

# Use of doping agents and symptoms of eating disorders among male and female patients in drug addiction treatment

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## ABSTRACT

**AIMS** – This study investigates the prevalence of use of doping agents and symptoms of eating disorders among patients in drug addiction treatment. The aim is also to look for characteristics of the groups reporting the use of doping agents or symptoms of eating disorders. **DESIGN** – A survey including questions on exercise, the use of doping agents and Eating Disorder Inventory-2 was administered in a Norwegian drug addiction facility. The study included 109 patients in residential drug treatment, 30 females and 79 males (ranging from 17 to 50 years old). **RESULTS** – Symptoms of eating disorders were reported by 33 percent of the females and 7.6 percent of the males. Previous use of doping agents (anabolic-androgenic steroids in particular) was reported by 40.5 percent of the men and 20 percent of the women. The results are discussed in light of the theory on emotion regulation, gender and cultural expectations, drug treatment as a liminal phase and similarities to drug addiction. **CONCLUSIONS** – The symptoms of eating disorders and the use of doping agents are prevalent in this sample of male and female drug addicts in treatment. Drug treatment facilities should be aware of this and take the appropriate actions regarding attention, screening and treatment.

**KEYWORDS** – Doping agents, anabolic-androgenic steroids, eating disorder symptoms, EDI-2, drug addicts, drug addiction treatment, gender

Submitted 13.12.2012

Final version accepted 09.04.2013

## Introduction

Research from the last three decades has revealed a co-prevalence between substance disorders and eating disorders (Calero-Elvira et al., 2009; Courbasson, McLaughlin, Letchumanan & Wong, 2010; Harrop & Marlatt, 2010; Holderness, Brooks-Gunn & Warren, 1994; Krahn, 1993; Nøkleby,

2012). In short, these reviews have found that among women a correlation exists between bulimic behaviour/bulimia/non-restricted type of anorexia (a type of anorexia that includes binge eating or purging) and an increased level of substance use/abuse/dependence. It is suggested that

## Acknowledgments

For their valuable comments on drafts of this article, I would like to thank professor Jo Kleiven, my supervisor Finn Skårderud and the anonymous referees of *Nordic Studies on Alcohol and Drugs*. The librarians at the Norwegian Institute for Alcohol and Drug Research (SIRUS) have also been most helpful, as always.

there is a common aetiology between eating disorders and substance disorders: personality traits such as reward sensitisation (Calero-Elvira et al., 2009), impulsivity (Thompson-Brenner et al., 2008), high interpersonal sensitivity (Carbaugh & Sias, 2010), neuroticism (high levels of negative affect such as depression and anxiety, low self-esteem) (Baker, Mazzero & Kendler, 2007), insufficient regulations of emotions (Root et al., 2010) and insecure attachment (Miljkovitch, Pierrehumbert, Karmaniola, Bader & Halfon, 2005).

There are significant differences between men and women in terms of eating disorders. Males constitute only approximately ten percent of the total group with anorexia nervosa and bulimia nervosa (American Psychiatric Association, 2000); the percentages are higher among individuals with pathological overeating and “eating disorders not otherwise specified” (EDNOS) (Ousley, Cordero & White, 2008; Striegel-Moore et al., 2009). This affects the gender composition in the sample with both eating and drug disorders, although men make up about two thirds of the drug addiction population (Amundsen, 2010; SAMHSA, 2011). However, the affected males seem increasingly more visible, partly because the development of diagnosis and assessment instruments has occurred in a less feminine way (for instance, the proposed changes in DSM-5 criteria, [www.dsm5.org](http://www.dsm5.org)).

Research has also shown correlations between substance use/abuse and the use of performance-enhancing drugs or doping agents, such as anabolic-androgenic steroids. Outside elite sports, doping agents are frequently more often associated with weight lifting (Graham, Davies, Grace,

Kicman & Baker, 2008; Santos, da Rocha & da Silva, 2011), illicit drug use (Hakansson, Mickelsson, Wallin & Berglund, 2012; Denham, 2009; Dodge & Hoagland, 2011; Ip, Barnett, Tenerowicz & Perry, 2011), conduct disorder and criminal behaviour (Pope, Kanayama & Hudson, 2012; Skårberg, Nyberg & Engström, 2010) and body image problems and eating disorders (Morgan, 2008; Pope et al., 2012). Outside the sports arenas doping agents are used significantly more often by men than by women (Lenehan, 2003).

Previous studies have shown that drug treatment may lead to overweight (Cowan & Devine, 2008; Hodgkins, Jacobs & Gold, 2003) and that diagnostic eating disorders are often insufficiently dealt with in drug treatment (Bonfa et al., 2008). However, little research has been conducted on what kinds of eating disorder symptoms and other body-related problems – including the use of doping agents – drug addicts in treatment suffer from. This study aims to describe drug addicts in treatment in accordance with their problems and needs of help. The research questions are: How prevalent are the use of doping agents and symptoms of eating disorders? What characterises these groups with doping use or eating disorder symptoms? What is the significance of gender? The results will be discussed in relation to possible interpretations.

## Methods

### *Sample*

The participants were male and female drug addicts in treatment. Of the 129 patients available for the study, 109 participated, 30 females and 79 males, ranging from 17 to 50 years. Nine percent were

under 20 years, 45 percent were between 20 and 30, and 46 percent were 31 or older (Table 1). The women were slightly younger than the men. The main substances reported to be used prior to referral were amphetamines, heroine/opiates, cannabis, alcohol and benzodiazepines/sedatives.

### Setting

All participants were patients in a Norwegian non-governmental institution offering long-term residential treatment. The average time spent in treatment at the time of the study period was eight months. Possessing or using doping agents was liable to lead to expulsion from treatment. The acquiring – not the use – of doping agents is illegal in Norway, if not medically prescribed. The legal status of using is now under debate.

### Instrument

The survey included questions on exercise and the use of doping agents, as well as the standardised instrument Eating Disorder Inventory-2 (EDI-2, Garner, 1991). The questions on the use of doping agents comprised lifetime use, last year use, type of doping preparations used and motivation for use of doping agents. The questions on exercise included participation in sports during childhood or adolescence and motivation for physical exercise in general. These questions on exercise and the use of doping agents were drawn from a Norwegian prevalence study on the use of doping agents among military recruits (Barland & Tangen, 2009). The survey also included such background questions as sex, age group and most used substance prior to treatment.

EDI-2 measures symptoms of eating

**Table 1.** Age group and most used substance last 12 months prior to treatment, in females (n=30) and males (n=79). Percentages.

	Females	Males
17–20 years old	20.0	5.1
21–30 years old	46.7	44.3
31 years and older	33.3	50.6
Amphetamines	39.3	36.6
Heroine/opiates (opioids)	32.1	38.0
Cannabis	10.7	12.7
Alcohol	7.1	5.6
Benzodiazepines, sedatives	10.7	2.8
Other drugs	0.0	4.2

disorders. In previous studies, the EDI-2 has been shown to discriminate between samples of eating disorder patients and non-clinical individuals (Garner, 1991; Nevenon, Clinton & Norring, 2006; van Strien & Ouwens, 2003). It also appears to be well suited for screening for eating disorder symptoms in the general population (Clausen, Rokkedal & Rosenvinge, 2009). The test-retest reliability was found to be high (Thiel & Paul, 2006). In Norway, Jan Rosenvinge (1998) has translated the EDI-2, which has primarily been used clinically; a Norwegian validation study has not yet been carried out. In Sweden (Nevenon et al., 2006) and Denmark (Clausen et al., 2009), validation studies have been conducted and normative data obtained. In view of possible cultural variations between different countries, a thorough cross-cultural adaption of the instrument is recommended (Gjersing, Caplehorn & Clausen, 2010). However, for this introductory study on the area in Norway, other Nordic studies were considered offering acceptable comparison data. The fact that EDI-2 provides particularly useful data on the sample's psychological profile has

been an important motivation for using EDI-2 in this exploratory study.

The EDI-2 comprises two types of subscales: three symptom subscales and eight psychological subscales, totalling 91 items (Table 2). The three symptom subscales measure attitudes and behaviours of eating, shape and weight. The subscale *Drive for Thinness* taps a strong pursuit of being thin – namely, a great fear of being fat – and is considered to be a central feature of eating disorders (Bruch, 1973, 1982, in Garner, 1991). *Bulimia* assesses binge eating and is the defining characteristic of bulimia nervosa. *Body Dissatisfaction* measures overall unhappiness with shape and size of specific parts of the body.

The eight psychological subscales measure attributes relevant to eating disorders (Garner, 1991). The sense of *Ineffectiveness* has been regarded as an underlying disturbance in eating disorders, entailing a feeling of inadequacy, worthlessness and a lack of control over one’s life. *Perfectionism* has to do with believing that one’s personal achievements should be top quality. *Interpersonal Distrust* measures difficulties with forming close relationships as well as expressing thoughts and feelings to others. *Interoceptive Awareness* assesses problems with how to recognise and appropriately respond to inner emotional states, including sensations related to hunger and satiety. *Maturity Fears* measures a wish to retreat to the security of childhood, whereas *Asceticism* measures a person’s ideal of self-discipline, self-denial and control of bodily urges. *Impulse Regulation* taps a tendency toward thoughtlessness, substance abuse and destructiveness towards oneself or others. Finally, *Social Insecurity* assesses a belief that social re-

**Table 2.** The 11 subscales in EDI-2

Symptom subscales	Psychological subscales
Drive for Thinness	Ineffectiveness
Bulimia	Perfectionism
Body Dissatisfaction	Interpersonal Distrust
	Interoceptive Awareness
	Maturity Fears
	Asceticism
	Impulse Regulation
	Social Insecurity

lationships are generally disappointing, unrewarding and insecure (Garner, 1991).

The scoring system in EDI-2 reflects the idea that responses in the non-symptomatic direction (scoring less than 4 on a 6-point scale, ranging from 1 to 6) should not be counted. Subscale scores were computed, allowing only one subscale item to be omitted, in accordance with the EDI manual (Garner, 1991).

The EDI-2 does not operate with fixed cut-off values to identify individuals with eating disorders or eating disorder symptoms (Garner, 1991). Still, Garner has suggested using a score on *Drive for Thinness* as a cut-off in the screening process, as this subscale touches the core psychopathology of both anorexia and bulimia (Bruch, 1973, 1982, in Garner 1991). The proposed cut-off is 14, although Garner advises that the level be adjusted according to purpose. Other cut-off values may be derived from the symptom index that comprises all three symptom subscales, or just *Drive for Thinness* and *Bulimia* (see Nøkleby, 2013).

For boys/men with the typical diagnostic eating disorders (anorexia and bulimia), EDI-2 has demonstrated its usefulness and validity (Spillane, Boerner, Anderson & Smith, 2004). In a study that compares matched male and female eating disorder

patients, the men showed significantly lower scores on *Drive for Thinness*, *Body Dissatisfaction* and *Impulse Regulation* (Fernández-Aranda et al., 2004). No significant differences were evident on the other subscales. In another study, male eating disorder patients scored lower than females on all subscales, both upon admission to treatment and at follow-up (Weltzin, Weisensel, Cornella-Carlson & Bean, 2007).

#### Implementation

The survey was distributed in the institution's different units by the author. Participation was voluntary and anonymous, but the participants could use the questionnaire's identification number if they wanted to get back to the researcher or a psychologist to discuss their individual results. Six female and 14 male patients did not participate or delivered an incomplete sheet; thus, 30 women and 79 men were included in the final analysis. Informed consent was given by all participants, and the study was approved by the Norwegian Regional Committee for Medical and Health Research Ethics, South-East (S-09219d).

#### Analysis

SPSS, version 19, was used for statistical analysis (IBM SPSS Statistics).

As we had no Norwegian norm data, a Swedish study was used for comparison (Nevonen et al., 2006). In the Swedish study, three samples were assessed: eating disorder patients, psychiatric outpatients and a non-clinical control sample. In the present study, we used data from the sample of eating disorder patients. The eating disorder patients were women between 18 and 24 years of age (N=978). They were diagnosed according to DSM-IV with anorexia nervosa (18 percent), bulimia nervosa (44 percent) and eating disorder not otherwise specified (38 percent) (Nevonen et al., 2006). The patients had been recruited from 15 eating disorder specialist centres in Sweden (Nevonen et al., 2006). These Swedish data were compared to our data through unpaired t-tests, using mean scores and standard deviations (SD).

#### Internal consistency of EDI-2

Cronbach's Alpha was used to test the internal consistency of the EDI-2 subscales applied on this sample (Table 3).

Two of the symptom subscales (*Drive for Thinness*, *Body Dissatisfaction*) as well as

**Table 3.** Cronbach's Alpha

Symptom subscales	C. Alpha	Psychological subscales	C.Alpha
Drive for Thinness	.90	Ineffectiveness	.85
Bulimia	.72	Perfectionism	.72
Body Dissatisfaction	.87	Interpersonal Distrust	.74
		Interoceptive Awareness	.80
		Maturity Fears	.71
		Asceticism	.46
		Impulse Regulation	.71
		Social Insecurity	.65

**Table 4.** Average scores and standard deviation (SD) on EDI-2 for total sample, males and females. Unpaired t-test of means.

Subscales	Total sample (N=109) SD	Males (N=79) SD	Females (N=30) SD	T-test
Drive for Thinness	4.3 (5.6)	2.6 (4.1)	8.7 (6.7)	<0.01*
Bulimia	1.6 (2.6)	1.3 (2.0)	2.5 (3.7)	0.03*
Body Dissatisfaction	7.7 (6.4)	5.8 (5.1)	12.6 (7.0)	<0.01*
Ineffectiveness	5.0 (5.0)	4.0 (3.7)	7.8 (6.9)	<0.01*
Perfectionism	3.9 (3.7)	3.4 (3.3)	5.2 (4.4)	0.03*
Interpersonal Distrust	5.2 (3.9)	4.7 (3.6)	6.6 (4.2)	0.03*
Interocep. Awareness	5.3 (5.1)	4.2 (4.5)	8.0 (5.6)	<0.01*
Maturity Fears	4.6 (3.8)	5.0 (4.1)	3.7 (3.0)	0.12
Asceticism	4.0 (2.8)	3.9 (2.8)	4.5 (2.8)	0.31
Impulse Regulation	8.1 (5.2)	7.4 (4.6)	9.9 (6.1)	0.03*
Social Insecurity	4.8 (3.3)	4.7 (3.1)	5.0 (3.7)	0.67

\* Statistically significant at 5-percent level

two of the psychological subscales (*Ineffectiveness*, *Interoceptive Awareness*) yielded Cronbach's Alpha coefficients above .80. The third symptom scale (*Bulimia*) and the rest of the psychological scales were around .70, except *Asceticism*, which had a critically low Alpha of .46. The average Cronbach's Alpha was .74, indicating an acceptable internal consistency.

## Results

### *Symptoms of eating disorders*

The 11 EDI-2 subscale scores for the total sample, and for women and men separately, are presented in Table 4.

Comparing men and women, we found that women had on average higher scores on all subscales, except for *Maturity Fears*, where men had the highest scores. Significant gender differences were found in *Drive for Thinness*, *Body Dissatisfaction*, *Ineffectiveness* and *Interoceptive Awareness* ( $p=0.01$ ), as well as for *Bulimia*, *Perfectionism*, *Interpersonal Distrust* and *Impulse Regulation* ( $p=0.05$ ). Only non-significant differences were found in *Ma-*

*turity Fears*, *Asceticism* and *Social Insecurity*.

A cut-off of 12 on *Drive for Thinness* identified 33.0 percent of the women (10) and 7.6 percent of the men (6). Lowering the cut-off by two points from Garner's suggestion of 14 included three more men, in accordance with Fernández-Aranda et al. (2004). Only one woman was added. Apart from the men's slightly lower score on *Drive for Thinness* (14 vs. 16.7), no differences emerged between these men and women based on their scores on other subscales.

The subgroup with symptoms of eating disorders scored significantly higher than the rest of the drug addiction sample on *Drive for Thinness*, *Bulimia* and *Body Dissatisfaction*, all of which comprise the symptom index, as well as on *Ineffectiveness*, *Interpersonal Distrust*, *Interoceptive Awareness*, *Asceticism* and *Impulse Regulation* ( $p<0.01$ ). *Perfectionism*, *Maturity Fears* and *Social Insecurity* showed no differences between the two groups – namely, those scoring above and below the cut-

**Table 5.** Subscale scores of the group of male and female drug patients scoring above 12 on Drive for Thinness, compared to a group of eating disorder patients (Nevonen et al., 2006). Unpaired t-test of means.

Subscales	Drug patients (SD) N=16	ED sample (SD) N=978	T-test
Drive for Thinness	15.7 (2.5)	13.4 (5.6)	0.10
Bulimia	4.4 (3.9)	8.0 (5.9)	0.02*
Body Dissatisfaction	15.1 (4.5)	17.3 (7.5)	0.24
Ineffectiveness	10.1 (5.8)	11.6 (6.7)	0.37
Perfectionism	5.4 (4.8)	6.1 (4.1)	0.50
Interpersonal Distrust	8.3 (4.0)	4.6 (4.0)	<0.01*
Interoceptive Awareness	10.9 (5.3)	12.2 (6.5)	0.43
Maturity Fears	4.8 (3.8)	5.5 (4.8)	0.56
Asceticism	6.5 (3.0)	6.9 (3.9)	0.68
Impulse Regulation	11.6 (6.0)	6.0 (4.9)	<0.01*
Social Insecurity	6.1 (3.4)	7.6 (4.3)	0.17

\* Statistically significant at 5-percent level

off of 12 on *Drive for Thinness*. These significant differences and similarities were equal for the cut-off of 14.

We compared this group to a sample of eating disorder patients from a Swedish study (Nevonen et al., 2006). (The scores from the Swedish and Danish studies were corresponding.) This comparison indicated that our group reported comparable scores on most EDI-2 subscales (Table 5). Our group scored significantly lower on *Bulimia* and significantly higher on *Interpersonal Distrust* and *Impulse Regulation*. The identified group showed typical symptoms of eating disorders.

Testing for preferred drug prior to treatment, this subgroup used amphetamine significantly more often than the rest of the sample, OR 3.5 ( $p < 0.04$ ).

In terms of motivation for exercise, the eating disorder symptoms group answered “get in shape”, “get a beautiful body”, “feel well” and “lose a few kilos” significantly more often than those scoring below 12 on *Drive for Thinness* (Table 6).

The eating disorder symptoms group reported “get bigger muscles” significantly less as their motivation. Other motives for exercise were equally distributed between those scoring above and below 12.

#### *Use of doping agents*

According to the results, 40.5 percent (32) of the men and 20.0 percent (6) of the women reported having used doping agents. The predominant preparations used were anabolic-androgenic steroids (used by 78.9 percent) and testosterone (used by 59.5 percent). Furthermore, 23.7 percent of this group (8.3 percent of the total sample) had been using during the last year, while the rest prior to the last year.

The motivation for using various doping agents was related primarily to the concrete, physical appearance (e.g. “get the body I want” and “get big muscles”) (Figure 1). It was less related directly to this body’s effect on others (e.g. “be able to defend myself”).

However, looking at their motivation for

**Table 6.** Motivation for physical exercise. Total sample, eating disorder symptoms group and doping agent group.

Motive	Total sample (N=109)	Eating disorder symptoms group (n=16)	Doping agents group (n=38)
Get in shape	85.4	100.0*	88.9
Feel well	76.7	92.9*	69.4
Get a beautiful body	74.8	100.0*	80.6
Get rid of unrest	70.9	71.4	77.8
Be with friends	51.5	42.9	47.2
Have something to do	50.5	50.0	33.3**
Have a healthy lifestyle	44.7	57.1	41.7
Get bigger muscles	43.7	14.3*	55.6
Lose a few kilos	40.8	92.9*	38.9
Become part of a community	38.8	28.6	33.3
Perform better in competitions	24.3	14.3	27.8
In order to feel safe	20.4	14.3	22.2
Defend myself or my dearest ones	20.4	7.1	33.3**
In order to be respected	13.6	21.4	19.4
Something else	10.7	14.3	8.3

\* Significant different percentage compared to those scoring below 12 on Drive for Thinness (<0.05)

\*\* Significant different percentage compared to those who report not having used doping agents (<0.05)

physical exercise in general (Table 6), the group who had been using doping agents was significantly more prone to answer “defend myself or my dearest ones” than the rest of the sample who had not used doping agents. The non-users reported “have something to do” significantly more often than users as a motive for exercise. In addition, users had significantly more often been engaged in regular sporting activities in their childhood and youth than the non-users, OR 4.1 ( $p=0.03$ ).

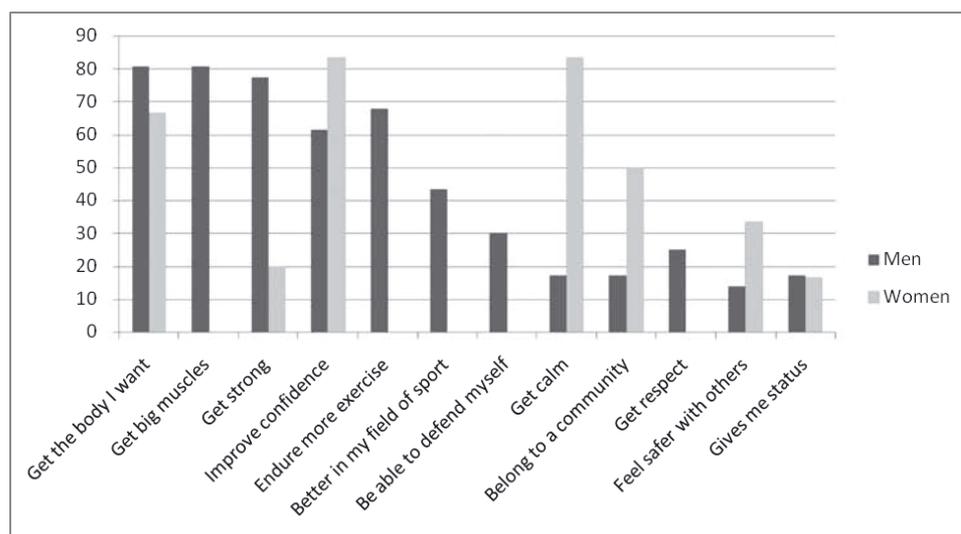
No differences occurred between the users and the non-users regarding which (other) substances of intoxication participants had used prior to treatment. Regarding the EDI-2 subscales, 10.5 percent of the users of doping agents reported a score above 12 on *Drive for Thinness* – that is, they exhibited symptoms of eating disorders. No differences emerged between us-

ers and non-users on any of the subscales. However, the subgroup that reported use last year scored higher than the rest of the sample on all subscales, with significant differences on *Inefficacy* ( $p=0.02$ ), *Asceticism* ( $p<0.01$ ), *Impulse Regulation* ( $p<0.01$ ), *Social Insecurity* ( $p=0.02$ ) and almost on *Interoceptive Awareness* ( $p=0.06$ ).

## Discussion

### *Regulating emotions*

The current study identified a subgroup of the drug addiction sample reporting symptoms of eating disorders. The group showed high scores in the pursuit of thinness. Compared with the rest of the drug addiction sample, this subgroup was characterised by poor self-esteem, difficulties with identifying and expressing their feelings, denial of bodily needs and inadequate impulse control (as measured by EDI-2). These find-



**Figure 1.** Motivation for using doping agents, men (n=32) and women (n=6). Percentages.

ings are supported by an understanding of eating disorders as related to the regulation of emotions (for example, Bruch, 1978; Fox & Power, 2009; Skårderud & Fonagy, 2012). Recent theory and research have focused attention on the regulation of emotions as underlying both eating disorders and drug addiction (Bateman & Fonagy, 2012; Root et al., 2010; Taylor et al., 1997). Typical examples include using heroin or amphetamine to suppress unbearable experiences and emotions or using a strict nutritional scheme or engaging in excessive physical exercise to control difficult thoughts and ‘unruly’ emotions.

The subgroup reporting use of doping agents during the past year was also characterised by poor self-esteem, denial of bodily needs, inadequate impulse control and lack of trust towards other people. The rest of the doping agent users reported no such characteristics, but their reasons for using doping agents imply that self-esteem is important for many. The data are not conclusive, but there are indications that

doping agents are used not only to build muscles, but also to build confidence and moderate other emotions, as is supported by previous research (Barland, Tangen & Johannesen, 2010; Petersson Bengtsson, Voltaire-Carlsson & Thiblin, 2010).

#### *Gender and cultural expectations*

Eating disorder symptoms, particularly the pursuit of thinness, are far more widespread among women than among men in this study. This result is in accordance with previous research (Hudson, Hiripi, Pope & Kessler, 2007; Keel, 2010), which may be at least partly related to cultural expectations (Dworkin & Wachs, 2009). With changing cultures, the proportion of boys and men with eating disorders may be rising. However, an inventory such as EDI-2 has a rather feminine bias with a focus on the female body, as do many eating disorder inventories. Thus, boys’ and men’s eating disorders may be overlooked.

Also identified is a substantial subgroup using doping agents, a group in which

men comprise the large majority. This also accords with previous research results, although we may also see a changing gender pattern in this area. The reported use of doping agents can refer to use in treatment, use in periods with (other) drugs or use in abstinent periods outside treatment. Qualitative findings suggest that gateways to the use of doping agents in this group of drug addicts are primarily drug use and drug treatment (Nøkleby & Skårderud, 2013). The most important motivation in general for using doping agents as reported in this study has to do with developing a desirable body. One craves for the right visual qualities but not necessarily a specific strength or capacity. This result may also be linked to cultural expectations towards the muscular man (Dworkin & Wachs, 2009), although the reported use by women in this study adds some nuances to this. Looking at the two subgroups (with eating disorder symptoms or doping use) together, there is a general preoccupation with appearance. Their physical exercise is largely motivated by looks.

This motivation and emphasis on bodily appearance can be seen in relation to substance treatment as a liminal phase (Turner, 1967; 1969). The liminal phase is the in-between phase in a transition process (a *rite de passage*) in which the individual no longer inhabits its previous role and has not yet reached its new role (van Genep, 1960). Residential drug treatment resembles the liminal phase in several ways. The patient is in an in-between period; not a drug addict, but still not an “ordinary non-addict”. The patients sleep and work/study in a particular setting, both symbolically and practically separated from their previous (drug) milieu and the rest

of society (Nøkleby & Skårderud, 2013). In this in-between setting, the transformation from user to non-user can take on many forms. For many patients, this transformative period is also a period for the transformation of the body. The use of doping agents and excessive workout can be a way of transforming one’s body, motivated by an overall need to change in order to become a “new and abstinent person”.

#### *Relations to the substance addiction*

As expected, our subgroup with eating disorder symptoms reports more frequent use of amphetamines. Previous research has highlighted various stimulants in studies of co-occurring drug and eating problems, recognising the appetite-decreasing effect of the use of these drugs (Cochrane, Malcolm & Brewerton, 1998; Neale, Abraham & Russell, 2009; Piran & Robinson, 2006). Some studies have found that cannabis (Rodondi, Pletcher, Liu, Hulley & Sidney, 2006) and opiates (Calero-Elvira et al., 2009) are the preferred drugs among individuals with eating problems and are perhaps used as a “downer” in combination with stimulants.

The differences between our subgroup with symptoms of eating disorders and the Swedish sample of eating disorder patients exposed some characteristics of the drug addiction subgroup. Their scores on *Drive for Thinness* are comparable to those in our eating disorder sample, but their scores on *Bulimia* were significantly lower. This bulimic factor (binge eating, purging) is emphasised in other studies of co-occurring substance abuse and eating disorders (Calero-Elvira et al., 2009; Holderness et al., 1994; Nøkleby, 2012). Moreover, our subgroup scored significantly

higher on the subscales *Impulse Regulation* and *Social Insecurity*, compared to the eating disorder sample. Not trusting other people and low degree of impulse control are traits that are rather characteristic of drug addicts in general (Cuomo, Sarchiapone, Di Giannantonio, Mancini & Roy, 2008; de Wit, 2008; MacKillop et al., 2011; Thorberg & Lyvers, 2010). (Two out of 11 items in *Impulse Regulation* concern use of substances directly.)

The important motivation for using doping agents (particularly anabolic-androgenic steroids) in this study resembles a well-known motivation for using drugs – that is, to improve confidence, calm down and create a sense of belonging and status. This related motivation suggests that using doping agents and (other) drugs may for some have similar functions or meanings. Recent findings in both qualitative (Barland et al., 2010; Nøkleby & Skårderud, 2013) and quantitative studies (Kanayama, Brower, Wood, Hudson & Pope, 2009; Rohman, 2009) suggest that the use of doping agents may induce a feeling of intoxication, similarly to such drugs as amphetamine or heroine, albeit not as fast or as strong. Some researchers have suggested that major use of anabolic-androgenic steroids be regarded as a possible dependence, along the lines of other substance dependences (Kanayama et al., 2009; Rohman, 2009; Trenton & Currier, 2005).

### *Limitations*

This study has used a non-validated version of EDI-2. The results from this part of the study need to be interpreted with caution as the findings are only prelimi-

nary. The sample size of the group is another shortcoming of the current study; a larger sample would have given more statistical power, particularly on behalf of the women. The lack of participant BMIs may be a limitation regarding body dissatisfaction, and more background information in general would have been valuable with regards to the generalisation of the findings. A standardised instrument identifying the more male-typical behaviour would have been suitable for comparing results with other samples.

### *Future Research*

Large-scale studies on eating disorder symptoms and use of doping agents using validated instruments should be carried out among substance abusers in a Nordic treatment context in order to describe the population in accordance with their problems and needs for help. In addition, more qualitative studies should be conducted to improve our understanding of such behaviours among substance abusers inside or outside treatment. In particular, the area of substance use and doping agent use requires more research on meanings and functions. Finally, the tailored treatment for these combined conditions should be given greater research emphasis.

**Declaration of interest** None.

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