

Title Page

Title: Social Work Implications of Anabolic-Androgenic Steroid Use, particularly among young people: A literature review

Abstract

Non-prescribed Anabolic-Androgenic Steroid (AAS) use has increased during recent years. Often used “recreationally” and for aesthetic purposes, AAS are easily purchased over the internet and informally from gym-using peers. Social workers have a responsibility to support service users, to identify and manage risks and AAS use raises some noteworthy challenges to social work practice. This literature review aims to identify AAS-related knowledge social workers might require and consider its implications for social work practice. Although some of the evidence is inconclusive, particularly in relation to causal relationships between AAS use and behavioural change or polysubstance use implications, there are consequences that could cause significant short and long-term harm to physical and/or psychological health to young people. Social workers should consider the possibility that a young person may be vulnerable to using AAS without being fully aware of the risks, as this could result in harm reduction and enhanced outcomes among this easily overlooked population. While rarely addressed in the existing social work literature, the risks associated with AAS usage, particularly in young people, necessitate more awareness and attention from social work practitioners particularly in today’s image conscious society.

Keywords: Anabolic-androgenic Steroids (AAS), Image and Performance Enhancing Drugs (IPED), Young People, Adolescents, Social Work, Substance Use

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Title: Social work implications of anabolic-androgenic steroid (AAS) use, particularly among young people: A review of the literature

Introduction

Anabolic-androgenic Steroids (AAS) are those drugs that relate to testosterone and its synthetic derivatives and are increasingly used recreationally by the general population for their anabolic effects to build muscle mass (McVeigh and Begley 2016). As an array of evidence pertaining to the detrimental physical and behavioural consequences of AAS use has emerged since 2000 (Evans-Brown et al. 2012), it appears timely to consider the need for professionals to have an understanding of AAS use as wider engagement with stakeholders, including social workers, around the issues of using AAS could help to minimise harm (Evans-Brown et al. 2012). A global lifetime prevalence of AAS is indicated at 3.3% (men: 6.4%, women: 1.6%) (Sagoe et al. 2014) and users often take supraphysiological doses orally or via injection (Pope Jr. and Kanayama 2012). Whilst users still represent a minority of the overall substance using population in the UK, the National Crime Survey (NCS) estimated that just under 61,000 16-59 year-olds had used AAS in 2017/2018; 17000 of these were 16-24yr-olds (UK Home Office 2018), which is an increase on previous years. This could be an under-estimate, as the NCS relies upon self-reported data. The Advisory Council on the Misuse of Drugs (2010) expressed particular concerns for the potential negative impact of AAS use on the physiological and behavioural development of young people. This increase in recreational use also raises practice implications when working with young people, especially those who may be susceptible to body image concerns as studies have highlighted both the negative impact of social media on body image for young people (de Vries et al. 2016) and found high concerns around muscularity are common in adolescent boys (Field et al. 2014) .

Social work, risk and substance use

To be effective and meet the challenges of evidence-based practice (EBP), social workers require an extensive, relevant and identifiable knowledge base (Thompson 2005). An examination of current

standard social work and substance use textbooks suggests that general information for social workers remains scarce; e.g. Paylor, Wilson and Measham (2012) refer to AAS use once and there is a short synopsis in Heanue and Lawton (2012) but no information is found in Goodman (2013) or Parrish (2014). Moreover, studies have shown that often social workers lack confidence in working with substance abuse and this has been recognised as a shortfall in social work education (Galvani and Forrester 2011). While not all social workers subscribe to the British Association of Social Workers (BASW) Code of Ethics, the BASW Policy Ethics and Human Rights Committee (2012, p12) nonetheless provides a relevant set of guidelines for professional practice, including the obligation to help people “to identify and manage potential and actual risk”. Galvani (2015) suggests the need for practitioners to fulfil three roles entailing specific capabilities aligned to working with harmful substance use to:

- Engage with the topic to support service users,
- Motivate people to consider changing their behaviours,
- Support people in maintaining changes.

In keeping with Galvani’s perspective, the authors have sought to incorporate her suggestions into the consideration of practice implications. Consequently, to identify areas for enhanced practice, the findings and discussion will focus on the first two of Galvani’s (2015) aforementioned roles.

Aims

The aims of this review are to:

- Provide an overview of the physical and psychological harms associated with AAS use,
- Identify the motivations for recreational/non-prescribed AAS use,
- Identify the risks of AAS use to young people (adolescents: age 13-19),
- Explore the implications for social workers working with those at risk of AAS use.

For the purposes of brevity, the phrase ‘AAS users’ will be used to refer to people who choose to use AAS.

Methods

To explore the nature and scope of the problem, the authors have undertaken a literature review, as such a review supports EBP (Aveyard 2014). This review covers material published primarily between January 2007 and July 2017, however when no information was found on relevant areas (for example domestic and child sexual abuse) within these date restrictions, the restrictions were broadened (1990 - 2017) to include pertinent articles.

Identification and Selection of Studies

The literature was searched following a systematic process and included peer-reviewed publications, case studies and Government reports. To select the most relevant literature, searches of terms such as ‘anabolic-androgenic steroids’, ‘image and performance enhancing drugs’ and associated acronyms were combined with the term ‘social work’ in the EBSCOhost online database. When no specific results were found, the search was widened to include terms for areas of risk e.g. safeguarding, violence, mental health. A complete list of search terms is at Appendix 1.

Specific inclusion (e.g. peer-reviewed literature) and exclusion criteria (e.g. excluding animal studies, prescribed steroids) were applied to ensure the most relevant articles were included. Where it was not possible to refine the results using inclusion and exclusion criteria, titles and/or abstracts were used to determine whether sources should be included based on the relevance to the research question. As the majority of AAS users are male due to the motivation to increase muscle size (Kanayama et al., 2009) and the majority of studies are focussed on male populations, this review concentrates on the risks for male AAS users.

Studies chosen were selected because of their potential contribution to the subject in relation to social work, which could have led to potential selection bias. Another possible limitation is that useful evidence may have been omitted as only English language articles were included; specific exclusion

criteria were used and the limitations of the databases searched. Other considerations for omissions could be the lack of consistent terminology around IPED use.

Risks of physical harm of Anabolic-androgenic Steroid use

Physical harm from using AAS can include acne, erectile dysfunction, hypogonadism, headaches, heart palpitations, testicular atrophy, liver toxicity, renal failure, dermal scarring, memory loss and cognitive problems, raised blood pressure, gynaecomastia (breast enlargement), muscle damage, myocardial injuries, and infertility (Nieschlag and Vorona 2015). Of the potentially negative physical side effects of AAS, only some are reversible after cessation (van Amsterdam, Opperhuizen, and Hartgens 2010). Furthermore, exposure during adolescence alters the normal pattern of brain development as well as neurotransmitter function and adult behaviour patterns (Cunningham, Lumia, and McGinnis 2013). There have been cases of prolonged AAS-use related deaths, however specifying their role is sometimes made difficult, as a cocktail of drugs is often involved (Frati et al. 2015). There is also a risk of harm due to the quality of the drugs, as the AAS sold may be of variable strength, adulterated, or counterfeit (Cho et al. 2015). A study of websites on AAS use found that less than 5% of those websites presented reliable health information (Clement et al. 2012); which is particularly concerning as studies have found that many AAS users seek out information on AAS use from websites and online forums (Harvey et al. 2019). An awareness of the physical harms could help social workers credibly discuss the risks with users and support them to reevaluate their use or seek professional support from specialist AAS services, their GP or counselling services.

Behavioural and psychological impact of using Anabolic-androgenic Steroids

AAS users report increased libido during AAS use (Petersson et al. 2010), are more likely to engage in high-risk sexual behaviours, and have more multiple partners than the general population (Ip et al. 2016; R. Brennan, Wells, and Van Hout 2017). However, the increase in libido does not last, and

reduces significantly when use ceases (Petersson et al. 2010). This increased libido, if acted upon, could suggest AAS users may be at more risk of contracting blood borne viruses (BBVs) or sexually transmitted infections and subsequently pass these on to partners. AAS users also face risks of contracting BBVs and HIV due to risky injecting practices and sharing vials (R. Brennan, Wells, and Van Hout 2017; Ip et al. 2016). Yet, the authors of both papers agree that this risk was lower than traditional intravenous substance users. Studies show that about 30% of AAS users use doctors or Needle Exchanges to access tests for Hepatitis B and C (Hope et al. 2015; Zahnow et al. 2017). However, 30% is not a high number of users, and the majority of participants in these studies were not adolescents. Young initiates to AAS use are thus potentially at heightened risk of BBVs and other infections unless they are encouraged to use safe injection practices and contraception.

The psychological effects of AAS use depend upon a range of factors such as type and dose of AAS, effects of use in combinations, pre-existing conditions and personality (Barceloux and Palmer 2013). Common effects include anxiety, mood disturbances and reckless behaviour (Piacentino et al. 2015). Links have been found between cessation of AAS use and depression, and AAS dependent users were more likely to report diagnoses of anxiety or major depressive disorder than non-dependent AAS users (Ip et al. 2012; Kaufman et al. 2015). While AAS use may be linked with mental health problems, the impact on individuals is idiosyncratic and unpredictable (Kanayama, Hudson, et al. 2010) therefore social workers should be alert for mental health-related problems, regardless of whether AAS is the cause of the mood disturbances or being used to alleviate them.

Unlike animal studies which link testosterone and aggression, the relationship between AAS and aggression in humans is inconclusive (Tomlinson, Brown, and Hoaken 2016). Yet, a UK study of 638 Image and Performance Enhancing Drugs (IPED) users found that 110 participants reported increased aggression and 164 reported mood swings (Bates and McVeigh 2016) and Piacentino et al.'s (2015) review linked long-term AAS use with the potential for increased aggression, mood destabilisation

and psychoses. Three relatively large studies found adolescent AAS users reported significantly increased levels of aggression compared to non-users (Beaver et al. 2008; Kokkevi et al. 2008; Jenssen and Johannessen 2015). Adolescent AAS use is linked with heightened vigilance in response to social encounters (Cunningham, Lumia, and McGinnis 2013) and there is a significant relationship between aggression and adolescent exposure to AAS use (Sagoe, Andreassen, et al. 2015).

Adolescents who scored high on tests for aggression were more likely to report intent and curiosity towards initiating AAS use (Sagoe et al. 2016). Adult AAS users who started using before age nineteen reported more impulsivity and behavioural disinhibition, and poorer planning and affective processing while using (Hildebrandt et al. 2014). The authors found that early onset use was associated with more hostility, but not other types of aggression when compared with users who started using after the age of twenty-two. The prevalence of antisocial behaviours including the bullying of peers was highest amongst AAS users when compared to non-AAS users (Hallgren et al. 2015). This study also noted a higher proportion of AAS users engaged in criminal activities such as theft, using weapons and rape. AAS use has been used in preparation for crime (Klötz et al. 2007), notably the case of Anders Breivik who used AAS in preparation for the July 2013 atrocities and as an adolescent (Melle 2013). Breivik provided details of his steroid use in his manifesto and primer for his followers (Breivik 2011). This is not to suggest that young people who choose to use AAS are involved in such activities, but is an example of the internet providing a place where potentially vulnerable young people can access information that could potentially put them at risk.

Regardless of whether AAS use increases the risk of aggression or if it is an indicator of low threshold for aggression, others could be put at risk. Skårberg, Nyberg, and Engström's (2008) qualitative study found that three of the five male AAS-users reported pathological jealousy which caused relationship difficulties. AAS users reported more incidents of having assaulted/threatened female partners (Skårberg and Engstrom 2007) and a study of 23 AAS users and 14 nonusers found AAS users reported more incidents of aggression against significant others than not when on AAS (Choi and Pope Jr. 1994). This could suggest that partners of AAS users may be more at risk of experiencing

violence when the AAS users are taking AAS. Assessing the links to aggression is complicated by the potential causal factors such as social background, polysubstance use and that the majority of studies rely on self-reported information. Moreover, the authors could find no studies that specifically sought information from partners and those close to people who use steroids about the impact on behaviour that they saw resulting from AAS use.

Adolescent AAS users might be parents or might be living in homes where young children are present therefore, consideration needs to be given to the potential risks to children. One case study suggested a link between AAS use and child sexual abuse; the participant reported having increased sexual desires as a result of the AAS use and whilst taking AAS had a male child masturbate him (Driessens et al. 1996). However, the authors found no further evidence in the literature to correlate AAS use and child sexual abuse. The evidence to suggest that children are at risk from harm from AAS users is limited, however it should not be ruled out completely. Social workers might find it prudent to alert AAS users and their families about the possible behavioural changes that could lead to more aggressive behaviour and also the potential risk of children accidentally consuming illicit substances, as illicit AAS does not come in child-resistant packaging (Evans-Brown et al. 2012).

Polypharmacy and use of Anabolic-androgenic Steroids

Two reviews exploring the links between AAS use and polypharmacy found a positive association between the use of alcohol, illicit substances and AAS (Dodge and Hoagland 2011; Sagoe, McVeigh, et al. 2015), but gave no clear conclusions as to the relationships around causality and prevalence. Polysubstance use complicates any consideration of the impact of AAS on mental health. AAS users may use additional substances to achieve their goals or to alleviate AAS side effects e.g. taking amphetamines to train more; benzodiazepines to sleep or reduce pain (Skårberg, Nyberg, and Engström 2008). The authors hypothesised that AAS use could be a potential gateway substance as

the five male AAS users reported starting on AAS before adding other substances. However, in a study of individuals suspected of infringing Swedish narcotics laws 55% of their subjects' narcotics use preceded their AAS use (Gårevik and Rane 2010). Polysubstance use with AAS use was significantly correlated with violent crime (Lundholm et al. 2015) and also with aggressive behaviours (van Amsterdam, Opperhuizen, and Hartgens 2010).

In assessing risk around substance use, people diagnosed with substance dependence could be considered at greatest risk of harm and substance dependence consistently raises questions of masking other underlying problems (Rudd 2014). The ICD-10 (World Health Organisation 2010) lists AAS as non-dependence producing substances whereas the DSM-5 (APA 2013) categorises AAS under "other" substances but does not explicitly state non-dependent and instead has criteria for substance use disorders (e.g., mild anabolic steroid use disorder). One study found substantial evidence for AAS dependence and a 30% likely prevalence amongst AAS users (Grönbladh, Nylander, and Hallberg 2016). Kanayama et al. (2010) proposed three pathways for developing dependence:

- Body image (fear of losing muscle size);
- Androgenic effects (loss of sexual function, fatigue, depression);
- Hedonic effects (reinforced psychoactive effects such as increased confidence and aggressiveness).

Although there is evidence for the possibility of developing AAS dependency, there is a lack of clarity around determining specific risk factors for dependency. Social workers need to be aware that AAS use varies from stereotypical substance dependency, in that the substances themselves may not cause physical dependence per se, but there may be psychological elements for the dependence e.g. positive feelings and peer admiration linked to increased muscle size (Griffiths et al. 2016). While these factors may not be sufficient to meet the criteria for dependence, professional awareness of progressive usage patterns may prove relevant to identifying vulnerability, and matching needs with the support available.

Motivations for using Anabolic-androgenic Steroids

Understanding the motivations for using substances is essential to effective professional practice with people misusing substances (Galvani 2015). The most prominent motivations for AAS use are enhanced physical appearance and/or improved physical performance, a full list of motivations is summarised in Table 1.

Table 1. Further motivations for use

As improving appearance and enhancing performance are prominent motivators for AAS use, this raises the question: what is driving this desire? The DSM-5 (APA 2013) links AAS use with some cases of muscle dysmorphia (MD), a form of body image disturbance and notes that MD occurs predominantly in men, affecting those with “normal” physiques who are preoccupied with the idea that their body is not sufficiently muscular. AAS users who self-reported using AAS to improve their appearance had greater overall disordered eating and MD symptomatology (Murray et al. 2016). AAS users had a similar prevalence of psychiatric symptomatology, e.g. anxiety, depression, interpersonal sensitivity and obsessive-compulsive behaviour as men with eating disorders, but did not share the same negative self-image (Björk, Skärberg, and Engström 2013). Potentially, seeing their muscles develop as a result of exercise and AAS use had helped them overcome previous negative self-images. Over- and underweight boys were four times more likely to use AAS than boys who perceived themselves as the right weight (Jampel et al. 2016). Looking at initial and current motivations for use, Harris, Dunn, and Alwyn (2016) found that the initial external motivation of wanting to be more muscular led to an internal motivation of body image concerns. The authors concluded that continued AAS use could be linked to the development of body image disorders among young people.

Adolescent concerns about muscles and body image and body checking behaviour are predictive factors for AAS use (Jenssen and Johannessen 2015), as are participation in sports, and diagnosed depression (Sagoe, Andreassen, and Pallesen 2014). AAS is normally used in conjunction with an exercise regime (Hakansson et al. 2012); users tend to exercise more than non-users (Onakomaiya and Henderson 2016) and students who exercised daily increased the odds of lifetime AAS use (Kokkevi et al. 2008). Other factors that potentially predict AAS use in adolescents are the use of legal-performance-enhancing substances e.g. protein supplements, and ease of access to AAS via the internet (Karazsia, Crowther, and Galioto 2013; B. Brennan, Kanayama, and Pope Jr. 2013). Social workers who are curious to know if a young person is engaged in AAS use, could talk with them about physical activity, healthy eating and body image. Terms such as ‘shredded’ to describe an ideal body are used by AAS users (Underwood 2017), so an adolescent’s use of such terms could indicate an interest in building muscle, and other possible signs could be use of protein supplements or membership of online bodybuilding forums or Instagram feeds.

One study of 518 AAS users highlighted that 90% of participants planned to continue their usage despite negative side effects (Ip et al. 2011), and over 50% of AAS users thought AAS were not harmful to their health if used correctly (Alsaeed and Alabkal 2015). AAS users did not generally express anxiety over the harms of using and viewed their new lifestyle as having alleviated previous problems such as obesity and depression (Kimergård 2015). R. Brennan, Wells, and Van Hout (R. Brennan, Wells, and Van Hout 2017) suggest that high-risks may be normalised within IPED communities and that AAS users may “disassociate from potential harms”. This information is relevant to social work as denial and rationalisation can be resistant to change (Harmon-Jones 1999), potentially compromising the service user’s motivations to stop AAS usage.

In a large US study of adolescent males, respondents perceived AAS use as less risky or harmful when they considered it easily obtained, if they had close friends who used AAS, or if they self-reported low levels of self-esteem, depression or risk-taking behaviours (Denham 2009). AAS users only sought treatment when the negative experiences outweighed the positive experiences (Skårberg, Nyberg, and Engström 2008), and tend to seek out advice from anonymous sources or personal networks (Larance et al. 2008). They often rely on ‘bro-science’ (information from other AAS users) (Underwood 2017; Hanley Santos and Coomber 2017) for information on combining drugs and risks; question the harms noted by medical professionals and prioritise information from experienced AAS users (Kimergård 2015). A potential risk for adolescents wishing to enhance their body to meet stereotypical masculine norms is the seeking out of role models who have enhanced their own body image and being unduly influenced by them. Social workers should be mindful that their expertise may be perceived as inferior to the peer group’s advice.

There have been a range of noteworthy psychosocial influences on the initiation of AAS use including: family histories of divorce, poor social support, childhood and adolescent conduct disorders, history of mental or physical abuse, problems at school, time in foster care and problematic parental interactions (Sagoe, Andreassen, and Pallesen 2014; Pope Jr., Kanayama, and Hudson 2012; Skårberg and Engstrom 2007; McDonald et al. 2014). One study found a negative relationship with fathers linked to AAS use, but identified no correlation with child sexual abuse or a reported family history of substance dependence (Pope Jr., Kanayama, and Hudson 2012); however, an earlier study had found that AAS users were more likely than non-users to have a history of sexual abuse (Ip et al. 2011).

Knowledge and skills for social workers

This review has identified risks to young people who use AAS. Parrish (p187, 2014) highlights the need for social workers to be aware of the implications in the area of substance use “regardless of

their identified area of expertise”. For example, social workers may well encounter AAS-related concerns among young people whose Adverse Childhood Experiences place them at risk of body image concerns or looked after children who lack positive male role models. Because of social work’s inherent person-in-environment emphasis they are amongst the helping professions most likely to understand dominant social and cultural scripts such as masculinity (Shafer and Bellamy 2016), peer group influences and social media pressure. Social workers need to establish sufficient rapport and trust to ask about substance use in order to encourage disclosure and offer support (Galvani, Hutchinson, and Dance 2014). Asking AAS users their own reasons for using AAS, while avoiding implications of stigma or disapproval aligns to taking a person-centred approach (Petersson et al. 2010), which is anti-oppressive and empowering (Thompson 2005).

Approaching young people’s AAS use with an appreciation of the benefits of use may enhance professional credibility with young AAS users (Griffiths et al. 2016). Professionals need to understand the physical (the increase in muscle size and strength gain) and psychological (positive reinforcement from attaining desired results) benefits as well as the associated side effects and harms from use. Understanding that a person’s perception of their body and their perception of gender norms may be possible motivations for using AAS, and that initiating AAS use could lead to young people and men developing unrealistic norms around body image (Harris, Dunn, and Alwyn 2016) allows professionals to be better placed to assess risks to young people. Moreover, identifying someone’s motivations for use could help ensure that they are signposted to the right type of support, e.g. support for adverse side effects or psychological support to address an underlying issue. Social workers are strongly placed to incorporate such practice frameworks as Prochaska and DiClemente’s (Prochaska and Diclemente 1986) Cycle of Change and motivational interviewing (Miller and Rollnick 2013). Social workers are further advantaged by their professional emphasis on a psychosocial perspective informing practice (Parrish 2014).

People can make unwise decisions and professionals must consider the possibility that users may focus on the benefits for a variety of reasons including but not exclusively: peer pressure, lacking

sufficient information, having a poor understanding in relation to harm, perceiving risks to outweigh benefits, or being more vulnerable due to pre-existing mental health difficulties. In terms of providing the best possible outcomes for adolescents, it could be beneficial to support a young person accessing the gym to help their overall physical wellbeing. However, giving consideration to the potential susceptibility of vulnerable adolescents to AAS use, effective discussions with them regarding the risks that could come from this type of environment are crucial, especially as adolescence is a developmental stage, when risk-taking behaviours are more prevalent than in child or adult-hood (Slee, Campbell, and Spears 2012). Furthermore, it is beneficial to educate parents about AAS use in order to help influence and support adolescent users (Dodge and Clarke 2015). This is especially relevant as the prevalence of fake AAS and reliance of information from the internet suggests practitioners need to be aware that websites tend to be biased towards pro-AAS use whilst downplaying the risks (Clement et al. 2012).

Social workers should also be aware of the legal status of AAS use within their own country as legal factors further complicate steroid use. Possession of AAS for personal use in the UK is legal (Misuse of Drugs Act, 2017), supplying and on-line purchasing of steroids remain illegal which is similar to Canada. Simultaneously, purchasing steroids in other countries in which they are legal, and bringing them back into the UK remains legal. However, in countries such as the US non-prescribed steroid use is illegal whereas use is legal in other parts of the world e.g. Hong Kong. Such factors make the law around purchase and supply complex and this could link to under reporting, secrecy around personal use and reluctance to access support.

When working with AAS users, a non-judgemental approach is needed by professionals (R. Brennan, Wells, and Van Hout 2017) which includes the need for careful listening to understand their experiences and not relying on assumptions based on stereotypes (Skärberg, Nyberg, and Engström 2008). One way to do this could be by reflecting on their own beliefs about AAS use, as it is

important for professionals to reflect on their own values around substance use (Galvani, Hutchinson, and Dance 2014). This is particularly important as many AAS users cite that a barrier to accessing support is the judgement that they perceive they will receive from professionals (Yu, Hildebrandt, and Lanzieri 2015). AAS users believe that the public has a distorted view of the negative side-effects of use (Cohen et al. 2007) and when considering AAS in society, often the media portrayal plays a key role. AAS users feel stigmatised by the public and press e.g. media depictions often focus on stories of ‘roid rage’ (Griffiths, Murray, and Mond 2016). This was evidenced recently in the wide-spread coverage of how the Westminster and London Bridge attacks that the perpetrators were reported to have used steroids prior to the attacks (Hamilton 2018; Weaver 2018), yet the subsequent inquest into the Westminster attack concluded that steroids were unlikely to have caused behavioural changes (Telegraph Reporters). As such, it is incumbent upon social workers to be aware of these risks but not to fall prey to the widely-held public belief that it causes ‘roid rage’ in all users as risk assessments need to be balanced.

Limitations and recommendations for future research

When considering the conclusions of this review, it is useful to highlight possible limitations and the scope of this review was ambitious and so this is reflected in the limited depth in some areas and use of recent literature reviews. There are limitations as non-prescribed AAS are potentially used in a sub-cultural environment that confounds ascertaining accurate estimates of users (Skårberg, Nyberg, and Engström 2008) and individuals may be unwilling to participate in studies. Many of the studies were based on small sample sizes of AAS users, the larger size studies were often from cross-sectional studies that did not necessarily set out to measure the AAS use and its effects and the type of user was not clearly defined. In many of the studies, ethnicity was categorised as white, although there are studies that show that people from a range of ethnic backgrounds use AAS (van Hout and Kean 2015; Bates and McVeigh 2016). When using surveys and questionnaires, studies can be affected by self-reporting biases (Sheppard 2004) as often the extent of the AAS use and effects of the use were reliant

on the participant's recall and honesty. The lack of data on the potential risks faced by partners and families of AAS users highlights this as a much needed area for future research.

Conclusion

Some of the evidence is not conclusive, particularly in relation to causal relationships between AAS use and behavioural change or polysubstance use, and not all adolescent AAS users will experience these risks, there are significant physical and psychological risks to self in relation to use which may be compounded by combining AAS with other illicit substances. Vulnerable people who could be more at risk of starting to use could be adolescents with poor self-image, adverse childhood experiences, or conduct problems. Given people's right to make unwise decisions under the Mental Capacity Act (HM Government, 2005) professionals could argue that there is no need for direct involvement unless the young person is actively seeking support. However, giving consideration to the possibility that a young person may be vulnerable to starting to use AAS or might be using AAS without being fully aware of the risks that they are taking could result in harm reduction and enhanced outcomes among this easily overlooked population. Considerably more research is needed regarding psychosocial factors related to young people at risk of AAS use.

In conclusion, an awareness of the risks associated with AAS use is both relevant and important knowledge for social work practice with an array of services users. The social work roles identified by Galvani (2015) are clearly applicable when it comes to working with young people who use AAS across a spectrum of settings. Developing expertise related to the complexities of AAS use is clearly needed to establish credibility and confidence among social workers. Social work education and training provides readily transferrable skills that are highly relevant to engaging with service users in ways that are trustworthy, credible and non-judgemental, providing motivation, and supporting change. Thus the authors argue that the existing literature serves to emphasise the relevance of sound social work practice in the burgeoning need for professional expertise in relation to AAS usage.

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Appendix

1. Supplementary Information: Table of Search Terms