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Positive and negative aspects of substance use and treatment goals among substance use disorder patients with and without attention deficit hyperactivity disorder: A qualitative study

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Abstract: There is limited research on the perceptions of substance use (SU) and treatment goals among patients with substance use disorders (SUD) and attention deficit hyperactivity disorder (ADHD). We investigate whether SU perceptions and treatment goals were different among SUD patients with (SUD+ADHD) and without (SUD-ADHD) ADHD. Twelve SUD+ADHD patients (39.5 ± 8.5 years, 10 men), and 10 age- and substance severity matched SUD-ADHD patients (34.0 ± 10.0 years, six men), consecutively recruited between February 2010 and July 2012 were interviewed during the course of their SUD treatment. Interview data were analyzed using content analysis. The perceived positive aspects of SU were self-regulation of physical health, behavior, feelings, reasoning/thoughts, and the rewarding effects. The perceived negative aspects of SU included consequences on physical health, behavior, feelings, and reasoning/thoughts. SUD+ADHD patients less frequently

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PUBLIC INTEREST STATEMENT

Substances use disorder (SUD) is a serious persistent condition in which uncontrolled and frequent substance use (SU) intake continues even when affecting the persons' health, relations and work. Attention deficit hyperactivity disorder (ADHD) starts in childhood, commonly continuing in adulthood. The core symptoms of ADHD are inattention, hyperactivity and impulsivity. We asked 12 adult SUD patients with (SUD+ADHD) and 10 without ADHD (SUD-ADHD) to describe the positive and negative sides of their SU and their SU-related treatment goals.

To most patients, SU changed negative thoughts, feelings, physical states and behavior into positive. Additionally, some enjoyed getting high/drunk. Paradoxically, SU also worsened negative thoughts, feelings, physical states and behavior.

SUD+ADHD patients most commonly mentioned that SU helped them control their behavior and less often linked SU to physical states at all. SUD+ADHD patients seldom considered quitting SU completely. SUD signifies a vicious circle, possibly more complex in persons with SUD+ADHD.

linked SU to physical health and more frequently perceived SU as helpful to self-regulate their behavior. Four treatment goals categories emerged: total abstinence, conditional abstinence, substance reduction, and unspecified. SUD+ADHD patients less frequently chose total abstinence, and when using more than one substance, they commonly chose variable goals. In contrast, SUD-ADHD patients chose more similar goals. SUD+ADHD patients showed a more complex relation to their SUD than SUD-ADHD patients.

Subjects: Mental Health; Psychological Disorders - Adult; Addiction - Alcohol - Adult; Addiction - Drugs - Adult; ADHD in Adults; ADHD

Keywords: substance use disorder; attention deficit hyperactivity disorder; qualitative; treatment goal; reduction; abstinence; SUD; ADHD; positive and negative perceptions; adult

Substance use disorders (SUD) are described by symptoms of tolerance, craving, uncontrolled and persistent substance use (SU), in spite of detrimental biopsychosocial consequences (American Psychiatric Association [APA], 2013; Saunders, Peacock, & Degenhardt, 2018). Individuals with SUD are frequently afflicted with attention deficit hyperactivity disorder (ADHD) (van de Glind et al., 2014), mood, anxiety, and personality disorders (Chen et al., 2011). ADHD is a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity (APA, 2013), that shares cognitive, motivational and reward difficulties with SUD (Kalbag & Levin, 2005; Wilens & Biederman, 2006). Studies have shown that about 14% of SUD patients fulfill the criteria for ADHD diagnoses (Roncero et al., 2015; van de Glind et al., 2014). In SUD clinical settings, patients with SUD and ADHD (SUD+ADHD) present at a younger age (Roncero et al., 2015), have an earlier SU debut, greater SU severity (Torok, Darke, & Kaye, 2012; Young et al., 2015), higher rates of psychiatric comorbidity (Kim et al., 2006; van Emmerik-van Oortmerssen et al., 2014; Wilens et al., 2005), and cognitive and social impairments (Brooks, Vosburg, Evans, & Levin, 2006) than SUD patients without ADHD (SUD-ADHD). Accordingly, SUD+ADHD patients may be more difficult to treat for SUD.

The complexity of SUD+ADHD calls for more research (Matthys et al., 2014), including qualitative studies on how SUD+ADHD patients relate to their own SUD. The available research suggests that adults with ADHD report more positive than negative effects of SU (Harty, Pedersen, Gnagy, Pelham, & Molina, 2015; Jensen et al., 2017; Mitchell et al., 2017), such as SU to cope with negative states, feel accepted and normal (Nehlin, Nyberg, & Oster, 2015), improve negative mood and ADHD symptomatology, and to get high (Canela, Buadze, Dube, Eich, & Liebreinz, 2017; Mitchell et al., 2017; Weisner et al., 2017; Wilens et al., 2007; Young et al., 2017). However, SUD+ADHD individuals have reported negative effects from SU, (e.g. increased impulsivity, aggression and social problems) (Kronenberg, Slager-Visscher, Goossens, van den Brink & van Achterberg, 2014; Nehlin et al., 2015). It is still unclear whether SUD+ADHD patients' SU perceptions differ from SUD-ADHD. This is crucial since intentional changes are only possible after a thorough evaluation in which the pros of changing a problematic behavior outweigh the cons (McEvoy & Nathan, 2007; Prochaska, DiClemente, & Norcross, 1992). This requires adequate cognitive functioning (Blume, Schmalzing, & Marlatt, 2005; Le Berre et al., 2012), which may be reduced among SUD+ADHD patients (Brooks et al., 2006).

SUD patients reporting severe SU, tend to choose treatment goals of total abstinence (Lozano et al., 2015; Lozano, Stephens, & Roffman, 2006) whereas those reporting less SU severity are less likely to choose total abstinence goals (DeMartini et al., 2014). There are no clear indications concerning which treatment goals SUD+ADHD patients prefer. In SUD treatment settings, treatment goals of total abstinence are associated with favorable outcomes (Adamson, Sellman, & Frampton, 2009; Berger, Brondino, Fisher, Gwyther, & Garbutt, 2016; Bujarski, O'Malley, Lunny, & Ray, 2013; Meyer, Wapp, Strik, & Moggi, 2014). However, substance reduction may be a viable treatment goal in

some cases (van Amsterdam & van den Brink, 2013). As ambivalence is common among SUD patients (Schlauch, Crane, Connors, Dearing, & Maisto, 2019), total abstinence may not be an option for some. Additionally, allowing total abstinence as the only outcome may keep some individuals from seeking SUD treatment (Wallhed Finn, Bakshi, & Andreasson, 2014). The acceptance of substance reduction is growing in SUD treatment centers (Klingemann & Rosenberg, 2009), whereas others may be still reluctant to accept treatment goals different from total abstinence (Davis & Rosenberg, 2013). As a positive therapeutic alliance is paramount in SUD treatment (Project Match Group, 1997), efforts should be made to understand SUD+ADHD patients' rationale behind their treatment goals choices, which may prevent treatment dropout. Evidently, more qualitative research on SUD+ADHD patients' perceptions of SU and their choice of treatment goal is needed.

The aims of this study were to qualitatively investigate whether (1) the positive and negative perceptions of SU and (2) SU-related treatment goals were different among SUD+ADHD patients and SUD-ADHD patients.

1. Materials and methods

1.1. Participants

Between February 2010 and July 2012, previously detoxicated SUD inpatients were consecutively recruited from two SUD treatment units at the University hospital in Northern Norway the ReStart unit, and in the last two months of the recruitment period, the Færingen unit. Written and verbal information about the study was provided; 16 SUD+ADHD patients and 87 SUD-ADHD patients agreed to participate and signed an informed consent form.

The ADHD assessment (International Classification of Diseases 10th Revision, World Health Organization [WHO], 1992) was conducted by clinical experts, independently from this naturalistic study. We obtained information on the diagnosis of ADHD from medical records. The information on ADHD was well documented as per the national guidelines (Directorate of Health and Social Affairs, 2007). The mean age at ADHD assessment was 33.7 ± 10.5 years (range 18–50). Seven (58%) of the 16 SUD+ADHD patients were receiving psychostimulants (methylphenidate) during SUD treatment. More information about study participants and procedures is found in (Flores-Garcia et al., 2016).

This study comprises qualitative data from 12 of the 16 originally recruited SUD+ADHD patients, (four stopped treatment), and a subsample of 10 SUD-ADHD patients. Study participants were matched by age and SU severity, as young SUD patients seem to have high SU severity and a high dropout risk (Brorson, Ajo Arnevik, Rand-Hendriksen, & Duckert, 2013). The Regional Committee for Medical and Health Research Ethics granted approval for this study REK sør-øst B, 2009/1355b.

1.2. Measures and procedure

The ReStart unit and Færingen unit used the motivational interviewing (MI) (Rollnick & Miller, 1995) and Therapeutic community approaches (De Leon, 1999), respectively. Following treatment-as-usual (TAU) procedures, all study participants underwent M.I.N.I.PLUS (Sheehan et al., 1994) psychiatric interviews for the assessment of axis I disorders. Axis II disorders (Structured Clinical Interview for DSM-IV (SCID II) (First, Spitzer, Gibbon, Williams, & Benjamin, 1995) were only assessed when necessary. Substance use severity was assessed by the Alcohol Use Disorder Identification Test and the Drug Use Disorder Identification Test (Berman, Bergman, Palmstierna, & Schlyter, 2005; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). A semi-structured interview guide was developed by the leaders of the ReStart unit and the first author, which was adapted into a template form (see example in Appendix 1).

Participants were interviewed face-to-face and could attend as many interviews as they considered as necessary during their SUD treatment (range: 1–5 sessions). Most interviews took place at the beginning of treatment. They lasted about one hour each and were undertaken by

a clinician with whom patients closely collaborated (both genders) or by the first author, who did not have a clinician role at the time of the study. Clinicians followed TAU procedures when administering the paper and pencil interview, which included (1) the perceived positive and negative aspects of SU and (2) the SU-related treatment goals. Study participants' answers were documented in the template forms by the interviewers or, whenever preferred, by the participants themselves. Reading/writing assistance was provided. Since the treatment goals were meant to be evaluated at follow-up, patients were given a copy of the templates. Follow-up interviews were conducted three, six, and 12 months after discharge, including questions about non SU-related goals. This study exclusively reports the findings from interviews concerning SU-related goals during SUD treatment.

1.3. Data analysis

The reasoning of this study was deductive (i.e. top-down), contrary to inductive reasoning, which involves no previous conceptual bases (i.e. bottom-up reasoning) (Bengtsson, 2016; Elo & Kyngas, 2008). In content analysis there are two data analysis techniques: manifest and latent (Bengtsson, 2016). In manifest content analysis, the aim is to explicitly describe the data, whereas latent content analysis aims to be more in-depth (Bengtsson, 2016). Interview data were analyzed using manifest content analysis, following four steps: decontextualization, recontextualization, categorization, and compilation (Bengtsson, 2016). For the decontextualization step, LFG and MK separately initiated the open-coding process (i.e. finding meaning units in the original texts), looking for patterns. Each author entered preliminary simple codes into a logbook and LFG reviewed these codes in relation to the original text, recoding when considered appropriate. The logbook was updated every time the codes were reviewed. This step was conducted several times, until agreement upon the final codes was reached. For the recontextualization step, LFG and MK reviewed the final codes, excluding unrelated study topics and including relevant unclassified text. In the categorization step, provisional categories were created by organizing codes with similar patterns. The category descriptions were constructed from the data (Bengtsson, 2016; Elo & Kyngas, 2008) by LFG, MK and TNB. Inter-rater reliability was conducted (Hallgren, 2012). In order to improve validity in the compilation step, codes and categories were first revisited by LFG and MK in relation to the original text, and then a second time by TNB. Frequency endorsements of codes and categories for SU aspects and treatment goals were summarized. The perceived positive and negative aspects of SU were categorized as intrapersonal and interpersonal. We mainly focused on the intrapersonal aspects, briefly mentioning the interpersonal since saturation was not reached in the latter. Treatment goals were classified by how concretely they were stated. Participants did not provide feedback on the findings. Examples of the coding process are shown in Table 1.

2. Results

Two of the patients in the study sample were from the Færingen unit. All patients but one (SUD +ADHD) were voluntarily receiving SUD treatment. Mann-Whitney *U* tests (Table 2) confirmed that no significant differences were observed in age or degree of SU severity between the SUD+ADHD and SUD-ADHD patients. The majority had previously completed SUD treatment and consumption of more than one substance was common in both SUD groups. Kappa coefficients across all the categories were $.65 >$ (from substantial to perfect), with an average of $.85$.

2.1. Perceived positive aspects of substance use

Positive intrapersonal aspects of SU included: self-regulation of *physical health, behavior, feelings, reasoning/thoughts*, and the *rewarding effects* of SU (Table 3). Positive interpersonal aspects comprised SU for social gathering, or drinking with meals. Compared to SUD-ADHD patients, SUD +ADHD patients rarely perceived SU as having positive effects on self-regulation of physical health, and more often perceived SU as having positive effects on self-regulation of behavior. Both SUD groups perceived SU as positive for the self-regulation of feelings, reasoning/thoughts, as well as for the rewarding effects, with a similar frequency.

Table 1. Examples of the coding process. Interviews on the Positive and Negative Aspects of Substance Use and Treatment Goals

Research question	Substance	Meaning unit	Code	Sub-category	Category
Positive aspects of SU	Alcohol	I sleep very well	It gives good sleep quality	Physical health	Self-regulation
	Amphetamine	It keeps me from doing harmful/impulsive things	It helps stopping unwanted behavior	Behavior	Self-regulation
	Benzodiazepines	I feel pleasure when used in combination with heroin	It gives pleasure	-	The rewarding effects
Negative aspects of SU	Alcohol	I might experience depression. It may be strengthened by alcohol	It gives/strengthens negative mood	Feelings	Consequences
	Cannabis	It results in a deteriorated memory and concentration	It worsens memory and concentration	Reasoning/ thoughts	Consequences
SU-related treatment goals	Amphetamine	I want to quit amphetamine use completely	Total abstinence		Total abstinence
	Amphetamine	Stop using if I get assessment and medication for ADHD	Abstaining from SU if receiving assessment and medication for ADHD		Conditional Abstinence
	Alcohol	Drink for example once a month without getting drunk	Reduce in frequency and amount of SU		Substance reduction
	Cannabis	Avoid using cannabis	No clear SU-related goal		Unspecified

Note. SU: Substance use

Table 2. Sociodemographic and clinical characteristics

	SUD+ADHD	%	SUD-ADHD	%	Statistic	P
	N = 12		N = 10			
Age M (SD)	39 (8.5)		33.5 (10.0)		U = 1.42	.156
Mdn (range)	40.5 (21)		35.0 (28)			
Age of Substance use initiation M (SD)	13.3 (3.0)		13.4 (1.3)		U = 0.07	.939
Mdn (range)	14.0 (11)		13.0 (4)			
AUDIT M (SD)	15.5 (12.7)		21.6 (15.0)		U = 1.18	.234
Mdn (range)	11.5 (33)		22.5 (40)			
DUDIT M (SD)	20.3 (16.8)		28.1 (16.8)		U = 1.16	.246
Mdn (range)	23.5 (41)		36 (43)			
Males		83		60	$\chi^2 = 1.50$.348
Not living with partner		75		80	$\chi^2 = 2.31$.315
Previous SUD treatment:		75		80	$\chi^2 = 3.58$.310
-Inpatient		75		60		
-Outpatient		-		20		
-None		-		20		
Previous treatment for mental health problems ^a		70		83	$\chi^2 = 0.55$.624
Other mental disorders—current:		25		30		
-Schizophrenia		8		-		
-Affective disorders		8		-		
-Anxiety disorders		8		10		
-Eating disorders		-		10		
-Personality disorders		-		10		
Previous SUD treatment						

(Continued)

Table 2. (Continued)

	SUD+ADHD	%	SUD-ADHD	%	Statistic	p
SUD diagnoses:						
-Alcohol		50		50		
-Opioids		17		20		
-Cannabis		17		50		
-Benzodiazepines		17		20		
-Amphetamines		50		70		
Number of self-reported substances of abuse:					$\chi^2 = 1.21$.271
-One substance		41.7		20		
-Two or more substances		58.3		80		
Frequency of self-reported substances of abuse:					$\chi^2 = 1.15$.886
-Alcohol		66.6		60		
-Amphetamines		50.0		70		
-Cannabis		33.3		50		
-Benzodiazepines		25.0		20		
-Opioids		16.6		10		

*p ≤ 0.05, two-tailed.

Sociodemographic and clinical characteristics of SUD patients with (N = 12) and without ADHD (N = 10)

Note. N can vary slightly. SUD: Substance Use Disorder; ADHD: Attention Deficit Hyperactivity Disorder

SD: Standard deviation; AUDIT: Alcohol Use Disorder Identification Test; DUDIT: Drug Use Disorder Identification Test. U: Mann-Whitney U test; χ^2 : chi-squared test.

‡ Unspecified if inpatient or outpatient.

Table 3. Description and frequency endorsement of the self-reported Positive and Negative Aspects of Substance Use in SUD patients with (N = 12) and without ADHD (N = 10)

Positive Aspects of Substance Use	SUD+ADHD	SUD-ADHD
	N = 12	N = 10
	%	%
Self-regulation:		
<i>Physical health.</i> Substance use is perceived to improve the physical discomfort at a basic physical level. Sometimes the substances are perceived to alleviate the discomfort caused by other substances.	8	60
<i>Behavior.</i> Substance use is perceived to help redirecting unwanted behavior, as well as completing, performing or coping with demanding activities and situations, and increasing productivity.	58	20
<i>Feelings.</i> Substance use is perceived to mitigate negative feelings of anxiety, lack of motivation, increasing feelings of well-being.	83	100
<i>Reasoning/thoughts.</i> Substance use is perceived to improve positive thinking. Additionally, improving cognitive abilities and limiting excessive thinking.	66	50
The rewarding effects:	25	40
Substance use in order to enjoy the euphoric effects: Such an experience does not involve a self-regulatory function, but rather involves hedonistic purposes.		
Negative Aspects of Substance Use		
Consequences:		
<i>Physical health.</i> Substance use is perceived to result in a deteriorated physical health, including problems with blood pressure, sleep, decreased appetite and increased physical pain.	42	100
<i>Behavior.</i> Substance use is perceived to give rise to unwanted behavior such as aggression, passivity, or lack of control of substance consumption. These negative actions conflict with the individual's true intentions.	50	60
<i>Feelings.</i> Substance use is perceived to give rise to or strengthen negative feelings, such as anxiety, depressed mood, irritation or even numbness.	50	80
<i>Reasoning/thoughts.</i> Substance use is perceived to have consequences such as mental exhaustion, remorse, disorientation and bad memory.	83	90

Note. SUD: Substance Use Disorder; ADHD: Attention Deficit Hyperactivity Disorder.

2.1.1. Self-regulation of physical health

Self-regulation of physical health was predominantly mentioned by SUD-ADHD patients. SU was considered to alleviate physical pain, improve sleep quality and appetite. For instance:

“I sleep very well” (SUD-ADHD P10, alcohol).

Substances were additionally perceived to counteract withdrawals caused by other substances:

“It (cannabis) lessens the suboxone withdrawal” (SUD-ADHD P6).

2.1.2. Self-regulation of behavior

Patients used substances to help them redirect unwanted behavior, and to complete or cope with activities perceived as demanding. These SU perceptions were described to a greater degree by SUD+ADHD patients across different substances. SUD+ADHD P1 said:

"I start using without thinking about it. Amphetamine allows me to control my impulsivity. I function normally, getting things done".

In this example SU was initiated by impulsive behavior and paradoxically, SU was perceived to manage the impulsivity. SUD+ADHD P6 said:

"It (amphetamine) keeps me from doing harmful/impulsive things".

Similar to the previous example, P6 perceived that SU helped stop unwanted behavior. SUD+ADHD P4 expressed that SU assisted in everyday life functioning and in relating to others:

"I am able to socialize" (alcohol)

"It helps me in my everyday life" (benzodiazepines).

SUD+ADHD P10 asserted that alcohol helped to pause an activity at hand allowing him to switch to a more enjoyable task.

"To postpone important tasks. I have a tendency to do a lot of one specific thing. I want to allow myself to do meaningless things" SUD+ADHD P10.

Some of the SUD-ADHD patients linked SU to improved productivity:

"I become hard-working" (P5, amphetamine).

2.1.3. Self-regulation of feelings

The positive effects of SU to self-regulate feelings was expressed as the substances helping to improve negative feelings or cope with overwhelming feelings. For instance:

"It helps relieve the anxiety so I can tolerate being on my own company. It is better to use medication that is addictive than to have no quality of life at all" (SUD+ADHD P8, benzodiazepines).

P8 accepted having a benzodiazepine addiction, experiencing that its use reduced negative feelings in order to tolerate his own company. Other examples of perceived positive mood changes due to SU were *"to calm down"*, *"to stop boredom"* and *"feeling good about oneself."* For instance:

"I feel happy" (SUD-ADHD P7, alcohol).

2.1.4. Self-regulation of reasoning/thoughts

The perceived positive effects of SU in reasoning/thoughts involved improve positive thinking, cognitive endurance, concentration, and limiting negative thoughts (e.g. *"flashbacks disappear"* and *"increased self-knowledge/self-confidence"*). Other examples include:

"At first, you become collected" (alcohol), and *"I become creative, sharp"* (amphetamine) (SUD+ADHD P12).

"I become more focused" (SUD-ADHD P2, amphetamine).

P12 experienced being collected and creative when using alcohol and amphetamines; P2 reported similar effects by amphetamines.

2.1.5. *The rewarding effects*

The rewarding effects of SU were meant to enhance pleasant effects, and did not have self-regulating purposes. Some examples provided were “*becoming comfortably numb when talking too much*,” the enjoyment of “*getting high*,” “*euphoria*,” “*laughter*,” and “*stronger sensory impressions*”. The rewarding effects of SU were expressed across different substances:

“I have experienced many good trips” (SUD+ADHD P5, amphetamine).

Some patients noted that combining substances intensified the rewarding effects:

“I feel pleasure when used in combination with heroin” (SUD-ADHD P8, benzodiazepines).

2.2. **Negative aspects of substance use**

The perceived negative aspects of SU followed themes similar to the positive aspects including the consequences of SU on *physical health, behavior, feelings, and reasoning/thoughts* (Table 3). The negative interpersonal consequences comprised ruptures in close relationships, economic problems, loss of drivers’ licenses, and legal problems.

2.2.1. *Consequences on physical health*

As with the perceived positive aspects, SUD+ADHD patients uncommonly related SU to physical health consequences compared to SUD-ADHD patients. This category included problems with blood pressure, oral health, sleep issues, decreased appetite and digestive problems, hepatitis, weight gain, breathing difficulties and increased physical pain:

“I become weak, in pain, have a bad appetite. I become tired and hungry” (SUD-ADHD P5, amphetamine).

P5 mentioned the diverse physical consequences of amphetamine use. SUD+ADHD P8 expressed:

“It (heroin) destroys the veins”.

2.2.2. *Consequences on behavior*

SU negatively impacted behavior, resulting in passivity, aggression, and a reduced control over such as “*becoming inactive, passive and postponing tasks*,” “*saying or doing things I did not intend to*,” “*losing spontaneity*,” and “*having to use a lot of it*”. The negative actions were unintended:

“I become aggressive if I drink spirits or too much” (SUD+ADHD P11, alcohol).

“The addictive behavior. I am out of control, with aggressive behavior” (SUD-ADHD P4, alcohol).

2.2.3. *Consequences on feelings*

The negative consequences of SU on feelings varied in intensity, from expressing

depressed mood to emotional numbness. For instance:

“I might experience depression. It might be strengthened by alcohol” (SUD+ADHD P9, alcohol).

“I become emotionally blunted” (SUD-ADHD P1, benzodiazepines).

Other commonly mentioned consequences of feelings were expressed as “*the worsening of anxiety*,” “*feeling unease*,” “*being unmotivated*,” and “*becoming irritable or angry*.”

2.2.4. Consequences on reasoning/thoughts

For some patients, SU resulted in weakened reasoning/thoughts (e.g. “losing sense of time and place,” and having “deteriorated memory and concentration.” Further, participants described mental exhaustion and decision-making that was contrary to their own moral standards:

“I become mentally tired” (SUD+ADHD P7, amphetamine).

“My ability to make the right decisions decreases. I have low scruples” (SUD-ADHD P4, amphetamine).

Other consequences on reasoning/thoughts included “having psychotic thoughts,” and “remorse.”

In sum, SUD+ADHD patients less frequently linked SU to physical health (either positively or negatively) compared to SUD-ADHD patients. Furthermore, SUD+ADHD patients more frequently linked SU to positive changes in behavior than SUD-ADHD patients. Otherwise, the SUD groups had similar perceptions across the different substances.

2.3. Substance use-related treatment goals

Four treatment goals categories were identified. *Total abstinence*, which referred to clear statements of wanting to completely abstain from SU. When multiple substances were involved total abstinence was sometimes limited to one specific substance. *Conditional abstinence* consisted of quitting SU or refraining from illegal use, on the condition of initiating, changing, or increasing the dosage in the prescription medication. *Substance reduction* consisted of reduced SU in frequency and amount compared to the consumption before entering SUD treatment. *Unspecified* consisted of vague statements of avoiding SU or indirectly related to SU.

2.3.1. Treatment goals of total abstinence

This category comprised clear statements of wanting to abstain completely from SU, such as “I won’t use the substance anymore,” “stay clean for good,” or “quit using”. For instance, SUD-ADHD P10 said:

“I want alcohol to be completely absent. I am sober today. I want to keep being sober”.

P10 clearly preferred to continue abstaining from alcohol use. Treatment goals of total abstinence were less common among SUD+ADHD patients compared to SUD-ADHD patients. Figure 1 depicts the frequency in which total abstinence goals were chosen. SU was limited to alcohol, amphetamines, and cannabis as these were the most frequently used substances by both SUD groups.

Figure 1 indicates that compared to SUD-ADHD patients, SUD+ADHD patients less frequently preferred total abstinence concerning alcohol and amphetamines.

2.3.2. Treatment goals of conditional total abstinence

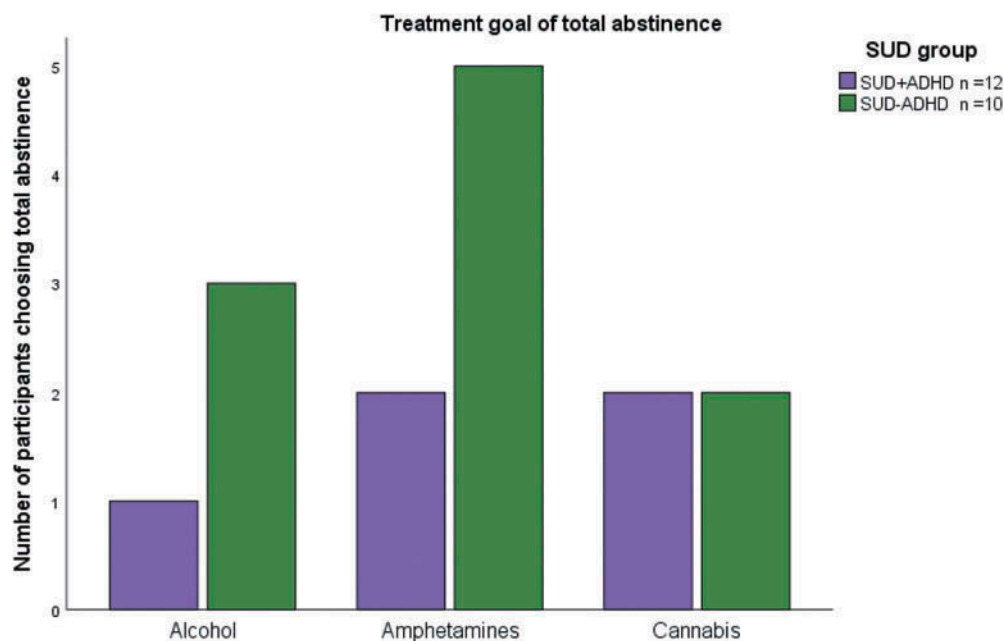
Conditional total abstinence (i.e. abstaining totally from SU or stop illegal use if changes in pharmacological treatment status were made). This category was represented by SUD+ADHD patients, P6 expressed the following:

“Stay away from illegal use of amphetamines for medicinal use. Don’t take amphetamine unless I start with dextroamphetamine.”

P6, was receiving methylphenidate and would compromise to stop illegally buying amphetamines if the current prescription was changed to dextroamphetamine (a more potent stimulant) (Kolar et al., 2008). Although the example above refers to amphetamines, other substances were described similarly:

Figure 1. Frequency of total abstinence goals concerning amphetamines, alcohol and cannabis.

Abbreviations: SUD: Substance Use Disorders; ADHD: Attention Deficit Hyperactivity Disorder.



“To eliminate illegal use of benzodiazepines. In the past, when I received the right benzodiazepine dose, I stopped using illegally” (SUD+ADHD P8).

P8 was able to stay away from illegal benzodiazepine use in the past when receiving an adequate dose. P8 would eliminate illegal use if the medication dosage was increased.

2.3.3. Treatment goals of substance reduction

Substance reduction goals were somewhat common among SUD+ADHD patients. Examples of treatment goals of reduced SU are provided below:

“Try to reduce. Drink for example once a month without getting drunk” (SUD+ADHD P1).

“Abstain from alcohol while I am under SUD treatment. Drink a couple of beers once a month. So that alcohol does not affect my everyday life” (SUD+ADHD P12).

Substance reduction was also mentioned by a few SUD-ADHD patients:

“Take a break from cannabis. Get in control, don’t feel powerless. I want to use 1–2 grams about 1–2 times a week” (SUD-ADHD P2).

P2 wanted to limit the amount and episodes of cannabis use.

2.3.4. Unspecified treatment goals

Unspecified treatment goals were frequent in both SUD groups. Statements such as “wishing not to use,” “trying to avoid using,” or those not directly related to SU were categorized as unspecified:

“Dare to open up about my alcohol problem” (SUD+ADHD P3).

P3 did not express a concrete goal concerning alcohol use.

Whenever more than one substance was involved, SUD+ADHD patients commonly chose different goals across the different substances, while the SUD-ADHD patients frequently had the same goals. For instance, when asked about the treatment goals for each substance, SUD+ADHD P4 decided on total abstinence from amphetamine and reduction in alcohol use:

“No more amphetamine.”

“Abstaining completely from drinking (alcohol) until the next follow-up, but eventually drink normally.”

Similarly, SUD+ADHD P11 wanted to completely abstain from benzodiazepine use, was unclear about cannabis, and expressed ambivalence toward alcohol:

“I won’t use benzodiazepines anymore.”

“avoid using cannabis.”

“I want to find out which goal I want to have in relation to alcohol. It is not a problem in itself, but I am starting to wonder whether I should stop drinking. Can it lead to other substance use? Can I become addicted to alcohol instead of other substances?”

In contrast, the SUD-ADHD patients tended to report the same goals across the different substances of use. For example, concerning total abstinence, P9 reported:

“To continue abstaining totally” (SUD-ADHD P9, amphetamine and cannabis).

In the following case, SUD-ADHD P1 expressed similar goal patterns concerning alcohol and benzodiazepines. Both cases were categorized as unspecified:

“I want to take one day at a time” (alcohol).

“Accept that the doctor refuses to prescribe me benzodiazepines.”

In sum, SUD+ADHD patients chose treatment goals of total abstinence less frequently than the SUD-ADHD patients. Additionally, those SUD+ADHD patients using more than one substance commonly set different treatment goals across the different substances, while SUD-ADHD patients usually had similar goals across the different substances. Unspecified treatment goals were observed in both SUD groups.

3. Discussion

We explored whether SUD+ADHD and SUD-ADHD patients had different positive and negative perceptions of SU and preferred different treatment goals. We found that SUD+ADHD patients rarely perceived neither positive nor negative aspects of SU related to physical health, and more frequently perceived positive effects of SU on self-regulation of behavior. Otherwise, the SUD groups expressed similar perceptions. With regard to the SU-related treatment goals, SUD+ADHD patients set total abstinence less frequently. Additionally, the treatment goals among SUD+ADHD patients using more than one substance were variable across the different substances, whereas among SUD-ADHD patients consuming more than one substance, treatment goals were similar across the different substances. It was unclear why SUD+ADHD patients seldom linked SU to physical health. Since both SUD groups showed similar SU profiles and high SU severity, it was plausible to expect that both groups also perceived similar effects of SU on physical health. This finding contradicts previous studies showing that individuals with SUD+ADHD consider that SU negatively impacts their physical health (Jensen et al., 2017; Kronenberg et al., 2014). One possible explanation is that SUD-ADHD patients were in worse somatic health than SUD-ADHD patients. Alternatively, the cognitive issues associated

with ADHD (Brooks et al., 2006; Marx, Krause, Berger, & Hassler, 2014), possibly interfered with SUD+ADHD patients' evaluations of the pros and cons of SU on their physical health.

The findings that SUD+ADHD patients perceived that SU was positive for self-regulating unwanted behavior (e.g. impulsivity) supports previous studies (Kronenberg et al., 2014; Nehlin et al., 2015). Potentially, the behavioral impulsivity inherent in ADHD (Crunelle, Veltman, van Emmerik-van Oortmerssen, Booij, & van den Brink, 2013) may explain the positive link between SU and self-regulation of behavior made by these participants. However, this is a hypothesis that needs to be further investigated.

The findings that the SUD groups perceived SU as positive for the self-regulation of feelings, reasoning/thoughts and the rewarding effects are in line with previous studies on individuals with problematic SU with and without ADHD (Mitchell et al., 2017; Wilens et al., 2007). Interestingly, both SUD groups expressed seeking SU for their rewarding effects (enjoying the high/being drunk). Novelty seeking (e.g. impulsive seeking of highly rewarding events) (Cloninger, Przybeck, Svrakic, & Wetzel, 1994) has been associated with SUD (Palmer et al., 2013) and ADHD (Perroud et al., 2016). The most recognized hypotheses on the link between SUD and ADHD are self-medication (SU to relieve negative states) (Khantzian, 1985) and a biological predisposition to seek immediate rewards (Ortal et al., 2015; Sousa et al., 2011; S. Young & Sedgwick, 2015). The present results are in line with both hypotheses.

A trend in which SUD+ADHD patients rarely preferred treatment goals of total abstinence was observed. To our knowledge, there is no research on this topic among SUD+ADHD patients. However, some SUD field studies have suggested that individuals consider changing their problematic SU when they experience greater cons than pros from SU in their lives (DeMartini et al., 2014; Prochaska et al., 1992). The findings on the SU-perceptions suggest that SUD+ADHD patients experienced more pros than cons from SU. This may explain why they less commonly preferred total abstinence goals. The finding that SUD+ADHD patients had variable treatment goals whenever multiple substances were involved may be related to problem-solving difficulties associated with ADHD (Young, 2005).

Notably, unspecified SU-related goals were frequent in both groups. These may be expressions of ambivalence, common among individuals with SUD (Magill, Stout, & Apodaca, 2013; Schlauch et al., 2019). However, we cannot rule out that treatment goals categorized as unspecified were merely a result of methodological issues (e.g. how the questions were asked and interpreted by the interviewers and participants, coding process, etc). Additionally, as motivation toward total abstinence may be strongest early in treatment, eventually decreasing (Wallhed Finn et al., 2014), the timing in which the interviews were conducted might have been crucial in participants' treatment goals preferences.

Overall, our findings of how substances positively and negatively affected patients' feelings, reasoning/thoughts, physical health, behavior, and social relations support the current biopsychosocial understanding of SUD (APA, 2013; Saunders et al., 2018). Furthermore, this apparent contradiction in which SU may represent a sustained way to cope with negative states and, paradoxically exacerbate them, may reflect the negative cycle inherent in SUD, as previously reported (Kronenberg et al., 2014; Pettersen, Ruud, Ravndal, & Landheim, 2013). The present results indicate that SUD+ADHD patients' relation to their SU is highly complex.

3.1. Clinical implications

SUD+ADHD patients may require more guidance than SUD-ADHD patients in assessing the positive and negative effects of SU and in setting treatment goals compatible with their degree of SU and life goals. We recommend the following interventions: A) SUD+ADHD patients should be systematically asked about their SU perceptions, including physical health previous to setting treatment goals. B) SU severity should be systematically assessed. This may enable a better understanding of SUD+ADHD patients' rationale behind their SU, and compensate for potential problem-solving difficulties. The updated definition of SUD (APA, 2013; Saunders et al., 2018), may be a useful

guideline to appropriately assess SU severity. C) To avoid attrition, alternative goals to total abstinence should be considered. D) A meaningful therapeutic alliance may facilitate a common understanding of patients' SU perceptions and goals.

3.2. Limitations

The number of participants in this study was relatively small. Additionally, to reduce patient burden, in-depth interviews were not conducted. Consequently, crucial themes concerning everyday functioning, emotional lability, and psychostimulant treatment remained unexplored. Furthermore, although the vast majority of study participants were recruited from the ReStart unit, participants from the Færingen unit might have provided answers according to this unit's TAU practice. Moreover, our findings may be attributed to methodological procedures, not ADHD status. No information was obtained from four SUD+ADHD patients (treatment drop-outs) who may have had greater SU severity. The present findings should be considered as preliminary, as further research on this topic is needed.

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Appendix 1. Example of interview guide

1. SUBSTANCE USE INFORMATION

Please describe the substances you have used most frequently in the past 12 months			
Substance of use	Is your substance use considered to be problematic (by yourself?/others?)	What are the positive aspects?	What are the negative aspects?
1.			
2.			
3.			

2. TREATMENT GOALS RELATED TO SUBSTANCE USE

Please determine the treatment goal(s) specified by type of substance that you consider as problematic.		Next evaluation date:		
Substance of use	What are your treatment goals?	Strategies		
		Concrete plan of action	Your strengths?	Challenges/obstacles for change?
1.	1.	WHAT CAN YOU DO?: 1.		
		WHAT DO YOU NEED FROM THOSE AROUND YOU?: 1.		

3. TREATMENT GOALS RELATED TO OTHER LIFE DOMAINS. SELECTION OF IMPORTANT DOMAINS

Keyword list:

Select domains that you want to prioritize, and rate them on the next page. Remember! Choosing the number of domains should be realistic to work with, considering the next evaluation date and your own opportunities.

___ Self-growth: well-being, self-worth (specify)

___ Health: Physical health, mental health (specify)

___ Economy

___ Network: Public support system/social/friends/family (specify)

___ Carrer/Job

__ Substance abuse, coping strategies

__ Inattention

__ Impulsivity

__ Hyperactivity

__ Other? What?

4. TREATMENT GOALS RELATED TO OTHER LIFE DOMAINS.

			Next evaluation date:	
Domain	Description of your current situation and treatment goal (wanted situation)	Action plan	Your strengths?	Challenges/obstacles for change?
1.	What is your current situation?:	What can you do?: 1.		
	What is your treatment goal?	What do you need from those around you?: 1.		

Appendix 2 Frequency endorsement of Substance Use related Treatment Goals in SUD patients with (N = 12) and without ADHD (N = 10)

Treatment goal category	SUD+ADHD			SUD-ADHD	
	Substances ♦ n = 23	%		Substances ♦ n = 21	%
Total abstinence ^a	6	26.1		10	47.6
Conditional abstinence ^b	4	17.4		1	4.8
Reduced use ^c	5	21.7		2	9.5
Unspecified ^d	8	34.7		8	38.1

Note. SUD: Substance Use Disorder; ADHD: Attention Deficit Hyperactivity Disorder.

♦ Across all substances reported by participants.

^a Clear statements of wanting to abstain completely from substance use. Total abstinence was sometimes limited to one specific substance, when multiple substances were involved.

^b Quit substance use or refrain from illegal use, on the condition of starting up, changing or increasing psychopharmacological treatment dosage, such as central stimulant medication or other prescribed habit-forming medication.

^c Usage reduced in frequency and amount, compared to the consumption before entering SUD treatment.

^d Vague statements of avoiding substance use or indirectly related to substance use.



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