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Themed Collection on *Human enhancement drugs: emerging issues and responses.*

Performance and image enhancing drug interventions aimed at increasing knowledge among healthcare professionals (HCP): reflections on the implementation of the Dopinglinkki e-module in the HCP workforce in Europe and Australia

Atkinson^{*a}, A.M., van de Ven^{b,c}, K., Cunningham^c, M., de Zeeuw^d, T., Hibbert, E^{e,f}, Forlini^g, C., Barkoukis^h, V. and Sumnall, H.R^a.

- a. Public Health Institute, Liverpool John Moores University, Liverpool, United Kingdom.
- b. Centre for Rural Criminology, HASSE, University of New England, Armidale, NSW, Australia.
- c. Drug Policy Modelling Program, Social Policy Research Centre, UNSW, Sydney, NSW, Australia.
- d. Mainline, Amsterdam, The Netherlands.
- e. Nepean Clinical School, Faculty of Medicine and Health, University of Sydney, NSW, Australia
- f. Dept of Endocrinology, Nepean Hospital, Kingswood, NSW, Australia.
- g. Faculty of Health, Deakin University, Victoria, Australia
- h. Physical Education and Sports Science, Aristotle University of Thessaloniki.

* Corresponding author. Email: a.m.atkinson@ljmu.ac.uk; phone: +44 151 231 428

Abstract

Background. Healthcare professionals (HCPs) provide an important point of contact through which people who use performance and image enhancing drugs (PIEDs) could access reliable information, advice, and interventions on a range of PIEDs, their use and related harms. However, HCPs often report difficulties engaging and building rapport with people who use PIEDs, and research suggests that they often lack specialist knowledge on these substances. Providing credible evidence-based resources to support HCPs is thus important. However, educational materials in this area are generally absent and the ones that do exist are not assessed for their utility in the HCP workforce. This paper examines the acceptability and usability of a PIED e-learning module (the Dopinglinkki e-module) targeted at HCPs in three EU Member States and Australia. **Methods.** A standardised two stage, mixed methodology was implemented. Stage 1 involved HCP completing the e-module and completing an online survey (N=77). Stage 2 involved conducting individual structured interviews with a subset of survey respondents (N=37). Normalisation Process Theory and the Theoretical Framework of Acceptability were used as conceptual lenses. **Findings.** The e-module provided information that was perceived as useful for HCPs' current and future practice. However, several individual, organisational and societal level barriers were reported as preventing the e-module becoming an accepted and normalised aspect of the HCP workforce, including the need for up to date evidence, the time-consuming nature of completing the e-module, lack of organisational support, the use of over-complex language, and the modules potential to reinforce the stigmatisation of PIEDs. **Conclusion.** Providing credible evidence-based resources to support HCPs knowledge development is important. Evidence-based and theory informed interventions are needed to equip HCPs with knowledge that can aid culturally sensitive interactions and effective engagement with people who use PIEDs. Reflecting on our study findings, it is important that the development of interventions should include the voices of both HCP and those using PIEDs, and that careful consideration should be given to the various factors that may act as a barrier to effective implementation.

Keywords: performance and image enhancing drugs (PIEDs); anabolic-androgenic steroids; workforce development; interventions; online learning; prevention; professional health culture

Article word count: 6337.

Introduction

In the last two decades it has become clear that the use of performance and image enhancing drugs (PIEDs) is not simply an issue in professional sport (where the term 'doping' is preferred) but occurs in a variety of diverse groups. Indeed, there is a growing body of evidence, which demonstrates that PIED use is widespread, particularly in groups interested in physical fitness and other recreational sports (Sagoe et al., 2014). There are various types of PIEDs, such as anabolic-androgenic steroids (AAS) used for muscle mass, or ephedrine used for weight-loss. The associated physical and psychological health issues depend on the types of substance used and their forms of administration (e.g. see van de Ven et al., 2020a; Pope et al., 2014). A wide range of policy responses have been advocated, developed and in some cases implemented, such as school prevention programs (Backhouse et al., 2014), harm reduction measures (van de Ven et al., 2020a), treatment, and other behaviour change interventions (Bates et al., 2019a;b) to target this growing public health concern. Nevertheless, effective public health responses to PIED use are still lacking, including the training of health care professionals (HCPs) who work with people who use PIEDs in primary and secondary care settings. Furthermore, despite people who use PIEDs representing a growing client group in needle and syringe programs (NSPs) in Australia and the UK, staff generally report having little knowledge of these substances, and experiencing difficulties engaging with user groups (e.g. Dunn et al., 2014; Iversen et al., 2016).

Frontline HCPs in particular, play an important role in the delivery of substance use prevention, education, and other interventions (see Roche et al., 2009). Research, for example, shows that even relatively brief interventions by HCPs, requiring just 10–15 minutes of advice-giving and/or counselling, can be effective in reducing substance use (e.g. see Bernstein et al., 2005; Kaner et al., 2018). Despite this, engagement with HCPs is low amongst people who use PIEDs. For instance, earlier research found that more than half (56%) of people who use AAS had never divulged their use to a doctor (Pope et al., 2004). More recently, an analysis of a subgroup of respondents from the online Global Drug Survey (Zahnow et al., 2017) showed that there is a reluctance among people who use AAS to engage with health services, with only 35.23% reporting that they visited a doctor when experiencing concerns about adverse effects. Similarly, low levels of engagement have been reported in bodybuilders and other people who inject AAS (Hope et al., 2015). In addition, people who use PIEDs are reluctant to attend traditional drug services (e.g. NSPs) for fear of being labelled as a 'drug user' (Brennan et al., 2016). This reluctance to seek medical assistance is problematic as consumers can experience adverse effects, with some being serious in nature (e.g. cardiovascular damage, liver disorders) (Zahnow et al., 2017). As such, improving engagement is key to prevent and/or reduce adverse effects of PIED use.

People who use PIEDs face numerous barriers to engagement with health services. Firstly, a critical issue underlying this lack of help-seeking behaviour amongst this group is trust in HCPs. That is, people who use PIEDs often report not trusting HCPs as a knowledgeable and non-judgemental source of information or perceive them not to have competency in this area of drug use (Kanayama et al., 2010; Pope et al., 2004). Consequently, people who use PIEDs may seek information from other sources believed to be more trustworthy and credible, such as peers and online fora (Kimergard & McVeigh, 2014). While some (online) sources provide balanced information about the pros (e.g., muscle growth) and cons (e.g., health harms) associated with PIED use, many only briefly mention the health harms associated with use, and the advantages of use may be promoted to a greater extent (Brennan et al., 2013). A second evidenced barrier is the significant stigma that exists around PIED use, particularly the use of AAS (Yu et al., 2015; Griffiths et al., 2016; Palamar et al., 2011), which may lead to individuals concealing their use when presenting to HCPs, or deter them from seeking help. Given the low level of help-seeking behaviours among this group, HCPs may not fully appreciate the motivations, prevalence, modes of use, and complexity of complications associated with PIED use. As such, they may not be adequately prepared to treat these individuals effectively when they are given the opportunity.

Currently, there are few educational materials and programmes that focus on people who use PIEDs outside of professional sport, and even fewer have been evaluated for their effectiveness (Backhouse et al., 2014; Bates et al., 2019a; 2019b). In the health field there has been a growth in the availability and use of digital (including online and app-based) interventions (McKay et al., 2019; Michie et al., 2017; Webb et al., 2010), and in the general substance use field, some digital interventions have been shown to be effective in reducing use and associated harms (e.g. Hoch et al., 2016; Moore et al., 2013; Schoeppe et al., 2016; Tait et al., 2013). However, to the best of our knowledge, whilst there have been a limited number of evaluations of digital interventions for PIED/doping prevention (e.g. Elbe and Brand, 2016; Nicholls et al., 2020), there have been no evaluations of digital training activities for HCP. More generally, despite their proliferation and popularity, digital interventions in the health field have been criticised because of a lack of attention paid to how they are developed (including reference to relevant behaviour change theories and models), whether they adhere to professional standards and ethics, whether they engage target groups, and if they have been evaluated for (cost) effectiveness (Yardley et al., 2016).

It is also unclear how many PIED materials and programmes (whether traditional or digital) have been co-produced in collaboration with stakeholders (such as HCPs or people who use PIEDs) which would improve the development of context-sensitive behaviour change strategies (Coulter & Collins, 2011; Hawkins et al., 2017). Intervention content developed in accordance with such

principles are of greater relevance to end-users, and may lead to better implementation and acceptability by target groups, and ultimately effectiveness (Hawkins et al., 2017).

To address some of these gaps, this article presents a case study of the European Doping e-Learning Tools (DELTS) project, also piloted in Australia, which examined the acceptability and usability of an evidence-informed e-learning module (the Dopinglinkki e-module) aimed at increasing knowledge on PIEDs among HCPs in three European Union Member States and Australia. Reflecting on the research process and findings, this paper (1) discusses the acceptability and usability of the Dopinglinkki e-module amongst HCP, and (2) provides a wider discussion of the key factors affecting the successful uptake of PIED interventions in the HCP workforce. We reflect on the findings to highlight some important factors at individual, organisational and systems levels that affect implementation of PIED interventions, and barriers to them becoming an accepted and normalised aspect of HCPs future practice in response to PIED use.

Methods

Theoretical perspective

We utilised the Normalisation Process Theory (NPT) (Murray, 2010) and the Theoretical Framework of Acceptability (TFA) (Sekhon et al., 2017) as conceptual lenses through which we developed our questions and approach to analysis. See Supplementary Tables S1 and S2 for how these mapped onto NPT/TFA components. The NPT is a heuristic framework (May, et al., 2018) which includes key mechanisms that explain the 'work' required to embed an intervention in routine practice (i.e. 'normalisation' of an intervention). It is a middle range theory that was developed as a way of understanding the interactions and social processes through which new practices or interventions are implemented; how they enter routine practice; and how variations in implementation are shaped by features of local delivery systems (e.g. health services). Briefly, these four mechanisms are (1) *coherence* - the sense-making work that people do individually and collectively when they are expected to operationalise a new practice (e.g. understanding the purpose of the tool, how it differs from usual ways of working, and how it could be useful to their professional practice); (2) *cognitive participation* - the work that people do to build and sustain practice around a new intervention (e.g. acknowledging that developing knowledge on PIEDs is part of HCPs role and that this might lead to changes in practice, identifying key people who would drive forward use of the tool, supporting the use of the tool by other HCPs); (3) *collective action* - the operational work that people do to enact a set of practices (e.g. sufficient time and resources are provided to CHPS to help them use the tool, and introduction is supported by management); and (4) *reflexive monitoring* - the

appraisal work that people do to assess and understand the ways in which a new set of practices affect them and others around them (e.g. agreement between HCPs that the tool is worthwhile, and it has the potential to lead to changes in working practices). The NPT framework has been applied across all elements of the intervention development process (May et al., 2018; Medical Research Council, 2008), including studies of implementation challenges (e.g. Elwyn et al., 2008) In this study, core NPT mechanisms were used to help understand implementation processes such as the individual and contextual factors (including HCP's agency and experience) and the 'work' required to support normalisation of activities to develop PIED-related skills.

The TFA provides a guide to understanding the extent to which people (i.e. HCP) delivering or receiving a healthcare intervention (i.e. the PIED tool) consider it to be appropriate to their professional practice (Sekhon et al., 2017), and includes constructs that complement those outlined for NPT. In this study we drew upon TFA components, including ethicality (the extent to which the tool had good fit with participant's value system on the ethics of PIED use), affective attitude (how the individual felt about using the tool), burden (the perceived amount of effort required to complete the tool), perceived effectiveness (the extent to which the participant believed the tool would achieve its likely purpose), self-efficacy (participants' confidence that they could complete the tool and incorporate learning into their practice), and intervention coherence (the extent to which participants understood the purpose of the tool).

The Dopinglinkki tool

The DELTS tool was originally developed by the Dopinglinkki project in Finland, which is part of the A-Clinic Foundation, a non-governmental organisation provider of drug treatment services. It targets HCP, but no previous specialism with PIEDs is assumed. In accordance with behaviour change taxonomies (Michie et al., 2013), it is classed as an educational intervention. It is a module-based online learning suite designed to be completed by the individual on a desktop computer in the workplace, and includes text, diagrams, videos, bibliographies, and self-assessment of learning outcomes. The tool aims to improve knowledge through the provision of information on a number of topics of relevance for HCP who work with people using PIEDs: motives for PIED use; PIED use and the law; the different types of PIEDs; adverse health effects of PIED use; poly-drug use; myths about use; and how to encourage HCP engagement with PIED-using individuals without moralising about use (e.g. through empathy and informed discussion about the motivations for PIED use). The tool did not specifically include any practical skills-development components as it was primarily designed to furnish knowledge to support HCP's usual practice with people who use PIED. The modular format means that the tool does not have to be completed in one session, and progress can be saved. For the purposes of this study, the tool was translated into different languages by the project lead in each

country, and cultural and legal content was updated and tailored to the country of intended use (e.g. legal status, prevalence of use).

The research process and participants

A standardised two stage, mixed methodology was implemented across the four participating countries. *Stage 1.* Convenience sampling from professional and PIED networks in each country were used to recruit HCP to complete the tool. A total of 77 (Finland n=21; Netherlands n=20; United Kingdom n=20; Australia n=16) participants completed the module and an online survey involving questions on its utility. As this study investigated acceptability and usability and not intervention outcomes, a sample size calculation was not necessary, but sampling was purposive to ensure representation from all relevant HCP groups in each country who would be likely to work with people using PIEDs. Twenty-three described themselves as healthcare professionals (including nurses, doctors/physicians, specialists), 21 were drug/alcohol workers; 2 policy makers. The remaining occupations included medical and nursing students, police, and health promotion workers.

The survey included 27 researcher-developed questions across four sections. Section 1 asked questions about the participants (e.g. age, gender, ethnicity; profession, job title, education, previous training on PIEDs) and section 2 about use of PIEDs among their clients (e.g. number of clients who use PIEDs, user groups engaged with (e.g. age range, gender, body builders, professional/elite athletes, amateur athletes). Section 3 asked questions about the module content and its use (e.g. whether they completed the module, time to complete, whether the module was completed in work or their free time (or both)). Participants were asked whether they agreed with a number of statements on a Likert scale (where 0 'totally disagree' to 5 'totally agree') and these were based on NPT/TFA constructs (see Supplementary material Table S1). Section 4 asked participants to self-assess their learning: whether they felt completing the module would help them to; assess the risks of PIED use; understand the long-term adverse effects of PIED use; recognise the symptoms and signs of PIED use; identify some of the myths around PIED use; engage with a person who uses PIEDs.

Stage 2. All survey respondents were also invited to take part in an individual structured interview (N=37; Finland n=10, Netherlands n=10, United Kingdom n=7, Australia n=10) to assess their experiences of completing the module, and perspectives on future implementation in their own and general healthcare practice. Interviewees were drawn from a range of healthcare professions including doctors/physicians, sexual health workers, pharmacists, medical students, nurses, needle exchange workers, and substance use workers. The interview schedule consisted of six sections and 33 questions. Interviews were conducted by the project lead in each country and were conducted via

telephone. Supplementary material Table S2 provides a summary of each section and examples of the questions asked.

Ethical approval was obtained from relevant bodies in each participant institution (e.g. University Research Ethics Committees, local health districts) for all stages of the project.

Analysis

The questionnaire addressed a number of key areas, including professional characteristics, previous training and training needs, current sources of PIED information, experiences of working with people who use PIEDs, current PIED practice, self-assessment of learning goals, experience of using the module, and its future use. Descriptive statistics were analysed using SPSS v26 (IBM Corp, 2019). Open text responses from the online survey were extracted and analysed separately, and considered alongside the interview data, and feedback provided within the online module. Interviews with the sub-sample of participants were conducted using a standardised interview schedule which focussed on their experience of using the module (e.g. what additional effort to their normal working routine was involved, their expectations), module content, the perceived impact of the module, and its future use (e.g. barriers to routine implementation). Interviews were analysed using a thematic coding frame incorporating a combination of pre-determined (research questions and theoretical lenses as outlined above) and emerging themes using a thematic analysis approach in NVivo (version 10) (Braun & Clarke, 2006). We followed Braun and Clarke's (2006) steps, which involved closely reading the transcribed interviews and systematically applying the coding frame and generating additional codes, which were then collated into themes that worked across the transcripts.

Findings

Gaps in knowledge, skills and credible resources

The survey responses show that HCPs reported difficulties engaging with people who use PIEDs, and wider barriers that prevented target groups from engaging with health services, with around a third (35%) mentioning negative societal attitudes and stigma, even within professional services. Thirty percent reported having received formal training on PIEDs, usually post-qualification and as part of professional development activities, and 60.5% felt they required further information and training on PIED use and associated harms. Thus, development of PIED knowledge and skills was not a normalised aspect of practice for the majority of HCPs participating in the research. However, there was a willingness to learn, and a recognition of gaps in knowledge and training within

their organisations and the wider health care field. Indeed, concerns were raised regarding a perceived lack of credible PIED resources in the public domain and the need for such resources. Interview participants noted that the module was much-needed and was even considered relatively '*better*' than existing training resources ('*There is no other tool of that calibre*', Pharmacist, Australia), and as a positive step towards filling a '*massive gap in people's knowledge*' (Harm reduction worker, UK).

Perceived effectiveness and practical utility

The perceived effectiveness and practical utility of an intervention are important factors contributing to the likelihood that it will be accepted and normalised within a health care setting. Generally, the module content appeared to be compatible with existing practices and individual and organisational values of both preventing use and reducing harm. Participants generally felt that it was a 'good idea' and although participants were from varied backgrounds, they suggested a number of uses for the module. As the survey data shows, there was consensus that completing the module would lead to increased knowledge (see Table 1 for self-reported learning outcomes), which was viewed as useful in aiding interactions, the identification of use and harms and in turn, and treating the health effects that may arise from PIED use. This was also supported by the interviews, for example, medical doctors reported that the module would allow them to '*treat and guide them [patients] better if they have symptoms caused by PIED use*' (Doctor 1, Finland). However, whilst participants from a range of healthcare backgrounds felt that they had a responsibility to address PIED use and harms within their professional practice, there was a lack of consensus with regards to how effective the resource was in preventing PIED use and the role of health professionals therein. In the interviews it was highlighted that whilst some felt that prevention was achievable through providing clients with information that could inform their decisions around use, others questioned their role in prevention ('*As a doctor the aim is not in prevention, it's more about treating*', Medical student, Finland) and whether simply passing on information can lead to behaviour change.

In terms of its practical utility, whilst 91% of participants felt that the module content was credible and many defined the module as such (e.g. '*It came across credible*', Social worker, The Netherlands; '*I have no doubt...that the information was coming from people that knew what they were talking about*', Pharmacist, Australia), the acceptance and practical utility of the module was limited by a perceived lack of credibility among others, particularly the view that some content was outdated ('*What I saw of the module I found a big step forward but certain areas were dated*', Harm reduction worker, with lived experience, UK). Importantly, for a topic area where evidence is constantly developing and emerging, information resources such as the e-module must be reviewed on an ongoing basis to ensure that content reflects the evidence-base on current trends in use, harms and effective responses. In addition, despite the majority of survey participants (74%) reporting that

they would recommend the tool to a colleague (*'I would absolutely recommend every physician to study the course', Doctor, Finland*), only 62% were prepared to invest time, energy and work in using the tool in future, with only 39% reporting that they would use the module in the next 12 months. Interview data revealed that whilst the module was appreciated for providing a wealth of useful information, it lacked practical utility in its current form. For example, a clinical nurse (Australia) noted, *'basically, understanding all that stuff doesn't really make much difference on our day to day practice'*.

Moreover, a lack of harm reduction messages was highlighted as a key barrier to the practical application of the module content to the working practices of both primary and secondary care physicians and other health care workers. Indeed, the module was regarded as lacking harm reduction messages (*'I missed specific harm reduction advice', Prevention specialist, The Netherlands*) (e.g. information of safer injecting, how to treat harms, interpreting blood work) that could be used in practise and was also described as *'conservative'* in nature (Sports dietician, The Netherlands). Information was also requested on referral, the ethics and legality surrounding professionals' role in responding to use and content on additional substances such as food and nutritional supplements. Clarity regarding the legality of use in some countries was also requested, and information on the reality that people use a range of substances in addition to AAS. Importantly, it was noted that the content focussed on harms, with a lack of reference to the pleasures and positives of use, thus neglecting an important aspect of use and the varied motivations of use.

Table 1 Self-reported learning outcomes

| Learning outcome | % of participants |
|--|--------------------------|
| Assess the risks of PIED use | 82% (n=63) |
| Understand the long-term adverse effects of PIED use | 77% (n=59) |
| Recognising the symptoms and signs of PIED use | 75% (n=58) |
| Identify some of the myths around PIED use | 71% (n=55) |
| Engage with a person who uses PIEDs | 66% (n=52) |

Stigma and language

Preventing experiences of stigma for those using PIEDs and equipping HCPs with the skills required to respond to PIED use in a culturally sensitive and competent manner is crucial. The survey data shows that three quarters (75%) of HCPs felt that the module would help them to identify myths and access unbiased information and 66% felt it would help them to engage with clients using PIEDs. In the interviews it was also mentioned by those working in the medical profession that completing the module would allow them to interact with clients who they suspected were using PIEDs, in a non-

judgmental manner, and as such, help prevent (perceptions of) stigma that may act as a barrier to seeking support. For example, as noted by a Dermatologist (Finland), *'knowing more about the phenomenon helps me not to moralise patients and lessen the stigma, makes it easier to meet the patient as an individual'*. However, our interview data highlighted the importance of language, with those with greater prior experience of working with people who use PIEDs raising concerns that the e-module may be counterproductive by reinforcing stigma through the use of language that was labelled as *'stigmatising'*, *'demonising'* and *'moralising'*. For example, the word *'doping'* was felt to be a form of *'stigmatising language'* by some UK (Drug and alcohol worker, UK) and Australian participants (*'It had stigmatising terms all the way through'*, Clinical nurse, Australia), yet the interpretation of such language appeared to be role, country and culturally specific.

Barriers to intervention acceptance and normalisation within the healthcare workforce

Self-efficacy and levels of prior knowledge influenced the degree to which participants from different professions accepted the module in its current form. The interview data made clear that the content was inaccessible to many, who regarded it as too *'complex'*, *'academic'* and *'medical'* (e.g. Health education officer, Australia). This particularly applied to those who were not medical doctors, which led to them feeling overwhelmed by the content. For example, as noted by a drug and alcohol worker (UK), *'I feel it was too academic and some medical terms could have been used in lay man's terms as I spent a lot of time looking up meanings in the medical dictionaries'*. The module content thus requires amending, simplifying and tailoring to support different levels of knowledge and preferred modes of learning, to ensure the knowledge learned can be applied in real world settings. For example, it was suggested that a simplified version of the module that HCPs could use in consultations with clients using PIEDs, would allow them to quickly access and apply information in real life practice.

In addition, whilst e-learning was considered a cost effective approach to education within health care settings, particularly among professionals working within pressurised environments where time is limited, it was not the preferred form by all participants. Some preferred more traditional training approaches, and expressed the value of human interaction that comes with face-to-face learning. Moreover, those in favour of e-learning emphasised the importance of interactive components and innovative features to aid learning, which many felt the module currently lacked (*'As a visual person I liked the pics, tables and videos, they helped in taking in the information. More visual elements would help'*, Medical Student, Finland).

Finally, our survey data illustrates that participation in the module was restricted by wider constraints on time, which meant that 73% of participants had completed and used the tool in their own time and around a third (30%) felt that the module took too long to complete. HCPs felt that a

lack of designated time within the working day to complete training was as a main barrier to its use, particularly in the context of competing demands. This was also noted in the interviews, for example, a nurse (the Netherlands) reported that, *'The present course requires quite some time investment. The employer has to facilitate this. If people have to do it in their spare time, I think then a lot of people will not do the course'*. As such, organisational support and buy in was felt to be essential in ensuring time was provided and to achieve acceptance beyond the individual, and the normalisation of such interventions within professional practice. However, only 52% felt that senior management and their organisation more broadly would support use of the module among staff in its current form. As noted by participants, one way through which organisations could be encouraged to support the module was through course accreditation, and mandatory completion at the organisational level. For instance, a needle exchanger worker (UK) noted that, *'If it was made compulsory cos it [training] doesn't happen in the services, especially the drug and alcohol recovery services'*.

Discussion

The Dopinglinkki e-module provides a valuable contribution to the field of PIED education and begins to address an important gap in the provision of responses aimed at training HCP. Participants recognised a need for resources such as this to improve HCP knowledge and skills to aid effective and culturally sensitive interaction with clients who use, or may be considering using, PIEDs. The module content provided information that was new to many of the HCPs who accessed it, and was perceived as useful to their current and future practice. However, a number of concerns at the module, individual, organisational and societal level were reported as barriers to the acceptance of the module in its current form, and in preventing the e-module becoming a normalised aspect of HCPs' future practice. This includes the need for the inclusion of up to date evidence, organisation support to complete the e-module, the time-consuming nature of completing the module (particularly in working hours), the use of over complex language, and the modules potential to reinforce the stigmatisation of PIEDs. Reflecting on these barriers, it is important to support the design, development and implementation of PIED interventions, and (online) training and information resources in the alcohol and illicit drugs and other health workforce more broadly.

Firstly, our findings show that health service organisation and its senior management need to support the use of such interventions, and support or mandate training in this area for staff in order for it to occur. Moreover, technological resources (e.g., computers, internet accessibility, IT support) need to be made available to support the use of such interventions, particularly if being run online. This need for workforce development in relation to a specific substance or client group is not unique to PIEDs; as a lack of sufficient training and educational opportunities is an issue within the substance workforce more generally (van de Ven et al., 2020b; van de Ven et al., 2020c), and there are

difficulties in attracting funding when it comes to PIEDs (Kiepek et al., 2019). Some of these difficulties relate to the assumption that PIED use is necessarily problematic and illicit, which reinforces stigma around substance use. In addition, implementation of interventions place additional resource burdens on health care workforces which limits the extent to which they are accepted as part of routine practice. Research undertaken with co-ordinators of (inter)national anti-doping educational programmes has identified similar challenges to programme implementation with coaches (Paterson et al., 2016). Despite the World Anti-Doping Code emphasising the importance of this type of activity, with coaching staff subject to sanctions for Code breaches, a lack of national co-ordination, scarce resources, and low levels of coaching buy-in has meant that these programmes have been poorly implemented. There was a perception that anti-doping efforts had historically been understood by both coaches and athletes to 'catch cheats' rather than to preserve sporting integrity, or support the health and well-being of athletes. This meant that work had to be undertaken to develop trust and relationships with target groups as a pre-requisite to educational programmes. At sub-national levels, coaches in team sports were willing to support anti-doping efforts, but were generally passive in their everyday practice, with perceptions that anti-doping activity was the responsibility of others in their organisation or unnecessary to their core skills performance development roles (Patterson and Backhouse, 2018).

Comparison with previous findings from the substance use field (outside of PIEDs) may also be useful (Sumnall, 2019). In the current study we found that only 30% of participants had ever received training on PIEDs, usually as part of post-qualification development activities. Previous attempts, at least in Europe, to promote multidisciplinary perspectives in the drug treatment field have not been successful (see overview by Pavlovska et al., 2017). Specific training has usually been incorporated into existing (non-drug related) professional roles (e.g. physician, nurse, social worker), and is considered supplementary to the core skills of those occupations. Training has most often been provided post-qualification (or as part of post-graduate education); and this has subsequently led to the prioritisation of discipline-specific perspectives in accordance with prevailing pedagogy and praxis. Responses to substance use are therefore secondary to the identity and practices of these professional groups, and not considered a specialism, suggesting that new approaches to practice, such as through the delivery of training, would be most successful where it is designed, delivered, and understood in relation to the language and routine practice of that occupation.

As our findings illustrated, HCPs are a time-poor workforce and as such, education interventions must be easy to use and understand, readily accessible as routine reference materials, and of a suitable length to prevent imposing additional burdens. Ensuring ease of access may be one means of embedding PIED educational and reference materials in the everyday working practices of professionals. It is therefore important to find innovative, cost-effective, time-efficient and

easily scalable ways to provide educational and training opportunities. Desktop computers and personal mobile devices have become an integral part of personal and professional life, and as these platforms have the potential to reach large numbers of the target group without the need for delivery of interventions by trained professionals, digital interventions may be potentially more cost effective than traditional delivery (McKay et al., 2019). These technologies may also confer additional advantages over traditional delivery techniques for target behaviours such as PIED use because they confer privacy for people who use substances and may be more accessible than physical services and programmes (EMCDDA, 2014). For HCP, digital training can provide standardised content that can be accessed when required as a reference material, or studied in more detail outside of busy clinical hours. However, as with traditional forms of health behaviour intervention (e.g. Faggiano et al., 2014) widespread implementation (or publishing in digital marketplaces for apps) of health-based digital interventions has tended to precede evaluation (McKay et al., 2018), and few have been developed in accordance with intervention development frameworks (Medical Research Council, 2008).

Accordingly, our findings suggested that whilst having high levels of acceptability and having already been implemented in one European country (Finland), the module should still be considered to be in the early stages of the intervention development cycle, which would restrict dissemination elsewhere. As highlighted in the MRC guidance on the development (and evaluation) of complex interventions (2008), intervention development is a long-term process, and premature dissemination of PIED interventions is one reason why so few approaches have been found to be effective in reviews (Bates et al., 2019b). Importantly, in this area there is a lack of application of theoretically informed intervention design and programme theories, unclear behaviour change techniques or targets, and few approaches that have utilised frameworks that support systematic actions to develop, manage, and evaluate interventions (McKay et al., 2018; O’Caithain et al., 2019; Stoyanov et al., 2015). Whilst we incorporated NPT and TFA in our evaluation design, a notable limitation of the Dopinglinkki e-module was the lack of a theoretical underpinning to understandings of PIED motivations. Information sources and interventions should also consider socioecological models of PIED use that recognise that individuals and behaviours exist within complex physical and social systems and result from the interaction of various factors at the individual, social network, institutional, community, and societal levels (Bates et al., 2019a). Such models provide a useful conceptual tool for designing interventions to ensure health professionals consider and understand a range of factors that influence PIED use. We would therefore encourage PIED intervention designers and developers to adopt relevant frameworks.

As our data illustrates, it is important for interventions to be adapted to fit different healthcare role needs and cultural contexts, rather than a universal approach. There were differences in the

types of healthcare activities and outcomes that were valued, prioritised, and considered to be part of the professional groups' activities (e.g. harm reduction, prevention, treatment). Our data, for example, shows that doctors and clinical nurses have a greater need for training protocols that illustrate diagnostic criteria and detailed medical information associated with PIED use, while NSP staff require more practical (i.e. harm reduction) information to support engagement with people who use PIEDs. As such, to enhance the practical utility of any training tool, some level of tailoring to the educational background and profession of end-users is required. As our data shows, e-modules need to be easily accessible and easy to understand for a variety of professionals in the organisation, not require large amounts of time, or high levels of technical skills to use. Tailoring for different HCPs could be achieved through a single online education resource with a content page and in each section a simple summary in lay terms and then a link to click on for more detailed information and references.

Finally, another important consideration is the absence of the voice of people who use PIEDs from the e-module material; implicitly, but also more explicitly in the form of (video) interviews with those using PIEDs. Therefore, in developing unbiased educational material, consultation with people who use PIEDs during the creation process, including participatory design, is a prerequisite and not an add-on. The rationale for this is that people who use PIEDs often raise concerns about stigma when dealing with health professionals, and it is one of the main reasons for this group to avoid formal healthcare (Jorstad et al., 2018; Zahnow et al., 2017). Research confirms the presence of (negative) stereotypic beliefs among doctors about people who use AAS (Yu et al., 2015). Information provision is one way to reduce stigma among health professionals, provided that the information is able to provide a nuanced and informed representation of people who use PIEDs (Harvey et al., 2019). For instance, incorporating aspects on the positive and pleasurable effects that people experience from using PIEDs (Mulrooney et al., 2019) into the content is essential, as a lack of acknowledgement of the realities of use by HCP may lead to them losing credibility among PIED-using clients, in turn preventing help seeking. As such, a motive for people who use PIEDs to consult a doctor, may not necessarily be to stop or reduce their use but to keep negative side effects as small as possible while maximizing 'gains' (muscle growth, strength, fat loss, etc.). It is therefore paramount to take these subtleties into account when creating educational materials for HCP.

Limitations

Convenience sampling was used and a small numbers of HCPs participated in the research. Whilst this means that the findings cannot be generalised to all HCPs, generalisation was not intended and a mixed methods approach incorporating both quantitative and qualitative methods allowed us to gain a deeper insight into participants experiences of using the module through providing the opportunity (interview) to discuss and explain their experiences in their own words. Although the

interviews provided participants with the opportunity to reflect upon and explain their experiences of using the module in greater detail, the structured and theoretically informed nature of the interviews may have limited the extent to which participants discussed issues of importance that fell outside of the predetermined questioning. We also focussed on experience at the individual level, and did not assess acceptability and utility at the organisational level (i.e. implementation within whole workplace settings, and cultures, or specific organisations). Whilst this approach allowed us to gain individual insight across a range of professions who come into contact with people who use PIEDs, it limited the extent to which the impact of organisational culture on acceptance, utility and normalisation could be determined. Future research should assess the implementation and effectiveness of the module within specific health care settings through gaining organisational support, and include research with those working in senior management, who have decision making roles with regards staff education and training.

Conclusion

Gaps in knowledge and skills in the HCP workforce regarding the use of PIEDs act as a barrier to people who use PIEDs accessing the care and support needed to maintain positive health and wellbeing. Evidence-based and theoretical informed interventions are needed to develop skills and competence among HCPs to aid culturally sensitive interactions and effective engagement. Reflecting on our study findings, it is important that intervention design carefully considers the various factors that may act as barriers to intervention acceptance and effective implementation. Our research found that the time-consuming nature of completing the e-module, a lack of organisational support, the use of over-complex language, and the modules potential to reinforce the stigmatisation of PIEDs prevented it from being accepted in its current form. The module requires adaption based on participant feedback and further research is needed which incorporates the voices of people who use PIEDs. The effectiveness of the adapted resources should be evaluated to assess whether training of this nature can become normalised routine practice within health care settings, and in turn, enhance HCP knowledge in a way that improves engagement and respectful interactions between HCPs and people who use PIEDs.

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