Polysubstance use practices among women using anabolic-androgenic steroids (AAS)

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Abstract

Background: Research with men who use anabolic-androgenic steroids (AAS) shows typologies exist where some younger and less risk-averse users engage in polysubstance use. Little research has investigated polysubstance use among women who use AAS. *Method:* This study explored patterns of AAS and other illicit substance use among a sample of female AAS users involved in strength sports (e.g., bodybuilding) from Australia (n=7). The research also engaged in interviews with male AAS users who came into frequent contact with women using AAS either by coaching them or as peers (n=7). Data were analysed within a constructivist framework using thematic analysis. *Results:* The data suggests belonging to a female strength athlete identity may have pseudo-protective elements which results in reducing licit substance use, however, illicit substance use does not run counter to the culture and may be supported by it. *Discussion:* Women who use AAS identified underlying factors, related to significant previous events in their lives, contributing to their polysubstance use. The male participants expressed similar views regarding underlying factors which contributed to women's use of other substances for recreational purposes. Further investigations are warranted to explore, more fully, the psychosocial factors which contribute to use of multiple illicit substances among women who use AAS and whether typologies exist.

Keywords: female; mental health; performance and image enhancing drugs; polysubstance; steroids

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Introduction

The major motivations for using anabolic-androgenic steroid (AAS) are generally known to be performance enhancement and aesthetics (Christiansen et al., 2017; Piatkowski et al., 2020, 2021b). This unique group of substance users is, therefore, comprised of recreational lifters (Christiansen et al., 2017) as well as those who compete in strength sports (e.g., bodybuilding; Dunn & Piatkowski 2021) making AAS users a diverse group. There are notable distinctions between those who participate in bodybuilding competitively as compared to those who do so recreationally and their AAS use practices (Underwood, 2017). Those who lift weights and use bodybuilding supplements (Piatkowski et al., 2022b) and AAS (Underwood, 2017) or other PIEDs (Piatkowski et al., 2020) generally have body enhancement goals which are not necessarily driven by competition. For instance, they may wish to 'bulk' (increase muscle size) and 'shred' (decrease body fat) for reasons including expressing muscularity through masculinity (Piatkowski et al., 2020; Underwood, 2018) as well as providing them an opportunity to tailor their body and maintain a consistently lean appearance while having a more sociable lifestyle (Underwood, 2017). Those who participate in strength sport competitively may have physical and psychological demands placed on them, emerging from high-level competition as well as within a broader context of training and preparation (Dunn & Piatkowski et al., 2021; Moore et al., 2019) which may increase their propensity to engage in risky behaviours.

Those who use AAS are known to engage in polysubstance use (Piatkowski et al., 2021a; Sagoe et al., 2014a), using a range of legal and illegal substances such as AAS depending on their goals (Piatkowski et al., 2020), or to counteract negative effects that they experience (Piatkowski et al., 2022a). Although AAS use has traditionally been associated with athletes and bodybuilders, there are now multiple subgroups of people using these substances (Christiansen et al., 2017; Piatkowski et al., 2021a). Previous research has focused

on the polysubstance use practices and effects in men (Piatkowski et al., 2021a; van de Ven et al., 2018), with little research exploring this among women despite some evidence that AAS use among women is increasing (Havnes et al., 2021a). Given the emerging reports of AAS use among women, understanding their patterns of other illicit substance use is warranted as polysubstance use has been shown to increase harm profiles among male users (Piatkowski et al., 2021a; Salinas et al., 2019).

Thus far, the evidence available on AAS users polysubstance use comprises almost exclusively male AAS users. Notably, research with male AAS users demonstrates they consume illicit substances for recreational purposes at higher rates than general population samples (Broadfield, 2017). Indeed, several studies have reported concurrent illicit recreational substance use among male AAS users (Antonopoulos & Hall, 2016; McVeigh & Begley, 2017; Sagoe et al., 2014a; Piatkowski et al., 2021a; Van de Ven et al., 2018). The most recent survey data demonstrate that between 32% to 47% of male AAS users reported psychoactive substance use in the past year (Bates & McVeigh, 2016; Begley et al., 2017) and this is substantiated by higher rates in qualitative research (Piatkowski et al., 2020, 2021a). Christiansen et al. (2017) outlined a typology of four different types of AAS users – Experts, Well-being users, You-only-live-once (Yolo) type, and Athletes. They suggest the younger group (Yolo type) are particularly at risk of health-related harms as they combine their AAS use with other drug use and engage in less help-seeking behaviours (Christiansen et al., 2017). Given that the sample was exclusively male however, the utility of these subtypes extending to women who use AAS are presently unknown.

The global prevalence of AAS use among women has been reported to be 1.6%, much less than the figure for men (Sagoe et al., 2014b), but individual studies have found prevalence figures much higher among AAS-using females compared to their non-using counterparts. For instance, Abrahin et al. (2017) sampled 361 females who participated in

weight training and found a prevalence rate of 13.3% for women using AAS. AAS users are generally a group who take health seriously, but some do engage in illicit substance use and research with women in this space is emerging. Havnes et al. (2021a) interviewed 16 AAS using females of which 12 reported lifetime polysubstance use – e.g., amphetamines and cocaine. Eight of these participants reported substance use problems which included clinical dependence with reports of AAS use as a form of coping with psychoactive substance withdrawal or cessation (Havnes et al., 2021a). The authors suggested the polysubstance practices of female AAS users posed a significant health risk and called for more research in this area.

AAS use among women is an under-researched area, and most studies that explore aspects of such use are based on small samples of women who compete in strength sports such as bodybuilding (Abrahin et al., 2017; Borjesson et al., 2016; Ip et al., 2010). Women's participation in strength sports and the evolving concept of women's ideal body may contribute to the salience of a sporting context where they are able to demonstrate strength and add muscle mass – e.g., strength sports such as bodybuilding, powerlifting, and strongman/woman. The perceptions of women's participation and the social and cultural context within their sport, may provide an understanding into how they negotiate any other risky behaviours or practices. For athletes specifically, Lindqvist and colleagues (2013) posited a relationship exists between use of AAS and mental-health disorders, as exhibited in a sample of former athletes who used AAS compared to those who did not. The cohort of AAS using athletes had more often sought professional expertise for mental problems and had used other illicit drugs compared to those who did not previously use AAS (Lindqvist et al., 2013) and similar concerns have been shared among recreational weight lifters as well (Ebbeck et al., 2009).

Further investigations are required to understand, more precisely, the substance use practices of women using AAS in an effort to tailor strategies appropriately and equitably for all cohorts. For instance, AAS use is predominantly conceptualised through the lens of male hegemonic patterns (Andreasson & Henning, 2022) and, therefore, it follows that women's AAS use is frequently informed by men. Specifically, Börjesson et al. (2016) found that all but one female AAS user in their study had a man in a close relationship encouraging them to commence use. Havnes et al. (2021b) also showed that men acted as sources of knowledge about, and suppliers of, AAS to women. Therefore, women rely on men who themselves may lack information about AAS or lack the sex-specific knowledge of how these substances effect women to guide their use. Given men's embedded role in women's AAS use, they may also represent voices which should be represented in discussions which follow and arise from discourses surrounding this unique cohort of women.

Therefore, given the preliminary reports of women who use AAS engaging in polysubstance use a clearer picture of their other substance use patterns is required. Understanding these patterns is important in informing harm reduction strategies for this group, particularly given the increase in harms which can occur for men who use AAS engaging in polysubstance use (e.g., Salinas et al., 2019). Women who use AAS also often participate in strength sports (e.g., Abrahin et al., 2017), and this has not been adequately accounted for in extant works which report polysubstance use among AAS using women (e.g., Havnes et al., 2021a). In line with this objective, the present study employed interviews which aimed to explore patterns of AAS use and other illicit substance use among a sample of female strength athletes from Australia. Given the role men play in women commencing AAS use (Börjesson et al., 2016) and advising them regarding their use (Havnes et al., 2021b) further exploration is required of how men perceive the patterns of women's AAS and

other drug use. Therefore, men who came into close contact with these women (e.g., coaches and peers) were also interviewed.

Methods

Participants

A purposive sample of participants was recruited via researcher contacts and through snowball sampling. Participants were eligible to be included if they were: i) women who were using or had used AAS, ii) were competing or had competed in strength sports. Participants were also included if they were men who used or had used AAS and were coaching or frequently in contact with women using AAS. All participants had competed at an elite (national or international) level in strength sports (i.e., bodybuilding, powerlifting, strongman). Interested participants were asked to contact a member of the research team; all interviews were conducted one-on-one with the first author. Ethical approval was granted from the Deakin University Human Research Ethics Committee HEAG-H 135_2021. A total of 14 interviews were conducted online (via Zoom) with participants in Australia (see Table 1). There was an equal number of men (n=7) and women (n=7) in the group.

Substance Usage Practices

All female participants had used or were using some form of AAS as per the eligibility criteria. Notably, all participants (male and female) used/were using testosterone or some derivative of testosterone at varied dosages, orally or intramuscularly. Most participants were long-term users and had completed multiple 'cycles' (AAS combination and duration of use). Many also 'stacked' (combined) their AAS (injectable and oral) with other performance and image enhancing drugs (PIEDs) such as insulin, clenbuterol, thyroxine, human growth hormone (HGH), among others. Lastly, all female participants reported lifetime use of illicit substances for recreational purposes, this including substances such as ‘ecstasy’, ‘speed’, and

cocaine. Men in this study were not asked about their own illicit substance use outside of AAS.

Materials and Procedure

Interviews were between 23 and 82 minutes (Mean length =37.45 minutes) in duration and conducted online due to the COVID-19 restrictions, digitally recorded and transcribed. The research team acknowledges the time range of the interviews. The first author conducted all interviews, and a semi-structured interview schedule was used. Given the nature of semi-structured interviews, some participants divulged more information and reflected more carefully on their lived experience while others were more succinct. Given the participants in this study straddled many roles (e.g., athlete, coach, mentor) some had specific amounts of time they could donate to this project. In these instances, the participants responded comprehensively to the questions, with few tangential remarks. The questions included a uniform set of 'prompts' which were firstly related to gaining information about the participant and building rapport, for example, "how long have you competed in strength sports" and "could you tell me a little bit about your working background". Further questions were related to the study and its aims, such as illicit substance use, for example, once participants had discussed their AAS use the interviewer would follow up with "are there other substances that are of concern?". The central questions related to this research revolved around whether illicit substances, other than AAS, were an issue for women who competed in strength sports. Women themselves were asked specifically regarding their patterns of illicit drug consumption. Men who both coached and interacted regularly with women using AAS were asked about their views on these matters. They were also asked about their own AAS usage practices. No reimbursements were offered for participation.

Data Analysis

All interviews were transcribed by the first author. Once this process was complete, the finalised transcripts were checked by the co-authors prior to analysis. Preliminary impressions and reflections were noted following the interviews. Data were imported into NVivo (Version 12) for reflexive thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2019). Within the NVivo platform, the transcripts underwent preliminary analysis by the first author, with input from the other authors at regular research meetings. The first author generated codes, then further organised and conceptually supported these codes by relevant examples from more than one transcript – a reflexive process where themes were developed through re-engaging with the written transcript and the recordings available (Braun & Clarke, 2018). Throughout this process, the first author reflected regularly on his experiences. Further research team meetings were held to scrutinize the results of coding decisions and reflect upon themes and patterns emerging in this process. These meetings represent a coding approach that is collaborative and reflexive, designed to develop a richer more nuanced reading of the data, rather than seek consensus on meaning (Braun & Clarke, 2019). Throughout this process, a list of verbatim quotations illustrating each theme was compiled and a list of theme titles and representative extracts was created. The themes were generated from participant responses to align as closely as possible with their language.

Qualitative Framework

To ensure rigour in the research process, a theoretical framework was employed in line with their appropriateness to our ontological position and relevance to research aims. An ontological framework led by an epistemology of constructivism is appropriate for discovering what is inherently meaningful in human and social action (Ahmed & Ahmed, 2014). Therefore, the analytic process for this research was guided by the lens of social constructivism, deemed suitable for qualitative enquiry in this field (Sparkes & Smith, 2014).

The research team followed the dynamic process of qualitative enquiry by scrutinising the analyses through multiple stages as outlined. Given the emerging field of enquiry which female AAS users represents, these approaches assisted in framing a meaningful psychological discourse. The discourse which evolved gave appropriate weight to the rich narratives of this unique group of participants.

Findings

There were two overarching themes developed from the data – 'The not-so protective factor of being a female strength athlete', which represents the pseudo-protective elements of belonging to this particular athlete identity; and 'Escaping "a lot of underlying issues"', which provided some explanation of the deeper issues driving illicit recreational substance use among this unique cohort of women.

Theme 1: The not-so protective factor of being a female strength athlete

Subtheme 1.1: The threat of licit substances

There was a strong ethos around the health choices of being a female strength athlete, which formed a part of this cohort's health attitudes in general. Specifically, being a strength athlete helped women construct their lives to be orientated towards optimal training and recovery, including refraining from alcohol and nicotine. These attitudes were shared by the women in the cohort. They were conscious about the impact of licit substances insofar as they did not affect their performance.

> *P11[Female]: But um I can't touch alcohol. But alcohol is so catabolic to muscle it's so potent to muscle that I can't see any benefits for bodybuilders and powerlifters to drink alcohol makes no sense to me.*

This trend could be seen by their male coaches and peers.

P4[Male]: I know some [female strength athletes] they don't, they don't smoke they don't drink…

This stringent attitude regarding health and wellbeing tended to make up a component of this group's health attitudes and intersect with their personal choices across social domains. That is, female strength athletes were expected to understand that social environments in which alcohol was being consumed were discouraged, by training partners and by coaches who were predominantly male:

*P6[Male]: I mean most of them [female strength athletes] that I know of, whether they're on PED [performance enhancing drugs] or not, they're taking their training quite seriously and they understand the detriment of alcohol use. Usually a top coach will be across that as well in a conversation of "Right, you know let's lock your s**t down"; eat your food, right, don't drink. Yeah, trainings a priority, so they're not doing anything to ruin their training so to speak.*

As a result of the strict attitudes which surround legal substances (i.e., alcohol) there may be a propensity for illicit substances to be more acceptable among this cohort. Women were known among their male peers and coaches to engage in recreational substance use.

P1[Male]: A lot of these girls come from obviously all different sort of walks of life, but a lot of them in this day and age, happy using recreational drugs, cocaine, ketamine, all that stuff right.

There was a view that athletes made a distinction between licit and illicit substances, whereby licit substances such as alcohol posed a 'threat' to health and performance but, perhaps because they were already using AAS, illicit substances did not have that same threat potential. One participant viewed a social mechanism among this group as responsible for increasing susceptibility, for example:

P7[Male]: Like realistically you can't really drink. Maybe they're [female users] a bit more prone to doing party drugs, because they can't drink. I do believe, if you're taking away alcohol from somebody they are more susceptible to taking party drugs.

Subtheme 1.2: Weight-control

Another link between female strength athletes using AAS and psychoactive substances which participants identified, was the disordered eating which comes from some strength sports. These disordered eating patterns are particularly prevalent due to the weight-sensitive nature of these sports as well as the aesthetic elements and appearance requirements. One participant draws the distinction between bodybuilding and other strength sports in particular:

*P14[Female]: Performance and you know, recovery and all that stuff, there's not a great deal of kind of disordered eating in this sport [strongman] compared to maybe say like bodybuilding, figure, bikini, all that s**t. Because like there is a lot of disordered eating that comes out of there, and you know excessive kind of like Speed [amphetamine] use and stuff like that for weight loss and appetite suppressant and all that stuff whereas strongwoman, strongman you don't tend to see it as much.*

There were also reports from participants that female athletes using AAS were engaging in polysubstance use for regulating weight. In these instances, participants acknowledged that the weight-sensitive nature of strength sports could encourage the use of psychoactive substances rather than alcohol.

P13[Female]: But from what I've seen, I think you know it's just (pause) it looks attractive, you know you don't want to have alcohol and blow out your calories so you just do you know coke [cocaine] or whatever, instead, because it has no calories.

Theme 2: Escaping "a lot of underlying issues"

Subtheme 2.1: Linking it back to mental health

While there were quite black and white reasons for abstaining from licit substance use, it was not so clear when it came to illicit substances which were not AAS. The women in this cohort had all used AAS and other illicit substances for recreational purposes. However, some also regularly used illicit substances as well as AAS. This behaviour represents a blurring of categories, where illicit substances are being used to enhance appearance and performance, but also for recreational activities. Some women linked their substance use back to mental health disorders they had, or sensation seeking. One participant expressed her need for stimulation, but also the assistance that illicit drugs provided as a mechanism of sensation seeking. As a result of these underlying symptoms one participant discussed that she would turn to alcohol and drugs for example:

> *P10[Female]: Yeah look I'm probably a good one to talk to about this. Yes (laughs). I have probably dabbled quite a bit with party drugs um yes yeah yes, how do I best say this. Probably I probably link it back, maybe to my ADHD to begin with, so the type of personality than I am is very go go go stimulation's obviously something that I'm constantly seeking. So, I try and have multiple things that stimulate my mind, stimulate my body.*

Some women also linked the use of illicit recreational substances with other underlying characteristics. For example, some women suggested the causes could include deficits in perceived self-confident or self-esteem.

> *P14: I guess, whereas there are other people who are a little bit more lacking in their own personal confidence that might feel compelled to use drugs.*

Other female participants explained that their use of illicit substances in general had ties to other underlying causes. For women, the use of multiple substances was linked to more significant and previous events in their lives.

P9 [Female]: [On using multiple substances] Like previous hurts, you know, like something, a bit of a trauma that's happened. I think yeah there's more mental health sort of stuff as well, going on and that the reason.

Subtheme 2.2: Escaping the underlying issues

Overall women acknowledged that these illicit substance use behaviours were a form of escapism. Specifically, women were not escaping stressors associated with training *per se*, but those stressors linked to underlying mental health symptoms. Some of the group discussed that they themselves, or those they knew could be 'in a bad place', which indicated that there was some ongoing level of psychological distress present for these individuals.

P13[Female]: I've seen that [polysubstance use] in powerlifting. But I think it's honestly, it's an escape like the people that I, the people that I see do it every weekend are in a really bad place in their life. They use it as more of an escape.

Specifically, escaping these mental health symptoms or 'previous hurts' was what led women to engage in substance use in the first place. One participant explained the dissolution of her long-term romantic relationship, which can be quite a distressing time, was what she linked back to all her substance use.

P5[Female]: I think the real catalyst now that I look back, so the real catalyst for me going down the road of all drugs was my long-term relationship ceased and finished.

Male participants recounted similar narratives about their female clients and peers. They acknowledged that there were links between underlying mental health symptoms and psychological distress and women's substance use:

P1[Male]: I've seen a massive correlation between increased drug use and females and anxiety, depression, body image.

These underlying contributions of trauma and mental health to substance use was linked, by some, to sensation seeking behaviour – wanting to feel something 'different'. A male coach

and AAS using peer suggested that the use of drugs was a way to escape their psychological distress and, rather than being related to AAS, was related to underlying factors. This view somewhat substantiates those expressed by the women interviews:

> *P3[Male]: And then as soon as the comps [competition] done yeah it's cocaine it's f**king weed some even dive into the like hallucinogens or whatever… taking them looking to feel something different. Looking for an effect or an escape from what they are feeling. I think there's a lot of underlying health issues going on.*

Discussion

This research explored the patterns of, and motivations for, AAS and other illicit substance use among a sample of female AAS users involved in strength sports from Australia. The female strength athlete identity does offer a level of protection for alcohol consumption. However, the findings suggest that women who use AAS are likely to engage in polysubstance use, including illicit substances, for recreational purposes. Notably, the strength athlete identity does not run counter to illicit recreational substance use among women and may even support it. This finding is particularly the case for those women who also report the weight-sensitive nature of the sport being a contributing factor in opting to use psychoactive drugs rather than alcohol. Female AAS users reported underlying mental health symptoms (e.g., sensation seeking) or disorders (e.g., ADHD) played a role in their use of illicit recreational drugs. The men involved with this cohort of women also expressed similar views regarding underlying concerns (e.g., depression and anxiety) contributing to drug use (e.g., cocaine).

The data emanating from male participants in the present study substantiates extant work in this area has indicated they represent an important voice in extending the understanding of women who use AAS. As outlined by Börjesson et al. (2016) and Havnes et

al. (2021a) the influence of unqualified advice from third parties (i.e., male partners) is impacting women's decision-making processes around AAS. In considering the role that men have in initiating and facilitating AAS use, the present study utilised their perspectives as a form of data triangulation. Their experiences as coaches and peers to these female AAS users provided important substantiating data which arose from their observations in training (e.g., in the gym) and competitions where these cohorts tend to mix. Previous research has demonstrated the significance of women's relationships with others, how these relationships are contextualised, and the interpersonal dynamics within such relationships could influence illicit substance use and subsequent physical and psychological harm (Rhodes et al., 2017). These partnerships comprise networks of situated connections, including the patterning together of substances, feelings, interactions, narratives, and ways of life (Rhodes et al., 2017). In acknowledging the agency of others involved in these partnerships (Duff, 2014), future explorations into the narratives involved in AAS-using women's polysubstance use may consider unpacking, more fully, the role of men.

Athletic self-identity is defined as the degree to which an individual thinks and feels like an athlete (Brewer et al., 1993). A strong and exclusive athletic identity has been linked to mental health outcomes among athletes in qualitative studies (Gustafsson et al., 2007). Research has demonstrated that strong identification with a particular sport may encourage athletes to train excessively, leading to the athlete risking their health (Gustafsson et al., 2007). In AAS users, recent research has demonstrated similar patterns occur, whereby users identify strongly with a social identity and group identity (Hogg et al., 1995) tied to striving for muscularity (Piatkowski et al., 2020) and collective use of AAS (Piatkowski et al., 2022a). Indeed, among female strength athletes there were pseudo-protective effects, whereby women discussed AAS regimens which excluded licit substances such as alcohol and nicotine but instead resulted in polysubstance use. Among female strength athletes who

use AAS, there may be stronger identifying processes in place operating through social and group identity mechanisms. In this way, using other illicit substances may be supported by the female strength athlete identity through nuances which inform use, for example, using cocaine to promote weight-loss as well as facilitate social functioning. There may be other differences that inform illicit substance use and do so in ways that fit within the goals and culture of strength sport which warrant further investigation.

Extant work demonstrates that women who use AAS regularly engage in polysubstance use (Havnes et al., 2021a,b) more than the general population or their male counterparts. Havnes and colleagues (2021a) have recently suggested that psychoactive substances assist women to cope with side effects of AAS. These side effects include irreversible masculinizing effects which negatively influence self-esteem, social life, and sexual function (Havnes et al., 2021b). Given that these side effects may be difficult to process, women may engage in other illicit substance use. Our data substantiate and extend on these recent findings. For example, the men in our study also indicated that women are observed as frequently engaging in these practices and have linked this to underlying health concerns, providing substantiation to exclusively female samples. Men in this study discussed the extensive use of recreational substances by females, particularly outside competition preparation. They identified that women who they interacted with and coached could come from ‘many walks of life’ and reported links between body image issues, depression, and anxiety. Indeed, these are not clinical diagnoses, but do provide some triangulation of our and Havnes et al.’s (2021b) findings.

Women in this study suggest the reasons for polysubstance use may also come from more underlying causes, such as pre-existing ‘hurts’ or ‘traumas’. These underlying factors may share similarity with the mental health symptoms and conditions identified by Ip et al. (2010) cooccurring among women who use AAS. Among our sample, the use of multiple

drugs was linked to sensation seeking and seen as a form of escaping. One female participant explicitly linked her own use of recreational illicit substances to escaping psychological distress unrelated to training. Another participant explicitly linked her substance use to the dissolution of a long-term romantic relationship, which fits with men who use AAS (Piatkowski et al., 2020). The polysubstance use seen among this group in terms of illicit recreational substance use, alongside AAS, being linked to escape also fits somewhat with data among men engaging in similar practices (Piatkowski et al., 2021a). Participants in Piatkowski et al.'s (2021a) study described a tendency to overindulge in party drugs on a variety of occasions, substantially increasing their risk of harm. There may also been links between typologies of AAS users (Christiansen et al., 2017; Zahnow et al., 2018). Despite the typologies being fit for only male AAS users presently, there may be some cross-over between female samples and, indeed, the current data supports this and may fit within a 'Yolo' subtype. Further investigations to elucidate female AAS user typologies are warranted.

Although we cannot exclude the potential for overlap between the contribution of polysubstance use arising from AAS use or strength sport participation, there is strong suggestion that underlying psychological factors played a larger role. Building on Lindqvist et al.'s (2013) suggestion that a relationship exists between use of AAS and mental health, these data indicate the relationship may operate in both directions. Specifically, those athletes who use AAS are predisposed to more psychological distress and those who are experiencing this type of distress may be drawn to use AAS as well as other illicit substances.

The weight-sensitive nature of strength sports, particularly bodybuilding, was unsurprising as a concern for this group and is somewhat consistent with an observed overrepresentation of eating disorders in sport (Rice et al., 2016; Neumann et al., 2022). Schaal et al. (2011) have shown that athletes from weight-sensitive or aesthetic sports, are

more prone to develop psychological distress, as well as eating disorders. Notably, the link between disordered eating and psychological distress can be explained through contemporary theories of body image. Cash (2012) proposed a theoretical cognitive behavioural model of body image, which suggests differentiated historical factors (cultural socialisation, interpersonal experiences, physical characteristics and changes, and personality aspects) and proximal factors (present life events which comprise precipitating and maintaining influences on body image experiences) shape the development of body image attitudes. Of relevance to the present data are the proximal factors. Proximal factors with a social component refer to specific events or situational cues, such as social scrutiny, which may activate schema-driven processing of information around self-evaluations of an individual's appearance. For women strength athletes using AAS, the situational cues of bodybuilding and powerlifting competitions where they are exposed to other individuals who are extremely muscular and potentially lean, may be activating self-evaluations of appearance. These self-evaluations may drive disordered eating practices which, in turn, increase psychoactive substance use as women do not wish to 'blow out their calories'. Given that 'party drugs' do not have the same caloric value as alcohol, participants expressed these (e.g., cocaine) were a viable alternative. Outside of the theoretical contributions of this research, there are also practical implications arising from the work.

Practical Implications

This preliminary investigation addresses the gender-specific information gap regarding women who use AAS and their patterns of other substance use. Our findings are indicative of areas of concern which may be specific to women. For instance, use of multiple substances by women who are already choosing to use AAS may be a sign of an increased risk profile. Given the representation of mental health symptoms and disorders among women who use AAS, service providers (e.g., healthcare providers, harm reduction

coordinators) working with this group may consider more focused screening and intervention strategies. The increased engagement of health care providers in AAS use among men has received recent attention (Atkinson et al., 2021) and women may benefit from similar engagement and education strategies. The facilitation of peer-led approaches and frameworks have been suggested for men who use AAS (Piatkowski et al., 2022a; Tighe et al., 2017) as well use emic harm reduction strategies through use of coaches (Gibbs et al., 2022). Therefore, particularly for women who use AAS and are involved in strength sports, building similar frameworks may be considered in future.

Conclusions

The population of interest in this study is underrepresented in extant literature to date and, therefore, this study serves as a preliminary exploration of women's experiences with AAS and other substances. We note the findings cannot necessarily be generalised to all women who use AAS, and further investigations are warranted to elucidate what other motivations exist for women who use AAS and other illicit substances. We believe the use of both men and women who use AAS represents a strength of the research and builds on work in this field, however, more understanding of the networks underpinning women's use is warranted.

The findings of this study provide important directions for future investigations concerning women who use AAS both in and out of sporting contexts. Notably, female strength athletes have indicated that they are using AAS and engaging in polysubstance use for recreational purposes. Being a female strength athlete may have pseudo-protective elements which results in reducing licit substance use but increased illicit substance use. The weight-sensitive nature of strength sport may also contribute to illicit substance use. Females who use AAS reported that there were underlying factors, linked to mental health disorders, which were contributing to their polysubstance use. Further investigations are warranted to

explore, more fully, the psychosocial factors which contribute to use of multiple substances among women who use AAS and whether there are typologies of women who use AAS. Understanding these factors may contribute to more effective prevention strategies.

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Table 1.

Participant details

Participant	Gender	Sport	Role	Lifetime AAS use	Lifetime illicit substance use
1	M	Powerlifting	Coach	Y	-
2	M	Bodybuilding	Coach	Y	-
3	M	Powerlifting	Coach	Y	-
4	M	Bodybuilding	Coach	Y	-
5	F	Powerlifting	Athlete and Coach	Y	Y
6	M	Powerlifting	Coach	Y	-
7	M	Powerlifting	Coach	Y	-
8	F	Powerlifting	Athlete	Y	Y
9	F	Powerlifting	Athlete	Y	Y
10	F	Powerlifting	Athlete	Y	Y
11	F	Bodybuilding	Athlete and Coach	Y	Y
12	M	Strongman	Coach	Y	-
13	F	Powerlifting	Athlete	Y	Y
14	F	Strongwoman	Athlete	Y	Y