

Psychosocial difficulties and treatment retention in inpatient detoxification programmes

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Abstract

Aims: Treatment retention is associated with addiction treatment outcomes. Research regarding predictors of retention at inpatient detoxification treatment is limited. The aim of this study was to investigate whether psychosocial difficulties (PSDs) are associated with treatment retention among Finnish inpatients undergoing detoxification treatment. **Design:** This register-based study included real-life data on detoxification treatment episodes ($n = 2,752$) between February of 2016 and May of 2019 from several inpatient treatment units in Finland. The PARADISE24fin instrument was used to assess PSDs. Socio-demographic and substance use related variables, as well as PSDs, were analysed with regard to treatment retention. Multiple logistic regression models were used to identify predictors of treatment incompleteness. **Results:** Of the 2,752 detoxification treatment episodes, 80.3% ($n = 2,209$) were completed. Men and women differed with regard to the variables associated with treatment retention. After adjusting for confounders, younger age (≤ 35 years), being less educated (≤ 9 years), being unemployed, using opioids, polysubstance use and more severe dependence were associated with treatment incompleteness. Overall severity of PSDs (PARADISE24fin mean score) became non-significant after adjusting for confounders. However,

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having more severe cognitive difficulties was significantly associated with treatment incompleteness, while more severe difficulties in daily activities was associated with treatment completion. **Conclusions:** Special attention should be paid to younger individuals with opioid and/or poly-substance use, as well as those with cognitive difficulties, in order to retain people in treatment.

Keywords

alcohol, detoxification treatment, opioids, psychosocial difficulties, treatment retention

Detoxification refers to a form of alcohol and/or substance use treatment where the focus is on managing symptoms of acute withdrawal. Withdrawal symptoms range from being mildly uncomfortable (e.g., irritability) to life threatening (e.g., delirium tremens). In Finland, detoxification treatment is always voluntary and treatment is available both in out- and inpatient settings according to the severity of withdrawal symptoms. While detoxification is focused on the safe management of withdrawal symptoms, an important goal is also to provide a stepping-stone into further addiction treatment services as detoxification treatment alone is rarely sufficient for the longer term. However, detoxification treatment retention can be a challenge, and length of stay in detoxification treatment has been reported to be associated with subsequent entry into outpatient treatment (Campbell et al., 2010). It is thus necessary to identify the factors associated with retention in detoxification treatment.

Previous research has identified several factors associated with addiction treatment retention, such as therapeutic alliance (Meier et al., 2005; Simpson & Joe, 2004), clients' perceptions of care (Gossop et al., 2003; Hawkins et al., 2008), motivation for treatment (Meier et al., 2005; Simpson & Joe, 2004) and social support (Dobkin et al., 2002). The studies examining the risk factors for poor treatment retention specifically in detoxification treatment have often focused on opioid detoxification and on the role of detoxification medications (Backmund et al., 2001; McCambridge et al., 2007). Some previous studies have

investigated socio-demographic predictors of detoxification treatment retention and found that being female (Sofin et al., 2017) and being older, employed and more educated were associated with better detoxification treatment retention (Armenian et al., 1999; Backmund et al., 2001; Sofin et al., 2017). However, the results are somewhat mixed and not all studies have found socio-demographic variables to be linked to detoxification treatment retention (Franken & Hendriks, 1999). Further, having a history of imprisonment as well as the number of previous treatment drop-outs have also been associated with detoxification treatment discontinuation in some studies (Backmund et al., 2001; Sofin et al., 2017), as has severity of dependence (Franken & Hendriks, 1999). However, no studies have focused on experienced psychosocial difficulties and their association with detoxification treatment retention.

According to the conceptualisation of the World Health Organization, and within the framework of the International Classification of Functioning (ICF), psychosocial difficulties (PSDs) are defined as impairments in bodily functions and structures, activity limitations and participation restrictions (World Health Organization, 2001). PSDs are an outcome of the interaction between the biological mechanisms of a specific health condition and features of the person's environment and personal factors. There is evidence to support that PSDs are not disease-specific but shared across many psychiatric and neurological conditions (Cieza, Anczewski et al., 2015). Information on PSDs can help clarify the individual obstacles and

problems that a person with a neurological or psychiatric illness faces. Systematic evaluation of PSDs is valuable in planning treatment and rehabilitation services and can serve as a method for individualising treatment regimens (Cieza, Sabariego, et al., 2015). Mapping experienced psychosocial difficulties in substance use treatment could uncover common factors associated with retention across different types of substance use disorders.

The PARADISE24 instrument was developed based on existing literature, in collaboration with experts in the fields of different neurological and psychiatric disorders in order to provide a concise, evidence-based instrument for clinical, and research purposes (Cieza, Anczewska, et al., 2015). The PARADISE24 instrument was designed to suit clinical use as a short but comprehensive measure to obtain overarching data regarding PSDs. The 24 questions focus on the most common PSDs which individuals with neurological and psychiatric disorders face in their day-to-day lives. The PARADISE24fin questionnaire has since been implemented in clinical practice and validated through continuing research (Cabello et al., 2019; de la Fuente et al., 2018; Pitkänen et al., 2018).

The aim of this study was to investigate whether PSDs are associated with treatment retention among Finnish inpatients undergoing detoxification when socio-demographic and substance related variables were considered as well.

Material and methods

This study is part of a registry-based follow-up of clients during treatment of substance use disorders at A-Clinic Foundation. The use of this anonymised register data for research has been approved by the A-Clinic Foundation's Ethical Committee for Treatment and Research and by the National Institute for Health and Welfare, Finland.

The data were retrieved from the patient information system (PIS), which consists of

natural data coded by professionals during the treatment process. The current data concerned ten inpatient treatment units of A-Clinic Ltd. (formerly A-Clinic Foundation), a non-profit, non-governmental organisation which operates nationally in Finland.

There were altogether 13,665 detoxification treatment episodes at the studied units between February of 2016 and May of 2019. During this period, routine evaluation and follow-up of PSDs using the PARADISE24fin was initiated. During the follow-up period, the PARADISE24fin was used by 258 professionals in the context of 3,592 treatment episodes. Most (91.7%) of the questionnaires were administered by 104 professionals, who had adopted the instrument into regular practice.

A total of 2,752 detoxification treatment episodes included necessary data regarding PSDs (PARADISE24fin), substance use (SDS) and reasons for discharge, and were thus included in the study.

Socio-demographics

Information regarding age, gender, education and employment were obtained from treatment records. Education was categorised into 9 years or less corresponding to primary schooling only, or more than 9 years reflecting some secondary education. Individuals were categorised as being employed (working full or part time, students and stay-at-home parents), unemployed (unemployed and seeking employment or otherwise outside of the workforce) or retired (retired due to age or health related issues). These socio-demographic variables were chosen on the basis of previous literature (e.g., Armenian et al., 1999; Backmund et al., 2001; Sofin et al., 2017).

Psychosocial difficulties

The PARADISE24fin instrument contains 24 questions regarding PSDs that a person might have faced in the past 30 days. The response options are 0 = no difficulties/problems,

1 = mild, 2 = moderate, 3 = severe, and 4 = extreme or cannot do. If the person had not experienced the context of the difficulty in question in the previous 30 days, they were asked to estimate how much difficulty he or she would potentially have. The PARADISE24fin questions are categorised into five thematic groups based and named according to their content (Pitkänen et al., 2018). The five thematic groups are: Emotional difficulties, Cognitive difficulties, Social difficulties, Difficulties in daily activities and Difficulties in self-regulation. The items concerning pain and sleep were not included in the thematic groups. The 24 items of the PARADISE24fin and the five thematic groups are presented in Table 1.

Missing information on single questions was rare. The largest number of missing values were seen on the questions regarding difficulty in joining in community activities ($n = 44$; 1.60%) and difficulty with work or school ($n = 88$; 3.20%). The other questions had from two to 24 missing values (0.07–0.87%). In the few instances where more than one PARADISE24fin questionnaire was filled out within five days before or after the beginning of the treatment period, the questionnaire with less missing information was included.

The mean scores (range 0–4) were used for the PARADISE24fin as a whole and for each of the thematic groups separately. Additionally, a metric score was calculated where zero indicates no PSDs and one hundred extreme difficulties (Cieza, Sabariego, et al., 2015).

Substance use

Information regarding the primary substance of use and severity of dependence was evaluated using the Severity of Dependence Scale (SDS), with the primary substance being the first substance reported on the SDS scale. The SDS is a short, five-item questionnaire designed to assess the severity of dependence, and can be used in connection to alcohol and different types of illicit drugs. It can be answered in connection to 1–3 substances; the substance is

specified prior to answering the five questions (Gossop et al., 1995). It has demonstrated good test-retest validity (Gossop et al., 1997) and has also been validated in the context of alcohol problems (Gossop et al., 2002). The items are:

1. Did you think your use of [named drug] was out of control?
2. Did the prospect of missing a fix (or dose) or not chasing make you anxious or worried?
3. Did you worry about your use of [named drug]?
4. Did you wish you could stop?
5. How difficult did you find it to stop, or go without [named drug]?

Each of the items is scored on a four-point scale (0 = never/almost never; 1 = sometimes; 2 = often; 3 = always/nearly always for items 1–4; and 0 = not difficult; 1 = quite difficult; 2 = very difficult; 3 = impossible for item 5). The total SDS score (range 0–15) is obtained by adding the scores for all items with higher total scores indicating higher levels of dependence. Individuals in this study were asked to complete the SDS for a maximum of three substances, with which they subjectively reported having problems. The total score of the primary reported substance was used to reflect severity of dependence in the analyses.

Incompletion of detoxification treatment

Detoxification is focused on safe management of acute withdrawal symptoms, where rehabilitation aims to address alcohol and/or substance use and their consequences in the long run. In Finland, both forms of treatment are available in both outpatient and inpatient settings depending on, e.g., the severity of the disorder and possible mental and physical co-morbidities. Completed detoxification treatment routinely includes a more comprehensive treatment plan where a patient will be encouraged to enrol in rehabilitation treatment, if he/she has not yet done so. In some

Table 1. Psychosocial difficulties, mean score (95% CI) measured with the PARADISE24fin instrument (range 0–4) of inpatients in detoxification according to treatment completion, $n = 2,752$.

How much...	All	Completed	Discontinued	p	Effect size ¹
PSD1...of a problem did you have due to not feeling rested and refreshed during the day (e.g., feeling tired, not having energy)?	2.29 (2.26–2.33)	2.26 (2.22–2.30)	2.43 (2.34–2.51)	0.001	0.24
PSD2...of a problem did you have with loss of interest?	2.10 (2.05–2.14)	2.05 (2.00–2.10)	2.29 (2.19–2.39)	< 0.001	0.29
PSD3...of a problem did you have with your appetite?	1.54 (1.49–1.58)	1.55 (1.49–1.60)	1.50 (1.40–1.60)	0.460	0.05
PSD4...of a problem did you have with sleeping, such as falling asleep, waking up frequently during the night or waking up too early in the morning?	2.43 (2.38–2.47)	2.44 (2.39–2.49)	2.38 (2.28–2.49)	0.361	0.06
PSD5...of a problem did you have being so irritable that you started arguments, shouted at people or even hit people?	1.16 (1.11–1.20)	1.08 (1.04–1.13)	1.45 (1.35–1.56)	< 0.001	0.46
PSD6...of a problem did you have with being slowed down or feeling as if things were moving too fast around you?	1.53 (1.49–1.57)	1.51 (1.46–1.56)	1.62 (1.52–1.72)	0.050	0.14
PSD7...of a problem did you have with feeling sad, low or depressed?	2.35 (2.30–2.39)	2.32 (2.27–2.37)	2.45 (2.36–2.55)	0.015	0.17
PSD8...of a problem did you have with worry or anxiety?	2.58 (2.54–2.62)	2.53 (2.49–2.58)	2.76 (2.67–2.85)	< 0.001	0.31
PSD9...of a problem did you have with not being able to cope with all the things that you had to do?	2.33 (2.29–2.37)	2.29 (2.24–2.34)	2.49 (2.40–2.59)	< 0.001	0.26

(continued)

Table 1. (continued)

How much...	All	Completed	Discontinued	<i>p</i>	Effect size ¹
PSD10...bodily ache or pain did you have?	1.81 (1.77–1.86)	1.78 (1.73–1.83)	1.96 (1.85–2.06)	0.002	0.21
PSD11...difficulty did you have in concentrating on doing something for ten minutes?	1.43 (1.39–1.48)	1.36 (1.32–1.41)	1.72 (1.61–1.83)	< 0.001	0.41
PSD12...difficulty did you have in remembering to do important things?	1.72 (1.68–1.77)	1.67 (1.63–1.72)	1.93 (1.83–2.03)	< 0.001	0.32
PSD13...difficulty did you have in making decisions?	1.81 (1.77–1.85)	1.76 (1.71–1.81)	2.02 (1.92–2.12)	< 0.001	0.32
PSD14...difficulty did you have in starting and maintaining a conversation?	1.39 (1.34–1.43)	1.33 (1.28–1.37)	1.63 (1.52–1.73)	< 0.001	0.36
PSD15...difficulty did you have in walking a long distance such as a kilometre (or equivalent)?	1.09 (1.04–1.14)	1.12 (1.06–1.17)	0.97 (0.86–1.07)	0.012	0.17
PSD16...difficulty did you have in grooming or dressing, toileting or eating?	0.90 (0.86–0.94)	0.92 (0.88–0.97)	0.81 (0.72–0.90)	0.035	0.15
PSD17...difficulty did you have in sexual activities?	1.15 (1.10–1.20)	1.17 (1.11–1.22)	1.08 (0.97–1.18)	0.140	0.10
PSD18...difficulty did you have in staying by yourself for a few days?	1.37 (1.31–1.42)	1.31 (1.26–1.37)	1.58 (1.45–1.70)	< 0.001	0.27
PSD19...difficulty did you have with looking after your health, such as eating well, exercising and taking your medicines?	1.70 (1.66–1.75)	1.67 (1.62–1.72)	1.82 (1.71–1.92)	0.013	0.17

(continued)

Table 1. (continued)

How much...	All	Completed	Discontinued	<i>p</i>	Effect size ¹
PSD20...difficulty did you have in initiating and maintaining a friendship?	1.50 (1.46–1.55)	1.47 (1.42–1.52)	1.64 (1.53–1.75)	0.003	0.20
PSD21...difficulty did you have in getting along with people who are close to you?	1.25 (1.21–1.29)	1.20 (1.16–1.25)	1.44 (1.34–1.54)	< 0.001	0.30
PSD22...difficulty did you have in your day-to-day work or school?	1.73 (1.67–1.78)	1.66 (1.60–1.72)	2.02 (1.89–2.15)	< 0.001	0.35
PSD23...difficulty did you have with managing your money?	2.25 (2.20–2.30)	2.17 (2.12–2.23)	2.55 (2.44–2.65)	< 0.001	0.42
PSD24...difficulty did you have in joining in community activities (for example, festivities, religious or other activities) in the same way as anyone else can?	2.10 (2.05–2.15)	2.07 (2.01–2.13)	2.24 (2.12–2.35)	0.011	0.18
Metric score (0–100)	65.94 (65.46–66.42)	65.38 (64.84–65.92)	68.19 (67.16–69.21)	< 0.001	0.23
Mean score (all items)	1.73 (1.70–1.76)	1.70 (1.67–1.73)	1.87 (1.81–1.93)	< 0.001	0.34
Emotional difficulties (items 1, 2, 7, 8)	2.33 (2.30–2.36)	2.29 (2.25–2.33)	2.48 (2.41–2.56)	< 0.001	0.32
Cognitive difficulties (items 11, 12, 13, 14, 22)	1.62 (1.58–1.65)	1.56 (1.52–1.59)	1.86 (1.78–1.94)	< 0.001	0.49
Social difficulties (items 18, 20, 21, 24)	1.55 (1.52–1.59)	1.51 (1.48–1.55)	1.72 (1.64–1.80)	< 0.001	0.33
Difficulties in daily activities (items 3, 15, 16, 17, 19)	1.28 (1.24–1.31)	1.29 (1.25–1.32)	1.23 (1.17–1.30)	0.208	0.09
Difficulties in self-regulation (5, 6, 9, 23)	1.82 (1.78–1.85)	1.76 (1.73–1.80)	2.03 (1.95–2.10)	< 0.001	0.45

¹Effect sizes for treatment completion vs. discontinuation were computed for using Cohen's *d* for continuous variables. Cohen's *d* 0.20–0.50 represents a small, 0.50–0.80 a medium and over 0.80 a large effect size.

instances, individuals will undergo detoxification treatment, but will not be willing to participate in longer-term rehabilitation. Incompletion of detoxification treatment may

lead to lack of a longer-term treatment plan and dropping out of addiction treatment services altogether, as previous literature has shown (Campbell et al., 2010).

In this study, we aimed to identify individuals who were at risk for treatment incompleteness and subsequently a lack of a follow-up treatment plan. Information regarding treatment completion or discontinuation was extracted from the treatment records ($n = 2,752$). Treatment was defined as completed when a patient either was discharged according to plan ($n = 1,855$) or continued into inpatient rehabilitation ($n = 354$). Treatment incompleteness included individuals who dropped out of treatment ($n = 441$), those who had to be hospitalised due to mental or physical health problems during treatment ($n = 66$) and patients who were discharged due to violations ($n = 36$). No significant differences were found regarding psychosocial difficulties (PARADISE24fin mean scores) or severity of dependence (SDS) between individuals according to reason for treatment incompleteness.

Representativeness of the data

This natural register study included 2,752 detoxification treatment episodes that provided all required data (PARADISE24fin, SDS and the reason for discharge) of a total 13,665 treatment episodes during the study period. The treatment episodes that were excluded (10,913) and included (2,752) were compared for detecting possible selection bias. The excluded episodes had generally started earlier (mean 8/2017) than the included episodes (2/2018 $t(5308.33) = -26.38, p < 0.001$). This reflects that many professionals had started the use of the questionnaire during the follow-up. There were no differences in gender or age. However, the excluded treatment episodes were of individuals who were less educated (≤ 9 years 55.4% vs. 44.8%; $p < 0.001$, Cohen's $d = 0.091$), less often employed (16.6% vs. 22.7%; $p < 0.001$, Cohen's $d = 0.063$), less often had alcohol (67.4% vs. 70.7%; $p = 0.001$, Cohen's $d = 0.029$) but more often opioids (18.0% vs. 15.8%; $p = 0.006$, Cohen's $d = 0.024$) as their primary substance and the treatment had discontinued more often (37.6% vs. 30.2%; $p < 0.001$, Cramer's $V = 0.063$). Thus, in this

large data set, the observed differences were not significant according to effect sizes (< 0.1).

Statistical methods

The detoxification treatment episodes were divided into two groups according to treatment completion or discontinuation for the purpose of analysing differences regarding socio-demographic and substance related variables as well as PSDs and the risk of treatment discontinuation. Basic statistical methods including crosstabulation and one-way ANOVA were used to identify the differences between the groups concerning mean age (continuous variable) and other socio-demographic as well as substance related variables and PSDs. Chi-square tests and independent samples t -test were used for studying the associations of socio-demographic and substance related variables as well as PSDs with treatment retention. Effect sizes were computed using Cramer's V for chi-square tests, and Cohen's d for t -tests. Cohen's guidelines (Cohen, 1992) were used for interpreting the effect sizes. For Cramer's V , 0.10 represents a small effect size, 0.30 is a medium effect size, and 0.50 is a large effect size. For Cohen's d , 0.20, 0.50, and 0.80 represent a small, a medium, and a large effect size, respectively.

Bivariate logistic regression was used to test the association of severity of dependence (SDS score) and severity of PSDs (PARADISE24fin mean score) with treatment incompleteness. A Pearson correlation coefficient was calculated to analyse the inter-correlation of the two instruments (0.425; $p < 0.001$).

Multivariate logistic regression models were used to test the association of severity of PSDs as a whole (PARADISE24fin mean score), severity of PSDs using the thematic groups as well as severity of single PSDs and severity of dependence (SDS score) with treatment incompleteness. The variables were chosen according to their unadjusted association with treatment incompleteness, the dependent variable. For the purpose of the multivariate models, a

categorical variable concerning age was formed (35 years or younger, 36 years or older) and employment status was categorised into employed, unemployed or retired/other/unknown. The primary substance used was categorised into alcohol, opioids or other; number of reported problem substances according to the SDS was grouped into one vs. two to three. Men and women were analysed both together and separately. The chosen variables were entered into the model as blocks. The first block of covariates consisted of background variables and included age ≤ 35 years, education ≤ 9 years and employment status, with employed being the reference group. The second block included variables related to substance use; information on the primary substance of use with alcohol as the reference and the variable concerning number of problems substances used with one substance as the reference. The third blocks were then tested individually one by one; 3a SDS score; 3b PARADISE24fin mean score; 3c the PARADISE24fin thematic groups Emotional difficulties, Cognitive difficulties, Social difficulties, Difficulties in daily activities and Difficulties in self-regulation; 3d each individual PSD 1–24.

Results were considered statistically significant at $p < 0.05$. All analyses were performed with SPSS 22.

Results

Of the 2,752 detoxification treatment episodes, 80.3% ($n = 2,209$) were completed with variation of incompleteness according to the primary substance used (Table 2). In nearly four out of five (76.2%) detoxification treatment episodes, the patients were men. Men and women did not differ with regard to discontinuation of treatment (19.0% males, 22.0% females). Of the background variables, only younger age was markedly associated (large effect size) with discontinuing treatment; the effect sizes of the other background variables were small.

In over half of the treatment episodes (51.5%), the patients were unemployed, while

22.7% were employed, 20.9% were retired and 5.4% had other or unknown employment situations.

In over two-third of treatment episodes (71.1%), alcohol was determined to be the primary substance of use. Opioids were the primary substance in 15.4% of treatment episodes, stimulants (7.0%), sedatives (3.5%), cannabis (2.3%) and other/unspecified substances (0.5%) being more rare. Alcohol as the primary substance was associated with somewhat better treatment retention compared to other substances, whereas opioids were associated with treatment incompleteness. Severity of dependence was associated with treatment retention; inpatients with higher SDS scores were more likely to complete detoxification treatment. Two-thirds (67.1%) reported having problems with only one substance on the SDS and these individuals were more likely to complete treatment.

The PARADISE24fin responses and mean scores are presented in Table 1. The mean PARADISE24fin scores were higher (indicating more severe problems) for those who did not complete treatment than those who completed it. Of the 24 single items, 15 PSDs were associated with treatment retention, with the mean scores being higher for those who did not complete treatment. Effect sizes (Cohen's d) were small. Treatment incompleteness was associated with more severe PSDs for the thematic groups Cognitive difficulties (Cohen's $d = 0.49$), Difficulties in self-regulation (Cohen's $d = 0.45$), Social difficulties (Cohen's $d = 0.33$) and Emotional difficulties (Cohen's $d = 0.32$).

Severity of dependence (SDS score) and severity of PSDs (PARADISE24fin mean score) were moderately inter-correlated (Table 3). When analysing the association of SDS score and PARADISE24fin mean score with treatment incompleteness using logistic regression, a significant association was found for both when analysing men and women together. However, when analysing men and women separately, only PARADISE24fin mean

Table 2. Socio-demographic and substance use related variables according to treatment completion, % of completed and discontinued detoxification treatment episodes.

	All <i>n</i> = 2,752	Completed <i>n</i> = 2,209 (80.3%)	Discontinued <i>n</i> = 543 (19.7%)	<i>p</i>	Effect size ¹
Age, mean (SD)	42.75 (13.60)	44.42 (13.33)	35.98 (12.53)	< 0.001	0.94
Gender, <i>n</i> (%)				0.097	0.03
Male	2,097	1,698 (81.0%)	399 (19.0%)		
Female	655	511 (78.0%)	144 (22.0%)		
Education > 9 years, <i>n</i> (%)	1,489	1,274 (85.6%)	215 (14.4%)	< 0.001	0.16
Employment, <i>n</i> (%)				< 0.001	0.10
Employed	624	532 (85.3%)	92 (14.7%)		
Unemployed	1405	1081 (76.9%)	324 (23.1%)		
Retired	575	486 (84.5%)	89 (15.5%)		
Other/unknown	148	110 (74.3%)	38 (25.7%)		
Primary substance of use, ² <i>n</i> (%)				< 0.001	0.26
Alcohol	1959	1697 (86.6%)	262 (13.4%)		
Opioids	425	257 (60.5%)	168 (39.5%)		
Stimulants	194	135 (69.6%)	59 (30.4%)		
Sedatives	97	66 (68.0%)	31 (32.0%)		
Cannabis	63	46 (73.0%)	17 (27.0%)		
Other/unknown	14	8 (57.1%)	6 (42.9%)		
Severity of dependence, ³ mean	10.03 (9.91–10.14)	9.91 (9.78–10.04)	10.5 (10.22–10.77)	< 0.001	0.27
Number of substances used, ⁴ <i>n</i> (%)				< 0.001	0.23
One	1846	1593 (86.3%)	253 (13.7%)		
Two	385	288 (74.8%)	97 (25.2%)		
Three	521	328 (63.0%)	193 (37.0%)		

¹Effect sizes were computed for treatment completion vs. discontinuation using Cohen's *d* for continuous and Cramer's *V* for categorical variables. Cohen's *d* 0.20–0.50 represents a small, 0.50–0.80 a medium and over 0.80 a large effect size; Cramer's *V* 0.1–0.30 represents a small, 0.30–0.50 a medium and over 0.50 a large effect size.

²According to treatment records.

³Mean score on the Severity of Dependence (SDS) scale of the subjectively reported primary substance, range 0–20.

⁴Number of substances with which an individual reported having problems according to the SDS scale, range 1–3.

score was significantly associated with treatment incompleteness.

Men and women differed with regard to the variables associated with treatment retention. When analysing men and women together and after adjusting for confounders, younger age (≤ 35 years), being less educated (≤ 9 years), being unemployed, using opioids and polysubstance use were associated with treatment incompleteness. Severity of PSDs (PARADISE24fin mean score) became non-significant after adjusting for confounders. However, more severe difficulties in the thematic group of

Cognitive difficulties remained significantly associated with treatment incompleteness, while more severe Difficulties in daily activities were associated with treatment completion. When analysing men and women separately, the results for men were similar, but among women, only younger age was associated with treatment incompleteness. When adding SDS score to the model, severity of dependence was associated with treatment incompleteness when analysing all subjects as well as men, but the association was non-significant among women.

Table 3. Unadjusted odds ratios (ORs) for treatment incompletion according to SDS and PARADISE24fin, logistic regression analyses, and inter-correlation (Pearson) of the two instruments.

	All			Men			Women				
	OR	95% CI		OR	95% CI		OR	95% CI			
		lower	upper		lower	upper		lower	upper		
SDS sum score	1.036	1.001	1.071	1.039	0.999	1.080	1.024	0.957	1.024	0.489	0.007
PARADISE24fin mean score	1.312	1.133	1.519	1.273	1.070	1.515	1.379	1.044	1.379	0.024	0.425*
										<i>p</i>	<i>R</i> ²
											Correlation

Note. SDS = Severity of Dependence Scale. *R*² = Nagelkerke R square.

**p* < 0.01.

The PARADISE24fin mean score did not become significantly associated with treatment incompletion after confounding variables were adjusted for (Table 4). However, when analysing men and women together, more severe problems in the thematic group Cognitive difficulties were associated with treatment incompletion while more severe problems in the thematic group Difficulties in daily activities were associated with better treatment retention. When analysing men and women separately, only more severe problems in the thematic group Difficulties in daily activities was associated with treatment retention.

The associations of single PSDs with treatment retention are presented in Table 4. Of the single PSDs, more severe problems with irritability (PSD5) and starting or maintaining a conversation (PSD14) were associated with treatment incompletion when analysing men and women together. Among women, more severe problems with feeling rested (PSD1), irritability (PSD5), decision making (PSD13) and getting along with close ones (PSD21) were associated with treatment incompletion.

Discussion

Younger individuals with opioid and/or poly-substance use were less likely to complete detoxification treatment than older individuals with alcohol as their primary substance. More severe dependence was associated with treatment incompletion, as were more severe difficulties in Cognitive functions. Having more severe difficulties in Daily activities was associated with better treatment retention. These associations varied somewhat according to gender.

Individuals who inject drugs and those with opioid use have been previously reported to have a higher risk of treatment incompletion compared to those with, e.g., alcohol use, with incompletion rates varying from 10% up to 50% (Beck et al., 1983; Endicott & Watson, 1994; Kenne et al., 2010). Treatment incompletion rates were comparable in this study, and

Table 4. Odds ratios (ORs) for treatment incompletion, logistic regression analyses.

	All (n = 2,752)				Men (n = 2,097)				Women (n = 655)						
	OR	95% CI		p	R ²	OR	95% CI		p	R ²	OR	95% CI		p	R ²
		upper	lower				upper	lower				upper	lower		
Block 1					0.089					0.087					0.096
Age ≤ 35 years	2.613	2.094	3.261	< 0.001		2.453	1.893	3.178	< 0.001		3.049	1.954	4.758	< 0.001	
Education ≤ 9 years	1.654	1.338	2.045	< 0.001		1.740	1.361	2.225	< 0.001		1.431	0.939	2.180	0.095	
Employment Employed (ref.)				0.046					0.029					0.814	
Unemployed	1.424	1.025	1.979	0.035		1.517	1.034	2.227	0.033		1.240	0.639	2.409	0.525	
Other	1.039	0.793	1.360	0.783		0.993	0.732	1.346	0.963		1.165	0.649	2.093	0.609	
Block 2					0.122					0.118					0.135
Primary substance Alcohol (ref.)				< 0.001					< 0.001					0.020	
Opioids	1.668	1.197	2.323	0.002		1.647	1.109	2.445	0.013		1.707	0.915	3.183	0.093	
Other	0.718	0.526	0.980	0.037		0.706	0.483	1.032	0.072		0.737	0.425	1.277	0.277	
Several (2–3 vs. 1) reported problem substances	1.357	1.037	1.777	0.026		1.291	0.935	1.781	0.121		1.550	0.937	2.564	0.088	
Block 3a					0.126					0.122					0.137
SDS, sum score	1.046	1.011	1.082	0.009		1.050	1.010	1.093	0.015		1.033	0.966	1.105	0.341	
Block 3b					0.124					0.119					0.140
PARADISE24fin, mean score	1.160	0.999	1.348	0.052		1.134	0.947	1.358	0.173		1.236	0.932	1.639	0.141	
Block 3c (Thematic groups)					0.139					0.133					0.156
Emotional difficulties	1.078	0.900	1.292	0.416		1.088	0.878	1.347	0.441		1.069	0.754	1.517	0.707	
Cognitive difficulties	1.249	1.038	1.504	0.019		1.239	0.994	1.544	0.057		1.298	0.905	1.862	0.156	
Difficulties in social life	1.083	0.916	1.280	0.351		1.094	0.896	1.334	0.378		1.051	0.755	1.463	0.770	
Difficulties in daily activities	0.698	0.590	0.826	< 0.001		0.680	0.555	0.833	< 0.001		0.723	0.525	0.997	0.048	
Difficulties in self-regulation	1.126	0.929	1.366	0.227		1.095	0.868	1.381	0.444		1.185	0.833	1.686	0.346	
Block 3d					0.154					0.144					0.241
PSD1: Not feeling rested	1.098	0.949	1.269	0.208		1.050	0.887	1.242	0.572		1.370	1.003	1.872	0.048	
PSD2: Loss of interest	1.074	0.955	1.208	0.234		1.103	0.962	1.265	0.159		0.994	0.780	1.268	0.962	
PSD3: Problems with appetite	0.953	0.852	1.066	0.396		0.963	0.843	1.099	0.575		0.923	0.734	1.159	0.489	
PSD4: Problems with sleep	0.877	0.789	0.976	0.016		0.898	0.792	1.019	0.095		0.834	0.672	1.034	0.098	
PSD5: Irritability	1.163	1.046	1.293	0.005		1.104	0.975	1.251	0.120		1.330	1.071	1.651	0.010	
PSD6: Feeling slowed down	0.911	0.810	1.025	0.123		0.898	0.781	1.033	0.133		0.870	0.681	1.110	0.262	

(continued)

Table 4. (continued)

	All (n = 2,752)					Men (n = 2,097)					Women (n = 655)				
	OR	95% CI		p	R ²	OR	95% CI		p	R ²	OR	95% CI		p	R ²
		upper	lower				upper	lower				upper	lower		
PSD7: Feeling depressed	0.95	0.824	1.096	0.486		0.95	0.808	1.118	0.541		0.923	0.672	1.267	0.620	
PSD8: Worry or anxiety	1.090	0.929	1.280	0.291		1.094	0.911	1.314	0.336		1.137	0.795	1.626	0.481	
PSD9: Not being able to cope	1.010	0.883	1.155	0.884		1.064	0.910	1.243	0.437		0.848	0.638	1.127	0.255	
PSD10: Having pain	0.983	0.884	1.094	0.756		0.991	0.877	1.121	0.891		0.953	0.759	1.198	0.681	
PSD11: Difficulty concentrating	1.052	0.935	1.183	0.402		1.076	0.939	1.233	0.294		0.987	0.765	1.272	0.918	
PSD12: Difficulty with remembering	0.953	0.834	1.088	0.475		0.944	0.806	1.106	0.478		0.977	0.745	1.282	0.869	
PSD13: Difficulty with decision making	1.114	0.976	1.272	0.110		1.042	0.892	1.218	0.601		1.424	1.068	1.898	0.016	
PSD14: Difficulty conversing	1.138	1.020	1.270	0.021		1.135	0.999	1.290	0.051		1.141	0.899	1.449	0.278	
PSD15: Difficulty walking long distances	0.913	0.822	1.015	0.092		0.855	0.752	0.972	0.017		1.104	0.897	1.359	0.352	
PSD16: Difficulty dressing, toileting, etc.	0.809	0.709	0.924	0.002		0.872	0.743	1.023	0.094		0.656	0.508	0.846	0.001	
PSD17: Difficulty with sexual activities	0.954	0.861	1.056	0.363		0.933	0.826	1.054	0.266		1.031	0.846	1.258	0.761	
PSD18: Difficulty with being alone	1.032	0.946	1.125	0.477		1.034	0.932	1.148	0.524		1.050	0.879	1.255	0.592	
PSD19: Difficulty with taking care of health	1.080	0.957	1.219	0.214		1.038	0.902	1.194	0.600		1.184	0.912	1.537	0.204	
PSD20: Difficulty with friendships	0.939	0.833	1.059	0.306		0.980	0.851	1.128	0.777		0.781	0.607	1.006	0.056	
PSD21: Difficulty getting along with people	1.061	0.945	1.192	0.315		1.004	0.875	1.153	0.949		1.310	1.028	1.669	0.029	
PSD22: Difficulty with work or school	1.070	0.978	1.171	0.143		1.110	0.999	1.234	0.052		0.909	0.756	1.094	0.312	
PSD23: Difficulty managing money	1.025	0.920	1.143	0.649		1.030	0.906	1.170	0.651		1.027	0.825	1.279	0.809	
PSD24: Difficulty joining in community activities	0.963	0.866	1.071	0.487		0.960	0.850	1.084	0.514		0.970	0.768	1.224	0.794	

Notes. SDS = Severity of Dependence Scale; PSD = psychosocial difficulty; R² = Nagelkerke R square.

higher incompleteness rates were observed for individuals with opioid and other illicit drug use compared to alcohol. Alcohol as the primary substance was associated with better treatment retention while opioids as the primary substance and polysubstance use were associated with higher rates of incompleteness after adjusting for confounders.

Severity of dependence has previously been reported to be associated with treatment retention (Franken & Hendriks, 1999) and more severe dependence according to SDS scores was associated with treatment incompleteness in this study as well. When comparing the SDS and the PARADISE24fin, both severity of dependence and severity of PSDs were associated with treatment incompleteness. However, when analysing men and women separately, only severity of PSDs was significantly associated with treatment incompleteness. The association of the severity of PSDs and treatment incompleteness did not reach statistical significance when socio-demographic and substance related variables were adjusted for. This finding would suggest that one or several of these variables mediate the association between severity of PSDs and treatment incompleteness. However, the PARADISE24fin did prove to be a practical tool for assessing PSDs in the context of detoxification treatment, as missing information was not common in this real-life sample.

Younger age, unemployment and being less educated have been found to be associated with treatment incompleteness in previous studies (Backmund et al., 2001; Sofin et al., 2017), which is line with the findings of this study concerning men. However, among the women in this study, of the socio-demographic variables, only younger age was associated with treatment incompleteness. Previous results have been mixed with regard to the effect of gender on treatment retention (e.g., Franken & Hendriks, 1999; Sofin et al., 2017). In this study, no significant difference in treatment retention was observed for gender; however, the variables associated with treatment incompleteness somewhat varied according to gender. This

finding suggests that it is necessary to study factors associated with treatment retention separately in men and women.

The strength of this study is the large number of detoxification treatment episodes with different clinical and socio-demographic profiles that represented well the patients at the clinics. However, the results should be interpreted considering some limitations. In all studies where treatment records are used, the results are subject to the limitations of data available. For example, data regarding psychiatric co-morbidities were sparsely available. The natural register data retrieved from original PIS represent real-life implementation of new practices, which take time to become routines, and the application of the PARADISE24fin was not uniformly performed. Further, the content of detoxification was not included in this study. Previous research has suggested that, e.g., the role of the type of medications used to relieve withdrawal symptoms may be significant with regard to detoxification treatment retention, specifically among individuals with opioid use disorder (Backmund et al., 2001; McCambridge et al., 2007) and analysing the impact of medications used on treatment completion also warrants further attention in the Finnish context.

It should also be noted that different reasons for treatment incompleteness were not studied separately due to small subgroup sizes. Individuals who did not complete treatment due to having been transferred to somatic or psychiatric inpatient treatment ($n = 66$, 12.2% of all incompleteness) did represent continuity of care. However, they were included in the discontinued group due to the rationale that they were unable to complete their detoxification treatment, which may put them at a risk for discontinuity of substance use related care, specifically. Further, the individuals who did not complete treatment for different reasons did not differ according to severity of psychosocial difficulties or severity of dependence.

This study did not evaluate whether treatment impacts PSDs, i.e., change in PARADISE24fin scores, during the course of treatment

as the aim of this study was not to evaluate treatment efficacy. Further longitudinal studies concerning the course of PSDs in clinical samples are needed in the future.

Younger individuals with opioid and/or polysubstance, severe dependence and those with cognitive difficulties have a higher risk of detoxification treatment incompleteness. Given the implications of poor treatment retention, efforts should be made to address ways that this group of patients could better be retained in treatment. Future research should consider studying factors associated with treatment retention separately in men and women.


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