doping can be found across all levels of sporting competition, as well as fitness contexts (Backhouse et al., 2016). Furthermore, regardless of whether doping happens among young sportspeople, coaches are important actors in the holistic development of athletes (ICCE, ASOIF & LBU, 2013) and therefore should take a proactive approach to anti-doping, including their own and their athletes' education.

For the first time, this study examined the conversion rate for awareness to engagement in anti-doping programmes. The findings partially support previous research (Allen et al., 2017; Mazanov et al., 2015) pointing to low engagement being influenced by a lack of awareness of opportunities. Indeed, almost half of the coaches were unaware of programmes and therefore are unable to engage with them. However, the finding that only 57% of coaches who are aware of programmes actually engage with them signals a need for further research to investigate, in-depth, the reasons that coaches who are aware of existing education programmes do not engage with them. Research in broader coach education points to time and financial constraints as well as a lack of formal requirements to complete educational programmes prior to deployment as limiting factors (Nelson, Cushion & Potrac, 2013). A greater understanding of these elements within the anti-doping sector will ensure maximum reach and uptake of learning opportunities going forward.

Anti-doping education delivery mechanisms

In line with current research in coach development (Cushion et al., 2010; Erickson et al., 2008; González-Rivera et al., 2017; Lara-Bercial & Mallett, 2016; Stoszowski & Collins, 2016), this study shows that coaches receive, and prefer to receive, anti-doping education and information via multiple methods. In particular, coaches learned about anti-doping via self-directed means (e.g., searching the internet, reading), formal education (e.g., certification, seminars, workshops) and lived experience (i.e., as an athlete or a coach). This also

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corroborates previous anti-doping research findings (e.g., Mandic et al., 2013; Rodek et al., 2013; Sajber et al., 2013).

However, in the present study coaches favoured an increase in formal anti-doping education opportunities, including the integration of anti-doping into the coach education and CPD process (e.g., coaching-related degrees, qualifications, certification and licensing). Previous research in coach education has offered a mixed set of views in this regard. Some studies have shown that coaches typically place low value on formal education experiences (e.g., Cushion et al., 2010), yet this has recently been brought into question by recent research which showed the high value placed by coaches on formal education, particularly earlier in their careers (Estâvão Correia & Bertram, 2018; Lara-Bercial & Mallett, 2016). Nonetheless, it should be noted that the surveyed coaches also called for more opportunities to learn from others in informal settings such as peer groups and mentoring – and this is congruent with previous research in general coach education (e.g., Culver & Trudel, 2008; Mezquita et al., 2014; Stoszowski, & Collins, 2016). When these findings are taken together, coaches in this study are stressing the need for a greater variety of educational sources including a greater balance between mediated and unmediated opportunities. It is therefore imperative that this preference is embedded in future anti-doping interventions targeting coaches.

With regard to the integration of anti-doping into the coach education and CPD process, the inclusion of doping-related topics in the UK National Occupational Standards for sport coaching (Level 2 and 3) and in the ISCF (ICCE, ASOIF & LBU, 2013) and European Sport Coaching Framework (Lara-Bercial, North, Hämäläinen, Oltmanns, Minkhorst & Petrovic, 2017) goes some way to addressing this proposition. Such integration eliminates the lack of awareness and engagement with programmes among coaches. However, the nature of

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this integration (i.e., level of certification, topics covered) and the extent to which it impacts upon coach behaviours requires further consideration and analysis.

Content of anti-doping education and its impact

This study found that coaches' learning experiences to date have most commonly focussed on detection and deterrence, including the banned substance list, testing procedures, consequences of doping, anti-doping rule violations, and athlete rights and responsibilities. This is in line with the historical focus of anti-doping efforts. In contrast, less attention was paid to providing information on whereabouts, the risks of nutritional supplements, and therapeutic use exemptions (i.e., the legitimised use of medications). Low coverage of the latter two topics is particularly pertinent as recent evidence suggests that UK-based coaches are most commonly approached to discuss nutritional supplements and prescription medications (Patterson & Backhouse, 2018). Furthermore, inadvertent doping through the unintentional use of prohibited substances through the ingestion of nutritional supplements and over-the-counter medications is evident in the ADRV cases in the UK (UKAD, 2017). Importantly, evidence (Outram & Stewart, 2015) suggests that inadvertent doping through supplement and medication use is a global problem and so these findings have implications beyond the UK context and warrant further investigation.

It is obvious that coaches would benefit from learning about these topics – and so there appears to be a discrepancy between the content covered in programmes and coaches' needs in practice. The consequences of this situation are significant; as both the coach and the athlete are at risk of committing an ADRV. Overall, coaches generally reported themselves as having only 'a little' knowledge of key anti-doping areas and they did not perceive themselves to be well-equipped to work with their sportspeople on doping-related matters. These findings support previous coach-based anti-doping research that has shown that coaches perceive themselves to have low knowledge (e.g., Fjeldheim, 1992) and feel

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unprepared to deal with doping-related issues (e.g., Engelberg & Moston, 2016). Given that emerging evidence (e.g., Allen et al., 2017; Patterson & Backhouse, 2018) suggests that coaches' perceptions of low knowledge and being unprepared contributes to them being reluctant to undertake anti-doping actions, it is important that the content of programmes is adapted to meet coaches' needs – and effectively develop their knowledge and skills. Central to effectively developing coaches' knowledge and skills is coaches' stated desire that education should provide them with opportunities to develop good practice through interactive and practical experiences, such as scenarios and case studies (Driska & Gould, 2014; Mesquita et al., 2014; Morgan et al., 2013; Trudel, Culver & Werthner, 2013). Furthermore, given that coaches are important actors in the holistic development of athletes (ICCE, ASOIF & LBU, 2013), coach education should equip coaches to be 'agents of positive change' not just compliance officers. Programme developers must therefore consider including opportunities for coaches to develop their translational capability.

Coaches stressed the importance of programmes being 'short/quick/brief/easy' and not being given information that does not apply to them as this might take away time that could be spent on other topics. Indeed, coaches emphasised the need for a balance between equipping and overburdening coaches, a view which has been found in previous coaching research (Goslin & Davies, 2014) and advocated in policy documents such as the ISCF (ICCE, ASOIF & LBU, 2013). In this regard, some individuals explained that more information might be needed at the 'higher levels' (i.e. performance sport). Taken together, these findings have important implications for future anti-doping education programmes because giving coaches information that appears irrelevant or overwhelming is likely to lead to them disengage or have a negative view of education (Knowles, Holton & Swanson, 2011; Lara-Bercial et al., 2017). This could then impact on their willingness to engage in further

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anti-doping learning opportunities. Therefore, the content and format of anti-doping education programmes for coaches must be reviewed with these considerations in mind.

Although some changes to anti-doping education for coaches would likely increase programme reach and impact, a final contribution of the current study is the finding that coaches who had previously learned about anti-doping perceived themselves to be in a stronger position to engage in an anti-doping role than those who had not. Specifically, these coaches rated themselves as more knowledgeable of most topics, felt better equipped to work with sportspeople on doping-related matters, and were more interested in learning more about anti-doping going forward. These findings echo Stodter & Cushions's (2017) realisation that different coaches took away different learning from similar educational experiences based on their previous experience and approach to learning. Therefore, engaging with existing opportunities can have a positive impact in terms of building the coaches' confidence, interest and motivation for further engagement in the field – which signals that something is better than nothing in this context. Taken together with the findings related to providing relevant opportunities that do not 'over-burden' coaches, these insights indicate the need to be progressive and scaffold coaches' learning, which could be done through the ever more complex treatment of the topic over the various coach education course levels and professional development process.

Strengths and Limitations

This study makes several contributions to the limited body of coach-centred studies in the anti-doping field, particularly with regard to coaches' educational experiences and preferences. Notably, the survey gathered new insights (e.g., how and from whom education is provided) or greater detail (e.g., knowledge across a range of topics) because they had not been asked in this way previously. Moreover, the current sample of 292 is at the upper end of

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the sample sizes within studies conducted previously and no previous studies had conducted contextual comparisons (i.e., across performance and participation domains).

Despite these strengths, the study has several limitations that must be acknowledged. Firstly, the data captures the experiences, opinions and preferences of the coaches within this research only. Cross-sectional research can be vulnerable to sampling bias and the sample might not be representative of the UK's coaching population. For example, the proportion of salaried coaches in the current sample (12.3%) was greater than the estimated proportion (3%) of the UK's coaching population (sports coach UK, 2011). Additionally, with regards to the sample, it is difficult to ascertain if all respondents were indeed currently coaching in the UK or if individuals chose to respond to the survey more than once. The likelihood of this being the case was reduced by asking respondents for specific (and extensive) demographic information about their coaching practice and by checking responses for duplicates (i.e., matching demographic details across individuals). Nonetheless, caution should be exerted in over-generalising the findings and when implementing the recommendations. Lastly, for the most part, the questions within the survey only capture the 'what', not the 'why' and 'how' (Patton, 2002; Robson, 2011). Given that Backhouse and McKenna (2012) emphasised the need for anti-doping education to be contextually relevant, qualitative research is required to gain a deeper understanding of coaches' experiences of anti-doping education and if/how the experience(s) impact their every-day coaching practice.

Conclusion

The current study has shown that there is a need for greater coherence and cooperation between relevant agencies in the design, delivery and impact evaluation of anti-doping education programmes. Further research can inform ways in which organisations might enhance delivery through an investment of resource, including devising marketing strategies to ensure programme reach. For now, the findings of this study indicate that delivery and

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reach might be enhanced by integrating anti-doping education into the coach education and CPD process. Such integration of anti-doping education should be through mediated methods (i.e., workshops and seminars) and must promote the development of applied understanding and competencies (i.e., through case studies, scenarios). Indeed, this mediated provision should be focussed on developing and sharing good practice. In this vein, it might be complemented with unmediated learning opportunities, such as discussions and observations with other coaches. Making these changes will increase the likelihood of anti-doping education for coaches meeting coaches' preferences, which should enhance programme attractiveness (e.g., more engagement) and effectiveness (e.g., coaching feeling better prepared). Continued efforts to understand coaches' reticence to fully engage with anti-doping education are crucial if we are to design programmes that are likely to bring about action and shared accountability in the coaching community.

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