



Muscle dysmorphia and self-esteem in former and current users of anabolic-androgenic steroids

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1. Introduction

Anabolic-androgenic steroids (AAS) represent a group of synthetic derivatives of testosterone that help to build muscle and improve performance (Pope & Brower, 2009). AAS imitates the role of testosterone, which enhances muscle growth and encourages the recipient to train harder (Griffiths, Murray, & Mond, 2016). However, evidence has shown that long-term, over-use of AAS can have detrimental effects on the individual. These include increased risk of violence and aggression (Pagonis, Angelopoulos, Koukoulis, Hadjichristodoulou, & Toli, 2006) depression and anxiety (Pope et al., 2014) and Muscle dysmorphia (MD) (Kanayama, Hudson, & Pope, 2008).

Now seen as a public health concern (Kimergård, 2015), AAS use within the UK has increased over the past few decades. The most recent Home Office report states that 293,000 16-59-year-olds had used AAS at some point in their lives (Lader, 2015). Current attempts to control the use of AAS in the UK involve harm reduction strategies with needle exchange programmes (NEP) who offer safe needle injecting practices and practical advice.

Despite the increase in AAS use and potential health risks associated with use, currently, there are no government policies aimed

at treatment or prevention for current AAS users, or for those at risk of becoming AAS users. Therefore, research that highlights both the potential risk factors for use and reasons behind continued use and cessation will help policymakers to develop appropriate treatments and intervention programmes (Greenway & Price, 2018). Consequently, research has set out to examine motivations behind AAS use, highlighting several key factors, including body dissatisfaction, low self-esteem and MD (Davies, Smith, & Collier, 2011; Field et al., 2014; Greenway & Price, 2018; Kanayama, Barry, Hudson, Pope, & MPH, 2006;). The past decade has seen an increase in the importance of body image portrayed in the media depicting the 'ideal' male body that include strong, well-toned bodies. Such exposure and pressure to look this way have led to an overall drop in self-esteem relating to higher rates of body dissatisfaction, an increase in AAS use and the development of appearance disorders such as MD (Martin & Govender, 2011; McFarland & Kaminski, 2009; Jampel, Murray, Griffiths, & Blashill, 2016; Pope, Kanayama, & Hudson, 2012). Categorized as a sub-type of Body Dysmorphic Disorder, MD appears in the Diagnostic and Statistical Manual version 5 (American Psychiatric Association, 2013). MD causes the individual to feel ashamed and embarrassment about their bodies, perceiving themselves to be small and weak (Choi, Pope, & Olivardia, 2002). Although overall epidemiology of MD is unknown, it is estimated that as many as 6% of people meet the criteria for MD in the general western population (Bo et al., 2014), with as many as 10% of male gym-goers in the UK experiencing the disorder (Ahmad, Rotherham, & Talwar, 2015).

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Despite the recent increase in interest towards MD, research on its prevalence and relationship with AAS use is under-studied. Of the studies that do exist (Babusa & Túry, 2012; Davies et al., 2011; Kanayama et al., 2006), findings show that AAS users score significantly higher than non-users on MD symptomology. Cafri, Olivardia, and Thompson, (2008) revealed that 44% of men with MD reported using AAS compared to 14% of men without MD. Olivardia, Pope, and Hudson, (2000) claimed that in 73% (8 of 11 men) of participants, MD preceded AAS use, but in the remaining 27%, MD followed AAS use. In contrast, Kanayama, Pope, and Hudson, (2018) argued that the symptoms of MD might begin or become exacerbated following AAS use, and men with MD are more likely to abuse and become dependent on AAS compared to those without MD (Pope et al., 2005). The complexity of this relationship is acknowledged by Harris, Dunn, and Alwyn, (2016). For men in their study, body image concerns had developed over time due to the pressure to gain muscularity suggesting that a negative body image may not be a consequence of AAS but rather a bi-product of the competitive nature of a bodybuilding environment, and MD, rather than causing AAS use, functions to perpetuate its usage. Consequently, with such inconsistency in results, the present study aims to add to the literature to determine whether MD is a precursor or cause of AAS use.

A further risk factor for men who use AAS is self-esteem. Early research investigating an association has revealed inconsistent findings with Grieve (2007) supporting a positive correlation between self-esteem and AAS use and Kanayama, Pope, Cohane, and Hudson (2003) reporting no relationship. Individuals with low self-esteem and body dissatisfaction become fixated and obsessed with their lack of muscles and size and therefore search for ways to alleviate these tensions (Pettersson, Bengtsson, Voltaire-Carlsson, & Thiblin, 2010). Strategies include excessive weightlifting, a drive for muscularity, muscle checking (Wolke & Sapouna, 2008) and AAS use (Choi et al., 2002; Grieve, 2007). In their study, Davies et al. (2011) reported that low self-esteem had led to AAS initiation and continued use in current users. In addition, so powerful was the effect of an increase in self-esteem, some former users considered returning to use. Furthermore, the lack of difference in MD symptomology reported between current and former users suggest that symptoms can often persist beyond cessation. The positive effects of AAS on one's self-esteem described in this study could explain why men find cessation and abstinence difficult. Despite Davies' novel use of interviews with former users, the lack of control group reduces the ability to compare self-esteem and MD symptomology with non-using weightlifters. Also, the small self-selected sample may have resulted in sample bias, which could have underestimated the prevalence and nature of MD and AAS use. In addition, face-to-face interviews may have caused men to withhold sensitive information relating to their AAS use, training regime or self-perceptions. Hence, to address these issues, the present study examined MD symptomology and self-esteem levels in current, former and non-users, and rather than conducting interviews, open-ended questions were added at the end of the questionnaire to encourage candid, anonymous responses relating to motivations for AAS use and cessation.

In a more recent study, Greenway and Price (2018) invited eight long-term AAS users to discuss their motives for initial and continued use. The authors were able to offer evidence for the direction of causality from the reports on initial usage. For some men, MD, body dissatisfaction and self-esteem had led to AAS use while, for others, they were the consequences of use. In particular, men reported that improvements in physique and self-esteem following use had led to a deeper obsession with training, continued dissatisfaction and talk of MD development. They also spoke of an addiction to their newly gained confidence and a fear of losing this if they were to terminate use. However, despite these novel findings, their study

lacked measurement of MD symptoms and self-esteem and did not include a comparison group, making comparisons to the wider training community difficult.

Given the contradictory results on the role of self-esteem and MD in AAS use, it would seem pertinent to examine the extent of and relationship between these concepts in current, former and non-users. Additionally, asking men why they started using AAS, the reasons behind continued use and cessation may contribute to the recent literature that aims to understand what motivates men to use AAS. Notwithstanding the need for further examination and replication of findings in order that health professionals and policy-makers can begin to provide appropriate preventative models for AAS users, at present AAS use does not feature within the UK Clinical Guidelines for the Management of Drug Misuse and Dependence (Ajayi, 2008) nor in the National Treatment Agency for Substance Misuse (2006). Instead, it is left to needle exchange programmes (NEP) providers to manage harm reduction approaches, rather than strategies to aid cessation or prevent initial use. Hence, it is essential to gain a deeper understanding of AAS use to (1) help prevent those considering AAS use in the future (2) to encourage those who no longer use AAS to remain abstinent, and (3) to decrease the potential negative impact of AAS on current users.

1.1. Research questions

- 1 What is the extent of low self-esteem in current, former and non-users, and how does this relate to their motivations?
- 2 How do self-esteem levels and MD symptomology differ between current, former and non-users?
- 3 What are the motivations behind the initiation, cessation (for former users) and continued use of AAS (for current users) and do motivations differ between current and former users?
- 4 What do these motivations suggest about the direction of causality?

2. Method

2.1. Participants

One hundred and forty-eight white British non-competitive weightlifters, aged 18–30 years, volunteered to take part in the study. Fifty current users from a needle exchange programme (NEP) in South Wales, 48 former users and 50 non-users from three gyms within the same locality were recruited. Those recruited from the NEP had attended for over 12 months, and access to them came via the second author who manages the NEP. These men were asked to complete the questionnaire on arrival at the NEP in a small separate room at the rear of the building. Former users had not used AAS for a minimum of 10-months, and all 50 non-users had reported never using AAS. These men completed the questionnaire in a private room at their gym. Inclusion criteria for the three groups were (i) that they had been weightlifting for at least 12 months and (ii) did so at least twice a week. Recruitment occurred from May 2017 to December 2017.

2.2. Materials

Participants completed a demographic questionnaire that included information about their age, height, weight, length of time training, how long they had been AAS users and age of initiation. Participants were then required to complete the Muscle Appearance Satisfaction Scale (MASS; Mayville, Williamson, White, Netemeyer, & Drab, 2002) and the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). Participants completed all questions for both scales resulting in no missing data. At the end of the questionnaire, current and former users were asked a series of open-ended

questions. Current users were asked: 'what were your initial reasons for using AAS', and 'why do you continue to use AAS?' Former users were asked for their initial reasons, and also 'what made you stop using AAS?' The questionnaires took approximately 20 mins to complete.

2.2.1. MD symptomology

The MASS is a 19-item scale that measures MD symptoms. The scale consists of 5 sub-components: Bodybuilding dependence (5 items) - reveals excessive weightlifting with compulsive traits towards weightlifting/bodybuilding; muscle checking (4 items) - assurance seeking behaviours; Substance use (4 items) - explores the attitudes and willingness to take steroids; injury (3 items) - examines overtraining symptomology and attitudes towards unsafe weightlifting; and muscle satisfaction (3 items) - measures the individual's satisfaction with their muscle shape and size. The items are rated on a 5-point Likert scale (strongly disagree = 1, strongly agree = 5), with higher scores reflecting the tendency for MD. Scores range from 19 to 95. Questions include "I am satisfied with the size of my muscles" and "I often spend a lot of time looking at my muscles in the mirror". The MASS has good internal consistency, with a Cronbach's alpha of 0.87.

2.2.2. Self-esteem

The RSES is a 10-item scale ranging from 1=strongly disagree to 4=strongly agree, that measures an individual's global self-esteem (evaluation of one's worth). The scale includes statements such as "At times, I think I am no good at all". Scores range from 10 to 40, with higher scores indicating higher self-esteem. A score of below 15 indicates low self-esteem, and a score above 25, high self-esteem. The RSES has good internal consistency, with a Cronbach's alpha ranging from 0.76 to 0.87.

2.2.3. Open-ended questions

Current and former users were asked to provide information on two open-ended questions to allow for information regarding the motivations behind the initiation of AAS use and reasons for cessation (former users) or continued use (current users). Of the 98 questionnaires completed, fourteen current users and nine former users did not respond. Therefore, the analysis was performed on 75 open-ended responses (36 current users and 39 former users). Responses were analysed following the principles of content analysis. Content analysis is a systematic coding and categorising approach used for exploring textual information (Mayring, 2004). It allows the researcher to analyse personal experiences through the identification of codes based on the frequency of occurrence (Vaismoradi, Turunen, & Bondas, 2013). An inductive approach was used to derive categories from the data and identify trends and patterns of words used, their frequency and relationships (Elo & Kyngäs, 2008; Pope, Ziebland, & Mays, 2000).

2.3. Analyses

The results section presents descriptive data and calculates several inferential statistics on the demographic data (three one-way Analysis of Variance (ANOVA) tests and two independent t-tests). Two ANOVAs were calculated to determine differences between current and former users and non-users for MD symptoms and self-esteem. A chi-square test for independence was calculated to determine an association between AAS user type (current and former users) and motivations for initial use. A further two chi-square goodness-of-fit tests were calculated to assess differences among motivations for (1) cessation and (2) continued use. The Cronbach alpha coefficient for the MASS was 0.85, and for the RSES, 0.81, indicating a high level of internal consistency in the current sample.

Analysis for the open-ended responses was separated into the two questions (1) motivation for initiating AAS use, (2) motivation for cessation (former users) and continued use (current users) and analysed following Elo and Kyngäs (2008) three phases of analysis which include preparation, organising and reporting. The preparation stage began with selecting manifest content analysis to establish words and concepts as the unit of analysis. No preconceived categories (Kondracki, Wellman, & Amundson, 2002) were used. Instead, data were read repeatedly to allow for immersion in the text. The organisation phase began with open coding, which involved notes and headings being written in the margins on the responses to describe the content (Hsieh & Shannon, 2005). Headings were then placed into coding sheets from which categories were generated. The categories were then grouped under higher order-headings (Burnard, 1991). This grouping reduces the number of categories in preparation for abstraction. Abstraction involved generating sub-categories that included similar words and concepts, which developed into generic categories, which led to main categories and themes (see Table 3).

Data were analysed by the two authors to provide evidence of internal consistency. The counting of words/concepts and coding was done separately; then, both authors met to discuss and decide upon categories and subsequent themes. Using Miles and Huberman (1984) technique for intercoder reliability, the initial coding agreement was 81 %, disagreements were discussed between the two raters until an agreement was reached or data recoded. The final intercoder reliability raised to 89 %. Ethics approval was granted by the University of Wales Trinity Saint David. All participants gave written informed consent before completing the questionnaire. All data were obtained anonymously and confidentially.

3. Findings

3.1. Demographic features

Table 1 presents the characteristics of each group. The average age for the whole sample was 23.8 years; their height - 177.3 cms, and their weight - 91.7 kgs. The mean length of training for all participants was 8.7 years.

Comparisons for age, height, weight and length of training were made using separate one-way ANOVAs. Significant differences were found between weight (user and non-user $p = .000$; former user and non-user $p = .001$) and length of training (former user and non-user $p = .002$). Independent t-tests for the length of AAS use and age of initiation revealed no significant differences across current and former users.

3.1.1. Between-group analyses

In terms of the extent of low self-esteem, the figures show that 43 percent of all respondents (63/148) scored below 15 on the RSES. Almost half of the 63 men (49 %) were current users, 38 % were former users and 13 %, non-users.

Total scores on the MASS and RSES were used to measure group differences for MD symptomology and self-esteem levels, and two separate one-way ANOVAs calculated. Mean scores on each of the measures are shown in Table 2.

In terms of MD, results revealed a significant difference between groups with a small effect size, $F(2,145) = 17.78$, $p < .001$, $\eta^2 = 0.109$. A Tukey post hoc test revealed that MD scores were significantly higher in current users than in non-users ($M = 60.98$, $SD = 10.19$ and $M = 48.5$, $SD = 9.62$, respectively, $p < .001$) and former users ($M = 54.22$, $SD = 7.76$, $p = .005$). Furthermore, MD scores were significantly higher in former users than in non-users ($M = 54.22$, $SD = 7.76$ and $M = 48.5$, $SD = 9.62$, respectively, $p = .021$). The results for

Table 1
Demographic features of current users, former users and non-users.

	Users		Former users		Non-users		df	Test value	P
	M	SD	M	SD	M	SD			
Age (years)	23.3	3.5	23.4	3.7	22.8	3.1	2145	F=0.377	0.687
Height (cm)	176.7	5.7	177	5.9	177.8	5.6	2145	F=0.455	0.636
Weight (kg)	96.2	5.5	93.0	5.7	88.0	6.8	2145	F=18.72	0.000
Training (years)	8.9	2.5	9.7	1.6	8.3	1.5	2145	F=6.02	0.003
AAS use (years)	8.8	1.9	8.3	2.2	-	-	96	t=1.11	0.268
Age of initiation (years)	19.7	3.4	19.8	2.9	-	-	96	t=0.301	0.764

Table 2
Means and Standard deviations for MD symptomology and self-esteem for current users, former users and non-users.

	Current users		Former users		Non-users	
	M	SD	M	SD	M	SD
MASS	60.98	10.19	54.22	7.76	48.50	9.62
RSES	16.62	5.07	18.63	5.94	22.90	4.90

self-esteem also revealed a significant difference between groups, $F(2145)=17.81$, $p<.001$, $\eta^2=.020$. The effect size was small. A Tukey post hoc test showed that self-esteem was significantly higher in non-users than in current users ($M=22.9$, $SD=4.9$ and $M=16.62$, $SD=5.07$, respectively, $p<.001$) and former users ($M=18.63$, $SD=5.94$, respectively, $p<.001$). There was no significant difference in self-esteem between current and former users ($M=16.62$, $SD=5.07$ and $M=18.63$, $SD=5.94$, respectively, $p=.157$).

3.2. Themes extracted from the open-ended questions

The categories derived from the open-ended questions provide information regarding factors that influence the use of AAS. Table 3 presents the main categories which are presented in no particular order of frequency or importance.

3.2.1. Motivations for initiating AAS use

Fig. 1 shows that both current and former users cited motivations from within each of the five categories. The most prevalent theme that arose for current users was low self-esteem with 32 comments addressing this concept, closely followed by negative body image (23 comments). For former users, it was a negative body image (32 comments), followed by a need to improve physique (26 comments).

A chi-square test for independence revealed a significant association between AAS user type and the motivations behind initial use, $\chi^2(4, N=98)=14.47$, $p=.006$, 95% CI [17.61, 20.18]. Cramer's V value was significant (Cramer's V = 0.27, $p=.006$), and it indicated a moderately strong association. Adjusted residuals showed that current users wrote significantly more comments on low self-esteem (user: 33%, former user: 17.7%) and social pressure (user: 15.4%, former user: 5.2%) than former users. Whereas, former users wrote significantly more comments to improve physique (user: 14.3%, former user: 27.1%) than current users.

In line with previous literature (Davies et al., 2011; Greenway & Price, 2018; Martin & Govender, 2011), it was clear that low self-esteem and negative body image had played a role in their decision to use AAS. One man wrote, "my confidence and self-esteem were bad,

Table 3
Main categories for motivations of use extracted from the open-ended questions.

Open-ended questions	Category 1	Category 2	Category 3	Category 4	Category 5
Initial use	Low self-esteem	Negative Body Image	Frustration with training	Social pressure	Improve physique
Continued use	Improved self-esteem	Negative Body Image	Increased female attention	Social recognition	Improved physique
Cessation	Physical side-effects	Psychological side-effects	Settled down	Improved Body Image	

rock bottom". Another stated "Health reasons, coz my body looked pathetic. This was stressing me out and affecting my self-worth". Former users reported similar comments "I hated my body which was affecting how I felt about myself". Another wrote "crap self-esteem". The primary motivator for former users was negative body image. Comments included "I hated the sight of myself in the mirror" and "I was flabby and disgusting". For many of the current and former users, low self-esteem featured alongside body dissatisfaction. Of the 12 who had mentioned both, nine indicated that body dissatisfaction had resulted in low self-esteem, which had led to AAS use, a relationship previously highlighted by Olivardia et al. (2000) and Greenway and Price (2018).

A clear issue highlighted by former users centred on a need to improve physique (28 comments) "To build muscle, I was skinny" and "to up my gains, bulk up and improve my shape". Current users (13 comments) cited this concept to a lesser degree. These comments support previous findings that link usage to obtaining a better shape and size (Evans-Brown & McVeigh, 2009). Both groups also cited frustration with training "I was frustrated with the speed of gains after lifting" (current user) and "the lifting had taken me so far, I needed something extra to get bigger" (former user). These findings are in line with previous literature (Greenway & Price, 2018; Pysny, Pysna, Petru, Cvrteckova, & Aismann, 2019), that indicate when men reach a plateau with natural weightlifting; they turn to alternative strategies to help them improve their size.

Although both groups mentioned social pressure, more current than former users included this concept (15 and 5 comments, respectively), the pressure came from two sources; friends and fellow weightlifters. One current user wrote, "I felt pressurised to look like the other lifters". Another stated, "I needed to keep up with the boys at my gym". Edwards, Tod, Molnar, and Markland (2016) reported similar findings of a relationship between peer pressure and drive for muscularity. Former users were more likely to report pressure from friends "my friends were on them, and they kept on for me to take them" and "I felt left out". It appears that for some men, the motivation to start using AAS was to 'fit in' and 'go with the crowd', yet for others, it was a feeling of inadequacy created by comparing themselves with other men at their gym.

Two chi-square goodness-of-fit tests were calculated to determine differences in the motivations of both current and former users. Results revealed significant differences in the comments made by current users, $\chi^2(3, N=50)=14.20$, $p=.03$ (most prevalent - low-self-esteem and negative body image). Similarly, significant differences were found between former users' motivations, $\chi^2(3, N=48)=22.23$, $p>.01$ (most prevalent - negative body image and improved physique).

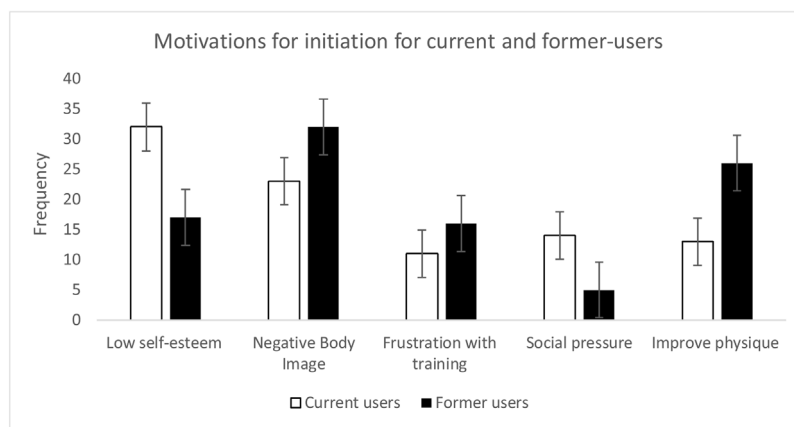


Fig. 1. Frequency of responses for each main category across current and former users. Error bars represent standard errors.

3.2.2. Motivations for continued AAS use

Fig. 2 shows that the most prevalent theme for continued use was a negative body image (32 comments). Here men commented negatively on their bodies, “I am still fat and shapeless” and “my body sucks, I need to get it right”. The same men who had stated that a negative body image had led to their initial AAS use made 19 of the 32 comments. This suggests that AAS use was unable to improve the body image concerns held by these men. The remaining 13 men had not stated negative body image as a motivator for initial use, suggesting that they may have developed a negative body image during AAS use.

Several comments (18) related to an improvement in self-esteem “my self-worth is good now” and “I feel good about myself again”. Seventeen comments were associated with an improved physique following AAS use “my body is the best it’s been” and “I look great - ripped, I can’t lose this now”. The positive effect of an improvement in physique following AAS use, and how this might prevent men from giving up has been highlighted previously (Davies et al., 2011; Greenway & Price, 2018; Petersson et al., 2010).

For many of the current users, social recognition (15 comments) and female attention (13 comments) were reasons behind their continued use. Social recognition was evident in the comments made about acceptance by fellow weightlifters “I gained the respect of the boys in the gym, they treat me differently”. An enhanced social life following an increase in female attention was also important “I’ve never had so many women into me” and “the girls love my new muscles”. These confirm findings reported by Greenway and Price (2018), who also reported an improvement in social standing, where men spoke of acceptance into the training community and subsequent improvement in their social lives.

A chi-square goodness-of-fit test revealed significant differences in the comments made by current users, $\chi^2(3, N = 50) = 11.90$, $p = .02$, with the most prevalent motivation for continued use was a negative body image.

3.2.3. Motivations for cessation

The most prevalent theme cited was an improvement in physique (25 comments) and was unsurprising since this was one of the primary reasons cited for initiating use in former users. Of the 25 comments addressing the concept of improvement in physique for initiation, 23 individuals gave this as a reason behind their cessation (see Fig. 3).

Comments for cessation included “I was small and weak when I started, this improved with steroids, so, I came off them” and “I looked fitter, so I didn’t need them anymore”. The comments suggest that AAS had improved the men’s physique (which was the intention of use), so, they no longer needed to use them. Former

users also commented on the side effects of taking AAS (18 psychological comments and 15 physical comments). Comments on the psychological effects included aggression and paranoia and support findings from Hoff (2012) “I turned aggressive, causing fights” and “I was paranoid. I thought I was going crazy”. There were also comments relating to anxiety and depression, “I was anxious and moody” and “they made me depressed all the time” and “they caused anxiety”. The physical side effects cited here have been reported by others (Evans-Brown, McVeigh, Perkins, & Bellis, 2012; Santos & Coomber, 2017) and include acne, erectile dysfunction, insomnia and hair loss, “I couldn’t cope with the acne on my back, it was painful” and “I just couldn’t sleep”.

The final theme was settling down with a partner (13 comments). Here former users reported that they no longer needed to use AAS or that their new partner did not want them using. One individual reported “it was time to settle down and stop using”, another wrote “I met the missus and she wanted me to quit”. Cessation following a change in personal circumstances, such as meeting a new partner has been highlighted in previous research (Olrich & Vassallo, 2006).

A chi-square goodness-of-fit test revealed no significant differences in the comments made by former users, $\chi^2(3, N = 48) = 4.66$, $p > .05$.

4. Discussion

The present study aimed to examine the extent of low self-esteem in men in the weightlifting community, and compare levels of MD symptomology and self-esteem between current, former and non-users. It also aimed to explore the motivations behind initial use, continued use and cessation, and whether MD is a precursor or cause of AAS use.

The extent of low self-esteem in this sample was surprising, with almost half of all men scoring below 15 on the RSES, with very few scoring above 25 (current: $M = 16.62$; former: $M = 18.63$; non-users: $M = 22.90$). This finding confirms previous literature (Grieve, 2007) that identifies low self-esteem as a risk factor for AAS use for those in the weightlifting community. However, when compared with similar groups, self-esteem levels of those in the present study were approximately two standard deviations lower than those in Chaney (2008, users $M = 31.05$); Kanayama et al. (2006, users $M = 31.1$; non-users: $M = 33.4$), and Wolke & Sapouna (2008, non-users $M = 32.88$). The observed differences may be a result of the sample chosen, in that the needle exchange programme and gyms in the present study are situated in one of the most deprived areas in South Wales (JRF, 2013). This has important implications for the local authority to ensure that they not only continue to provide harm reduction

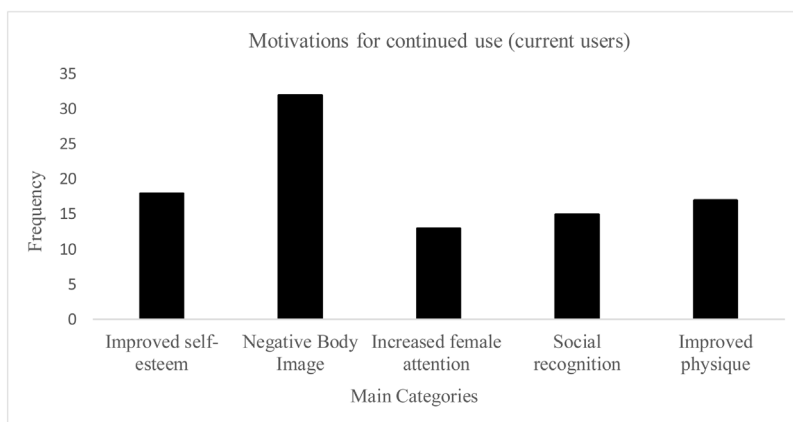


Fig. 2. Frequency of responses of motivations for continued use.

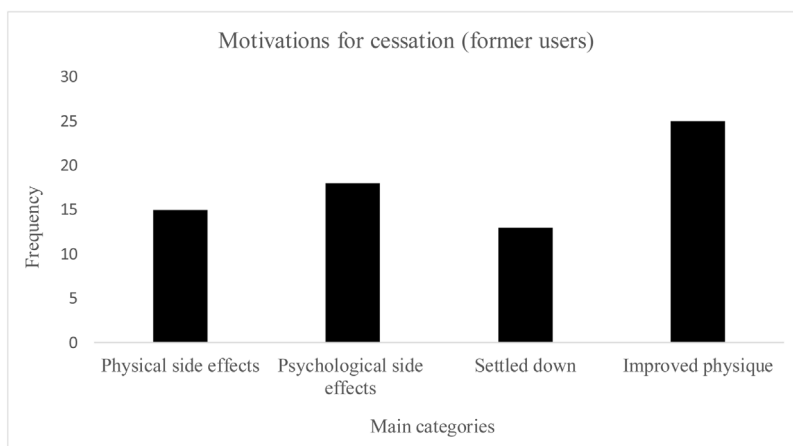


Fig. 3. Frequency of responses for each main category.

services but that they engage with this vulnerable community to create interventions that focus on building self-esteem.

Regarding differences between groups, although there were no significant differences in self-esteem scores between current and former users, current users cited significantly more comments relating to low self-esteem than former users, supporting [Davies et al. \(2011\)](#) that low self-esteem may have led them to AAS use. Additionally, the improvement in self-esteem, as a motivator for continued use, in current users suggests it may act as a secondary reinforcer that perpetuates AAS use. If this is the case, then future campaigns may need to adopt a two-stage approach that (i) offers self-esteem building activities for those in the weightlifting community to help prevent initiation and (ii) help in reducing the impact of secondary reinforcers by encouraging individuals to redirect their sources of reward.

The importance of secondary reinforcers in the maintenance of AAS use has been highlighted previously ([Greenway & Price, 2018](#); [Skárberg, Nyberg, & Engström, 2008](#); [Vassallo & Olrich, 2010](#)). The fact that many men continued using AAS despite an improvement in self-esteem (and improved physique, social recognition and an increase in female attention) suggests a dependency on these secondary reinforcers and provides further evidence for a need to rethink the lack of specific criteria for AAS dependency in the DSM-V (2013). The inclusion of criteria that highlights the delay in reward experienced by AAS users could help health professionals to develop appropriate treatments that deal with psychological dependency in AAS users. Given that former users did not cite the same dependency, future initiatives could include former users as

mentors within the training community to share their experiences and offer guidance that could encourage cessation in others, and abstinence in themselves.

In line with earlier research ([Santos & Coomber, 2017](#)), the majority of men in this study were motivated by a need to enhance their image, rather than their performance. This was evident in both current and former users citing body image concerns and motivations linked to improving their size, muscularity and body dissatisfaction. The high scores on the MASS in current and former users compared to non-users supports previous literature ([Babusa & Túry, 2012](#); [Harris, Alwyn, & Dunn, 2019](#)) that proposes body-image pathology contributes to why some men use AAS and others do not. This finding highlights a potential problem for health professionals since body anxiety issues in AAS users are associated with more severe symptoms of AAS dependence ([Griffiths, Jacka, Degenhardt, Murray, & Larance, 2018](#)). Therefore, additional research is needed to examine the role of body image anxiety and MD on AAS dependence.

Interestingly, the significant difference in MD symptomology between current and former users is contrary to [Davies et al. \(2011\)](#) and may indicate that these symptoms decline in former users as they no longer use AAS. This explanation was supported by changes in the former users' motivations from initial use to cessation. For initial use, negative body image and improved physique were cited as primary motivators yet, when asked about cessation, they only cite an improvement in physique, which may suggest that the increase in muscularity following AAS use extinguishes body image concerns, a finding highlighted in earlier research ([Van Den](#)

Berg, Mond, Eisenberg, Ackard, & Neumark-Sztainer, 2010). However, the fact that MASS scores were higher and self-esteem scores lower for former users than non-users, indicate that body image concerns and low self-esteem continue to be an issue for these men. One explanation for this could be that former users experience a decrease in muscularity upon cessation, which affects their self-esteem and body satisfaction. If this is the case, then former users and policymakers alike should be concerned, as a decline in physique during abstinence may cause a relapse and return to use. Consequently, future research may wish to concentrate on former users' self-esteem and body image concerns post-use so that health professionals can adjust their interventions to improve abstinence rates.

A further aim of the study was to determine whether MD symptoms precede or cause AAS use. Interestingly, the results differed between current and former AAS users, with former users running contrary to Harris et al. (2016) who argued that MD perpetuates usage, not causes it. For example, over three-quarters of former users cited MD symptoms as primary motivators for initial use, suggesting that MD symptoms led to AAS use for these individuals. This novel finding requires further research to examine the backgrounds and life histories of these men to help establish the precursors to their MD development. In contrast, current users appeared to develop MD symptoms post-AAS use. This was apparent in negative body image citations almost doubling from initial to continued use. This could be explained by low self-esteem and continued social pressure they feel from fellow weightlifters. If, as it appears in the present study, that peers at the gym are directly contributing to AAS initiation and maintenance, health professionals need to work with the weightlifting community to decrease the powerful effect of social comparison. Strategies could include displaying posters in gyms that promote healthy images of men who do not use AAS and posters that discourage AAS. Also, training gym instructors on methods to attain goals without using AAS and promoting healthier alternatives could help to reduce initiation. Introducing forums led by positive role-models to discuss or demonstrate techniques for avoiding AAS alongside former user's stories of the negative consequences of AAS and strategies for remaining abstinent may help to reduce initial AAS use and subsequent MD development.

Another aim of the study was to examine motivations for cessation. Findings here provide further insight into former users' motives, highlighting both the positive and negative aspects of AAS use. The positive effects were evident in the motivations relating to an improvement in physique and settling down with a partner. The comments relating to improved physique confirm that these men were using AAS for a specific reason, and once they reached their goal, they no longer needed to use. This is interesting because current users also cited a need to improve physique as an initial motivator and reason for continued use, yet unlike former users, an improvement was not enough for them to terminate use. One explanation for this finding may be linked to self-esteem. Low self-esteem was cited significantly less by former users, suggesting that they were not affected by this to the same extent as current users. These findings propose that low self-esteem may be more powerful an influence to continue using for current users than former users. Hence, for these men, preventative measures may need to concentrate on boosting and maintaining self-esteem whereas, for former users, body image concerns appeared to be more important than self-esteem, suggesting that campaigns may need to focus on creating strategies that promote positive body-image role models (Greenway & Price, 2018).

The negative effects associated with AAS use were apparent in comments relating to side effects. Given the evidence that many users are not deterred by the adverse effects of AAS and are willing to accept the risks to health (Hartgens & Kuipers, 2004; Ip et al., 2012), it was surprising to see so many terminate use due to

these effects. The most prevalent cited here, and in Havnes, Jørstad, and Wisløff (2019) were psychological effects, such as depression, anxiety and paranoia. These findings heighten the importance of providing accurate information on the risks and treatments for those experiencing the negative effects associated with use. Despite many men ceasing use due to the above side effects, many begin or continue to use regardless of the negative effects experienced. Such decisions may be explained by the Health Belief Model (HBM; Janz & Becker, 1984). According to the HBM, the decision to use AAS is based on an individual's knowledge and perception of the severity of the effects of AAS, and the decision for continued use is based on their belief regarding their susceptibility to its effects and the barriers to cessation (Halliburton & Fritz, 2018). Therefore, to ensure the effectiveness of future interventions, researchers may need to use the HBM to identify appropriate behaviour change mechanisms (Craig et al., 2008) to help prevent initiation and encourage cessation and abstinence. Although the negative effects cited by former users provide insight into their motivations to stop using AAS, they do not reveal anything about the low self-esteem and negative body image still felt by some former users, post-use. Therefore, future qualitative studies that examine how former users live with these issues once they stop using AAS would be beneficial to improve abstinence rates and future outcomes for these men.

The present study has several strengths that include using both quantitative and qualitative methods to examine self-esteem and MD symptomatology. The quantitative aspect allowed the authors to confirm previous findings that self-esteem and MD symptomatology are risk factors for AAS use and that weightlifters from this particular area in South Wales exhibit particularly low levels of self-esteem and MD symptoms that appear to exceed the current statistics on those currently experiencing the disorder in the UK. The qualitative aspect confirms previous literature that suggests AAS users show heterogeneity in their motivations (Van Hout, 2015), with some citing MD symptomatology as a contributor to AAS use while, for others, they are the consequences of AAS use.

This study also has several limitations. Issues with the participants include a sample bias towards non-competitive weightlifting males. However, since AAS use is rare in females and the majority of users are weightlifting male (Kanayama, Hudson, & Pope, 2009) the sample here is typical, and an exploration of female AAS users may not provide a large enough sample for comparison. The small sample size per group may have limited the statistical power for analyses, and using current users from one NEP may have produced selection bias, since those attending harm reduction facilities may be more likely to take part than those who do not participate in such services.

5. Conclusion

The observed differences in motivations and their direction of causality between current and former users offer new insights into the experiences and subsequent interventions that could be offered to AAS users. The fact that body image concerns were primary motivators for former users, and psychosocial factors, such as low self-esteem and social comparison, were more pronounced in current users, make preparation for future initiatives difficult and costly to manage. However, they may offer the necessary conditions for cessation. For example, an increase in muscularity with AAS reduced body image concerns, which led to cessation whereas; the psychosocial issues were not alleviated with AAS but for many led to further body image pathology, and not cessation. Consequently, in the first instance, future research needs to replicate these differences between current and former users. Then, public health campaigns can reflect on the differences observed here to provide preventative measures that decrease the likelihood of MD devel-

opment and AAS use, and for those already using AAS, treatments are needed to address the psychological dependency created by secondary reinforcers.

Declaration of Competing Interest

No conflict declared

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