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ORIGINAL ARTICLE

Repeated Addiction Treatment use in Sweden: A National Register Database Study

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Sweden has a free, universal addiction treatment system, yet few studies exist examining utilization of treatment in this country. This study identified predisposing, enabling, and need factors associated with history of number of voluntary addiction treatment episodes for a national sample of 12,009 individuals assessed for an alcohol and/or drug use disorder in Sweden. On average, people reported 4.3 prior treatment episodes. Linear regression methods identified that predisposing factors such as older age and being male were associated with more voluntary addiction treatment episodes compared to younger and female clients; a higher Addiction Severity Index (ASI) employment score (an enabling factor) was associated with more voluntary addiction treatment episodes; and need factors including a history of inpatient mental health treatment, a higher ASI psychiatric score, a higher ASI alcohol score, higher levels of illicit drug use, more compulsory addiction treatment episodes, a *lower* ASI legal score, and a history of criminal justice involvement were all associated with more voluntary addiction treatment episodes compared to their counterparts.. There were no differences in the number of treatment episodes by education or immigrant status. Implications: (1) Need is a key factor associated with more treatment use. (2) Further studies are needed to identify gender differences in access/use of treatment. (3) Given multiple treatment histories, Swedish addiction treatment policy should reflect a chronic care model rather than an acute care model.

INTRODUCTION AND PROBLEM DEFINITION

Many individuals with substance abuse or dependence "cycle" in and out of addiction treatment. Repeated treatment use may be seen as a positive thing. Specifically, some studies suggest that multiple treatment episodes may improve outcomes for drug abusers. For example, in a study examining whether short-term outcomes predict long-term outcomes for substance abusers, Weisner, Ray, Mertens, Satre, and Moore (2003) found that for people who were not abstinent at 6 months after leaving drug treatment, treatment readmission was a major predictor of being abstinent at 5 years. They suggest both that readmission to treatment should not always be considered a relapse and that multiple treatment entries may have a beneficial impact on outcomes (Weisner et al., 2003).

However, substance abusers who repeatedly seek treatment have been found to have more severe alcohol and drug problems compared to their counterparts. For example, Cacciola, Dugosh, Foltz, Leahy, and Stevens (2005) found that substance abusers entering drug treatment programs that had a history of prior drug treatment reported more severe drug problems compared to those who entered drug treatment for the first time. Grella, Hser, and Hsieh (2003) identified that among DATOS cocaine users, individuals with higher service needs were more likely be treatment repeaters. Anglin and colleagues (1997, 1999) found that drug treatment repeaters had more severe levels of drug use, criminality, and use of drugs by injection than clients with only one admission. Dennis and colleagues (2005) also found that drug users who were initially abstinent after completing drug treatment and then relapsed, were more likely to have had a history of more treatment episodes than drug users who remained abstinent after treatment and did not relapse. Finally, an earlier

longitudinal retrospective/prospective Swedish study of in-patients admitted to the Magnus Huss Clinic in 1976–1978 identified that most patients had repeated treatment contacts with specialized alcohol treatment, psychiatry, social services, and somatic care. High treatment users had the most unfavorable social situation and the most severe alcohol-related problems (Damström-Thakker, 1990). Indeed, a number of current studies suggest that multiple drug treatment use needs to be understood within the context of the chronic nature of drug addiction (McLellan, 2002; McLellan, McKay, Forman, Cacciola & Kemp, 2005; World Health Organization, 2010). Weisner and Matzger (2002), in a discussion of factors that influence entry into drug and alcohol treatment, point to "the prominence of prior treatment predicting treatment" as evidence of the need for a chronic disease model of care for addiction.

However, in Sweden, few research studies have been conducted to identify if there are specific demographic and substance use related differences associated with history of repeated treatment use among individuals using the addiction treatment system. This lack of knowledge results in an inability by the treatment system both to adapt addiction care based on individual needs and to have realistic expectations of treatment outcomes.

Overall Aim and Research Question

The overall aim of this study research is to: identify and describe specific population groups who are repeated treatment users of the Swedish addiction treatment system. Specifically, through the use of data from a Swedish national database of 12,009 individuals who were assessed for a substance use disorder between 2002 and 2008, the study identified the associations between specific predisposing (age, gender, immigration status) characteristics, enabling characteristics (education, family/social factors, and employment), and needs (health, mental health status, substance use severity, and criminal justice history) characteristics and self-reported history of number of voluntary addiction treatment entries.

Next, please find a description of the theoretical framework used and the literature review on existing research on population characteristics of individuals who are repeated addiction treatment users.

THEORETICAL FRAMEWORK

For a long time, researchers have been interested in trying to understand and explain how people in different societies make use of health care systems and which factors predict utilization (Smedby & Andersen, 2010). In this article, in order to identify and describe specific population groups who are repeated treatment users of the Swedish addiction treatment system, we will use health service utilization theory (Aday & Awe, 1997; Andersen, 1995; Gelberg, Andersen, & Leake, 2000) as a theoretical framework.

The original behavior model was developed in the late 1960s "to assist in understanding why people use health services" (Gelberg, Andersen, & Leake, 2000, p. 1275). The behavior model assumes that "use is a function of a predisposition by people to use health services, factors that enable or impede such use, and people's need for care" (Gelberg, Andersen, & Leake, 2000, p. 1275). The Gelberg–Andersen Behavioral Model for Vulnerable Populations (Gelberg, Andersen, & Leake, 2000) is an expansion of the original Behavioral Model of Health Services Utilization (Aday & Awe, 1997; Andersen, 1995). It "represents an adaptation of the behavioral model that includes factors to consider when studying the use of health services among vulnerable populations. Some of the categories may need to be adapted, tailored to specific vulnerable groups when the model is applied to them" (Gelberg, Andersen, & Leake, 2000, p. 1276). For example, substance abuse, mental illness, and criminal behavior may assist in understanding health behaviors in vulnerable populations. "Vulnerable areas focus on social structure and enabling resources" (Gelberg, Andersen, & Leake, 2000, p. 1275). The literature review next discusses specific predisposing, enabling, and needs factors found to be associated with repeated treatment use in prior, primarily, non-Swedish research efforts.

Literature Review of Predisposing, Enabling, and Need Factors
Predisposing Factors

Age: US studies on treatment repeaters show that clients with a prior treatment history tend to be older than first-time clients (see, for example, Cacciola, Dugosh, Foltz, Leah, & Stevens, 2005)**.** Further, research shows that individuals who re-enter into treatment tend to start alcohol and drug abuse at an earlier age than those who do not re-enter back in addiction treatment (Dennis, Scott, Funk, & Foss, 2005; Scott, Foss, & Dennis, 2005). Little research has been conducted in Sweden about this but we hypothesized finding the same relationship in Sweden between age and number of treatments entered.

Gender: International research in addiction and addiction treatment related to gender shows that women and men differ with regard to the initiation of their drug use careers and their subsequent patterns of treatment participation (Grella, Scott, & Foss, 2005). Further, Grella et al. (2005) describe that women initiate drug and alcohol use at later ages than men and typically do so within the context of personal relationships. However, they enter treatment after a briefer period of use. Treatment entry for men was more often promoted by the criminal justice system or health care system, whereas woman more frequently attributed their referral to treatment to themselves or others in their social network (Grella et al., 2005). Addiction careers were significantly longer for males compared to females (Dennis, Scott, Funk, & Foss, 2005). However, being female was associated with higher likelihood of treatment readmission (Grella et al., 2003). We hypothesized finding a similar relationship in Sweden about addiction treatment readmission and gender as in these US studies.

Ethnicity/immigration status: A national study in US about treatment utilization for alcoholism, drug abuse, and mental health care found greater unmet need for all forms of treatment among African Americans relative to Whites (Wells, Klap, Koike & Sherbourne, 2001). Ethnic minority status was related to having less access to treatment (Weisner & Matzger, 2002). Also, some research studies suggest that overall, immigrants have less access to addiction treatment (McLean-Leow, Goldstein, & McGlinchy, 2006; National Institute on Drug Abuse (NIDA), 2003). Little research has been conducted in Sweden on race/ethnic disparities and national datasets generally do not collect data on race/ethnicity. However, one study has identified that second generation immigrants from non-Nordic countries are more likely to have a history of compulsory treatment than Swedish citizens (Lundgren et al., 2012). Given this finding, our study will explore if there is a significant association between immigration status and history of number of voluntary treatment episodes.

Enabling Factors

Education: International studies on the association between a client's level of education and use of addiction treatment show contradictory results. Some studies indicate that clients entering substance abuse treatment for the first time tend to be more educated than clients with long prior treatment histories (Cacciola, Dugosh, Foltz, Leahy, & Stevens, 2005). In other studies, it appears that clients with lower educational levels had more difficulty accessing treatment (Weisner & Matzger, 2002).

Family: There is a significant body of research that suggests that having a family supportive of recovery is associated with positive treatment outcomes both in Sweden and the US (Trocchio et al., 2013; Von Greiff & Skogens, 2012).

Employment in countries such as in the US is an enabling factor since employment may include health insurance which promotes access treatment. In Sweden, prior studies indicate that those with substance use disorder who are employed are more likely to find housing and be more educated (Storbjörk & Room, 2008). Hence, employment is here defined as an enabling factor even though employment per se is not associated with insurance or payment for addiction treatment.

Needs Factors

Psychiatric comorbidity: Studies have found that clients in addiction treatment have high levels of psychiatric problems. One study found that a greater level of psychological severity negatively impacted the positive outcome of treatment (Hser, Teruya, & Anglin, 2004). Relapse and readmission are common when addiction is accompanied by psychiatric problems (Scott, Foss, & Dennis, 2005). Clients with a treatment history tend to have more mental health problems than clients entering addiction treatment for the first time (Cacciola, Dugosh, Foltz, Leahy, & Stevens, 2005). Studies have shown that having a comorbid psychiatric condition influences decisions

to enter treatment (Weisner & Matzger, 2002). Hence, we hypothesized that clients in Sweden who report more mental health problems would be more likely to have more addiction treatment entries compared to their counterparts.

Substance use severity: In the US, a greater severity of alcohol and drug use is often associated with repeated treatment use (Grella et al., 2003). Clients who have a history of compulsory treatment or court-mandated treatment often have more complex sets of problems compared to their counterparts. According to the Swedish law, the Care of Alcoholics and Drug Abuser Act (LVM, 1988: p. 870), individuals are mandated to enter compulsory treatment after an assessment has been made of a combination of doctors, social workers, and the courts (Johansson, 2006). Compulsory treatment should be understood as an emergency, used in a situation that could be perceived as acute, when an individual's misuse reached such a level that he/she is a danger to herself/himself or others. Hence, the key factor of being court-mandated to treatment is severity of substance use. Therefore, we hypothesized that individuals who have been mandated to compulsory care would also have a greater history of voluntary addiction treatment episodes compared to their counterparts.

Criminal Justice History. Grella et al. (2003) identified that clients with both a drug use history and higher levels of criminal involvement at treatment admission had a greater history of repeated drug treatment compared to their counterparts.

Health. It has been shown that clients with more severe addiction problems often have more severe physical health and mental health problems than their counterparts (Andréasson, Allebeck & Romelsjö, 1990; Sundquist & Franck, 2004; Öjehagen, 2011). We hypothesized that clients with more severe physical and mental health needs were more likely to have more voluntary addiction treatment episodes than their counterparts.

METHODS

Database/Study Sample

Today, in Sweden, approximately 200 (70%) of the 284 municipalities use the Addiction Severity Index (ASI) (McLellan et al., 1992) as the key instrument for baseline assessments with individuals presenting with addiction-related problems. The data from these assessment interviews are entered into a common database. A revised individual-level research database, from the larger ASI database but including no duplication of cases, was created by Armelius, Nyström, Engström, and Brännström (2009). This revised database includes data from 50 municipalities, representing close to a third of all municipalities using the ASI assessment tool in Sweden in 2005 (Armelius et al., 2009). A comparison of the results from the Armelius database with the Swedish Census data indicates that the Armelius and colleagues (2009) data is highly representative of the Swedish population data. However, there is an overrepresentation from municipalities with larger populations (Armelius & Armelius

(2011)). A comprehensive analysis of both baseline and follow-up data from this database is described in Armelius and Armelius (2011). For the purpose of the study presented here, only baseline assessment data with 12,009 individuals from the Armelius research database were included in this effort.

Variables Used in the Analysis

Predisposing factors. Three predisposing *demographic variables* were used: *Age* was measured as a continuous level measure. *Gender* had two categories, male and female. There is no data collected on race/ethnicity, however data were collected on immigration status and birth country of parent. Therefore, the third demographic factor measuring immigration status was used: *Immigration status* is a five-category variable developed to measure first- and second-generation immigrant status. Given the cultural similarities between the Nordic countries (Sweden, Norway, Finland, and Denmark), immigration status was further specified by whether or not an individual or her/his parents were born inside or outside the Nordic countries. Specifically, the immigration status variable includes the following categories: (1) both the individual and her/his parents born in Sweden, (2) individual born outside of Sweden and inside Norway, Finland, or Denmark (first-generation immigrant), (3) individual born outside of Sweden, Norway, Finland, or Denmark (first-generation immigrant); (4) individual born in Sweden with parents born in Norway, Finland, or Denmark (second-generation immigrant); and (5) individual born in Sweden with at least one parent born outside Nordic countries (second-generation immigrant).

Enabling factors. *Education,* measured as number of years of education, was one of three enabling factors measured for this study. Family and social relationships were measured in terms of satisfaction with marital status and relationships with others, and how bothered the client was by his or her family and social situation and the client's report on how much help was needed for these issues, yielding the *ASI family and social score*.

The *ASI employment score* encompasses both the ability to get to work (e.g., access to car) and number of days worked in the past 30 days and amount of money earned.

Need factors. Twelve variables measured need factors. Mental health needs were measured in several ways including history of inpatient and outpatient psychiatric treatment which were measured with two dichotomous variables measuring whether the client had ever been in *inpatient treatment for psychiatric problems* (yes/no) and whether the client had ever been in *outpatient treatment for psychiatric problems* (yes/no). The *ASI psychiatric score* combined 11 different measures including mental health symptoms (ever experienced during lifetime), importance of getting help, how bothered the client was by the symptoms, and the number of days during the past 30 days the client was bothered by the symptoms.

Substance use severity was measured with two ASI scores and an additional four variables. The *ASI alcohol score* and *ASI drug score* each focused on use and how bothered the client felt by the problems arising from alcohol and/or drug use and how important the client felt it was to get help to address those problems. In addition, a third variable measured client reports of *the number of years they had used multiple drugs as well as alcohol to intoxication three or more days per week*. A fourth variable measured t*he number of times the client had overdosed on drugs*. A fifth variable *measured the number of times the client had been in compulsory treatment for illicit drug use*. Finally, a sixth variable measured *number of times in compulsory treatment for alcohol*.

The *ASI legal score* measured the client's self-reported involvement with the criminal justice system and how bothered and how in need of help the client reported feeling about legal issues. *History of Involvement with the criminal justice* system was measured through a composite variable that combined answers from three variables, number of drug crimes, number of property crimes, and number of violent crimes the client has been charged with, into one variable measuring whether the client had ever been charged with any crime. The *ASI health score* measured the number of days of health problems in the past 30 days and the client's sense of being bothered and needing to get help to address health concerns.

For all seven Addiction Severity Index scales (employment, family and social, health, psychiatric, alcohol, drug use, and legal), higher scores indicate more distress. i.e., greater needs (McGahan, Griffith, & McLellan, 1986; McLellan et al., 1992). Creation of new ASI scores resulted in 1,455 missing cases, or 10.8%. To understand missingness, a missing data analysis was conducted. Cases missing in any of the independent variables in the regression analysis were grouped as "missing" and compared to complete cases in several ways.

Missing cases were compared to complete cases on the dependent variable and the independent variables. Bivariates analyses (correlations and one-way ANOVA tests) were conducted using the sample of complete data only ($n = 12,009$). The results were very similar to results on all cases in the original sample ($n = 13,464$). For example, differences in Pearson Correlation Coefficients vary by .03 (.08 compared to .11), or .09 compared to .07. Means on the dependent variable, number of substance abuse treatment episodes vary slightly as well, for example, 5.7 treatment episodes compared to 5.2, among individuals born in Norway, Denmark, or Finland.

Collinearity tests were run when testing a model that included all the original variables in the model plus the six new ASI scores. Variables were not collinear.

Dependent variable. The dependent variable; "self-reported history of number of substance abuse treatment episodes," was created by adding together all of a client's treatment episodes: that is, number of outpatient and inpatient treatment episodes for drugs and number of outpatient and inpatient treatment episodes for alcohol abuse. For 5,605 clients or 46.7%, this was their first treatment entry. To account for the current treatment episode, the current treatment episode was added to each client's sum of treatment episodes as "1."

Data Analysis
Descriptive Statistical Methods

First, univariate descriptive statistics were used to describe the sample. Next, bivariate analyses were conducted using chi-square, one-way ANOVA, and Pearson correlation methods to examine the relationship between each independent variable and the number of substance abuse treatment episodes. A linear regression model was developed using variables that were significant at the bivariate level. For the linear regression model, the multi-category variable measuring immigrant status was divided into four dummy variables, with no dummy variable for the largest group, individuals and their parents born in Sweden. Finally, for the linear regression model, all variables were entered as a group.

RESULTS

Sample Description

Predisposing factors: The clients in this study were on average 40 years old, 69.1% were men, and 69.1% of clients were Swedish with Swedish parents and 30.9% were either first- or second-generation immigrant. *Enabling factors:* Clients had on average completed 11 years of education, had a mean ASI family and social score of .2, and a mean ASI employment score .7. *Need factors:* With respect to mental health treatment 23.6% reported that they had a history of inpatient mental health treatment and 44.8% reported that they had a history of outpatient mental health treatment. The ASI psychiatric score was .4, while the ASI alcohol score was .3 and the ASI drug score was .1. With respect to substance use severity, clients had on average spent 3.4 years of their lives as polydrug users, defined as taking multiple drugs and being intoxicated with alcohol 3 days or more per week, and about one-fifth (22.1%) of clients reported having overdosed on drugs at least once in their lives. In addition, 15.7% had been in compulsory narcotics treatment at least once, 12.6% had been in compulsory alcohol treatment at least once, with an average of less than one compulsory treatment episode per client for drugs or for alcohol. The ASI legal score was .1, and slightly more than half of all clients (51.8%) reported that they had been charged with a crime in their lifetime. The ASI health score was .2.

Finally, on average, clients reported having a history of four addiction treatment episodes. Table 1

Bivariate Results

The bivariate statistical analysis evidences, as described in Table 2 next, that all variables except the one that measured whether or not a client had a history of outpatient mental health treatment were significantly associated with number of addiction treatment episodes. Specifically, in correlation analyses yielding the Pearson Correlation Coefficient, those who were older (a predisposing factor), those with less education and higher ASI family and social scores and ASI employment scores (all enabling factors), and in terms of need factors, clients with higher ASI psychiatric scores, higher ASI alcohol scores, and higher ASI

TABLE 1. Univariate descriptive statistics: Factors associated with number of substance abuse treatment episodes ($N = 12,0009$)

Variables	N	% or Mean (SD)
Predisposing factors		
Age	12,009	39.8 (12.8)
Gender	12,009	
Male	8303	69.1
Female	3706	30.9
Immigration status	12,009	
Individual and their parents born in Sweden	8300	69.1
Individual born in either Norway, Denmark, or Finland	697	5.8
Individual born outside of Sweden, Norway, Denmark, and Finland	1194	9.9
Individual born in Sweden and at least one parent born in Norway, Denmark, or Finland (no other country outside Sweden)	957	8.0
Individual born in Sweden and at least one parent born outside Sweden, Norway, Denmark, and Finland	861	7.2
Enabling factors		
Number of years of education	12,009	11.0 (2.8)
ASI Family and social score	12,009	.2 (.2)
ASI Employment score	12,009	.7 (.3)
Need factors		
Ever been in inpatient treatment for psychiatric problems	12,009	
Yes	2832	23.6
No	9177	76.4
Ever been in outpatient treatment for psychiatric problems	12,009	
Yes	5385	44.8
No	6624	55.2
ASI Psychiatric score	12,009	.4 (.3)
ASI Alcohol score	12,009	.3 (.3)
ASI Drug score	12,009	.1 (.1)
Number of years of polydrug use and alcohol drinking to intoxication three or more days per week	12,009	3.4 (6.8)
Number of times overdose on drugs	12,009	1.0 (5.1)
Number of times in compulsory treatment for drug use	12,009	.4 (1.5)
Number of times in compulsory treatment for alcohol use	12,009	.3 (1.5)
Legal score	12,009	.1 (.2)
Ever been charged with a crime	12,009	
Yes	6215	51.8
No	5794	48.2
ASI Health score	12,009	.3 (.4)
Dependent variable		
Number of substance abuse treatment episodes	12,009	4.3 (10.0)

drug scores, more years of polydrug use and alcohol intoxication at least 3 days a week, those who had more overdoses, those who had more compulsory drug and alcohol treatment entries, and those with higher ASI legal scores were significantly more likely to report higher number of

TABLE 2. Bivariate descriptive statistics: Factors associated with number of substance abuse treatment episodes ($N = 12{,}009$)

Variables	Mean (SD) number of substance abuse treatment episodes	F statistic	Critical F ($p < .01$)	Pearson Correlation Coefficient
Predisposing factors				
Age**				.10
Gender***		29.3	6.64	
Male	4.6 (10.2)			
Female	3.6 (7.7)			
Immigration status**		3.9	3.3	
Individual and their parents born in Sweden[a]	4.3 (9.7)			
Individual born in either Norway, Denmark, or Finland	5.2 (10.2)			
Individual born outside of Sweden, Norway, Denmark, and Finland	3.5 (9.2)			
Individual born in Sweden and at least one parent born in Norway, Denmark, or Finland (no other country outside Sweden)	4.3 (9.7)			
Individual born in Sweden and at least one parent born outside Sweden, Norway, Denmark, and Finland	4.3 (8.3)			
Enabling factors				
Number of years of education**				−.07
ASI Family and social score*				.02
ASI Employment score**				.13
Need factors				
Ever been in inpatient treatment for psychiatric problems***				
Yes	5.8 (12.9)	93.4	6.64	
No	3.8 (8.2)			
Ever been in outpatient treatment for psychiatric problems				
Yes	4.2 (9.5)	.56	6.64	
No	4.4 (9.6)			
ASI Psychiatric score**				.08
ASI Alcohol score**				.04
ASI Drug score**				.07
Number of years of polydrug use and alcohol drinking to intoxication three or more days per week**				.19
Number of times overdose on drugs**				.09
Number of times in compulsory treatment for drug use**				.26
Number of times in compulsory treatment for alcohol use**				.36
ASI Legal score**				.03
Ever been charged with a crime***				
Yes	5.4 (11.7)	189.6	6.64	
No	3.1 (6.3)			
ASI Health score**				.09

[a]Posthoc results: individual/parents born in Sweden > Individual born outside of Sweden, Norway, Denmark, and Finland; Individual born in either Norway, Denmark, or Finland > Individual born outside of S/N/D/F.
*$p < .05$, ** $p < .01$, ***$p < .001$.

treatment episodes. In one-way ANOVA analyses comparing mean scores among categories, men had significantly more substance abuse treatment episodes than females, clients born in Norway, Denmark, or Finland had more substance abuse treatment episodes than their counterparts, clients with a history of inpatient psychiatric treatment had more treatment episodes than clients without a history of inpatient treatment, and those who had been charged with a crime, all had significantly more addiction treatment episodes than their counterparts.

To untangle the relationships between the independent variables and the dependent variable, a multivariate linear regression model was developed where all independent variables significant at the bivariate level were entered into the regression model.

Linear Regression Model

As Table 3 indicates, in the linear regression model, all independent variables except for immigrant status, years of education, the ASI family and social score, the ASI drug score, and the ASI health score, remained significantly associated with number of times in addiction treatment. Specifically, for predisposing factors, those who were older, and those who were males had significantly more addiction treatment episodes than their counterparts. The ASI employment score, an enabling factor, was positively

TABLE 3. Linear regression: Factors associated with number of substance abuse treatment episodes ($N = 12{,}009$)

Variables	B	Standardized Beta	t
Predisposing factors			
Age***	.09	.11	12.57
Gender**	−.62	−.03	−3.44
Immigrant status variables			
(Individual and their parents born in Sweden)			
Individual born in either Norway, Denmark, or Finland compared to everyone else	−.01	.00	−.02
Individual born outside of Sweden, Norway, Denmark, and Finland compared to everyone else	−.34	−.01	−1.23
Individual born in Sweden and at least one parent born in Norway, Denmark, or Finland (no other country outside Sweden) compared to everyone else	.01	−.00	−.19
Individual born in Sweden and at least one parent born outside Sweden, Norway, Denmark, and Finland compared to everyone else	.21	.01	.67
Enabling factors			
Number of years of education	−.01	−.00	−.27
ASI Family and social score	−.15	−.00	−.39
ASI Employment score***	1.68	.05	5.80
Need factors			
Ever been in inpatient treatment for psychiatric problems***	.92	.04	4.62
ASI Psychiatric score***	2.24	.06	5.94
ASI Alcohol score*	.64	.02	2.34
ASI Drug score	.03	.00	.04
Number of years of polydrug use and alcohol drinking to intoxication three or more days per week***	.12	.09	9.01
Number of times overdose on drugs***	.07	.04	4.63
Number of times in compulsory treatment for drug use***	1.06	.16	18.51
Number of times in compulsory treatment for alcohol use***	1.89	.29	34.25
ASI Legal score**	−1.62	−.03	−3.58
Ever been charged with a crime***	1.01	.05	5.19
ASI Health score	.35	.01	1.45

R Square .202, Adjusted *R*-square .201, p<.000.

*p <.05, **p < .01,***p <.001.

and significantly associated with number treatment episodes, with those with higher scores having more addiction treatment episodes. Each of the need factors was associated with addiction treatment episodes with the exception of the ASI health score. Clients who had ever been in inpatient mental health treatment, who had higher ASI psychiatric scores, higher ASI alcohol scores, those who reported more years of polydrug and alcohol use to intoxication, more overdose experiences, who reported more compulsory treatment episodes for narcotics and alcohol, and who had ever been charged with a crime, reported significantly more addiction treatment episodes than their counterparts. Lower ASI legal scores were also associated with more voluntary addiction treatment episodes.

Notably, the factors with the strongest associations with the number of treatment episodes were the number of *compulsory* treatment episodes for alcohol and for drugs. Given that compulsory treatment can be considered a measure of severe levels of substance use, this finding is not surprising.

DISCUSSION

This is the first study in Sweden which identifies and describes specific population groups who are repeated treat-

ment users of the Swedish addiction treatment system. As expected, findings in Sweden are highly consistent with literature from other countries reviewed in our literature review section. Specifically, our study identified that treatment repeaters in the Swedish addiction treatment system were those who were older, men, those who reported more years of polydrug and/or alcohol use to intoxication, who reported more compulsory treatment episodes for narcotics and alcohol, who had ever been charged with crime, who had ever been in inpatient mental health treatment, and who reported more mental health symptoms compared to their counterparts. In the linear regression model, the strongest significant association identified was between prior history of number of compulsory treatment episodes for alcohol and/or drugs and number of voluntary treatment episodes.

One main difference between results from our study and study from other countries is that these findings suggest fewer disparities between population groups with respect to accessing treatment. Specifically, in the linear regression model, immigration status and education were not significantly associated with number of treatment episodes. However, gender and employment differences remained significant. We do not know why gender differences remained significant. One reason may be that

there are uniquely different reasons for the differing substance patterns between men and women we were unable to identify through the use of existing measurements. It may be that women do not seek voluntary treatment for their addiction to the same extent as men, as they to a greater extent have custody of their children and thus have a fear of losing them to fostercare. A further reason why women have fewer treatment admissions may be that once they offered care for their addiction, treatment given is provided during longer time periods or may be of higher quality. This we cannot answer, but it is of interest to further research.

The health care utilization conceptual model was found to be useful in this analysis and specifically in Sweden where it seems as though need and severity define who has more treatment episodes. For example, individuals who reported higher levels of alcohol and drug use and who had abused alcohol/drugs to such levels they had participated in compulsory treatment also entered treatment more times. Since individuals assessed for alcohol and drug addiction through the public welfare system in Sweden have access to voluntary addiction treatment regardless of financial resources, lack of capacity to pay for voluntary treatment is not a factor contributing to disparate rates in use of the Swedish addiction treatment system between different population groups. Instead, findings in the study seem to be consistent with a chronic care model (McLellan, McKay, Forman, Cacciola, & Kemp, 2005), i.e., individuals with higher levels of need including higher levels of substance use also use more treatment. Historically, addiction treatment has been delivered under an acute-care model that created a belief for social workers, therapists, clients, and their families that one-time treatment would help their situation and solve the problem (Scott, Foss, & Dennis, 2005). Relapse was considered as a failure instead of seen as a natural part of the recovery process, many deemed that treatment did not work, while social workers and therapists often blamed the clients (Scott et al., 2005). Many alcohol- and drug-dependent patients relapse following ending of treatment. For example, a US study identified that about 50% of clients began reusing drugs within 6 months after treatment (Grella et al., 2003), "regardless of the type of discharge, the patient characteristics or type of alcohol and/or drug use" (McLellan, McKay, Forman, Cacciola, & Kemp, 2005, p. 449).

While one can discuss the similarities between addiction and other chronic illness such as hypertension, diabetes, and asthma, there is no doubt that alcohol and drug abuse are treated and evaluated based on different premises and in a different way. Treatment for chronic disease as hypertension, diabetes, and asthma are not time-limited, there are no cures for these conditions and because of that there is a great acceptance for those diseases. Instead, there is a continuity of treatment adapted from disease severity and current symptoms, with appropriate intensity of care and monitoring based on needs and current research.

In terms of existing research that supports addiction as a chronic condition often involving a repeated cycling in and out of treatment, increased understanding and knowledge about alcohol and substance abuse and addiction treatment point to the need for a change in the Swedish treatment system, the methods that social workers and therapists are trained in and use, and the expectations of the clients and families have about their situation and what treatment may contribute. To move forward, the field needs to understand and accept addiction as a chronic disease with cyclical relapse, treatment reentry. and recovery.

In summary, available research on treatment repeaters indicate that the addiction treatment system needs to expect that individuals who are repeatedly using the addiction treatment system have significant treatment needs including a high level of mental health problem, higher levels of alcohol and drug use severity, more complicated both addiction treatment histories, and criminal justice histories and that their needs have to respond to a treatment system based on a continuum of care.

Limitations

First, this study only includes self-reported data on history of repeated treatment use; as a next step, studies need to be conducted on actual treatment utilization using national register data. Second, given that this is an exploratory cross-sectional study, it is only able to identify possible associations rather than causal connections between selected study factors. Third, this dataset, as well as all Swedish public government datasets, does not include measures of race/ethnicity. Another limitation of this study is that it does not include qualitative open-ended questions regarding the attitudes of clients on how they see their repeated treatment use and availability of care. This could be a focus on another study.

Declaration of Interest

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GLOSSARY

Addiction treatment: Any planned or intentional intervention in the health, behavior, personal, and/or family life of an individual suffering from a substance use disorder designed to enable the affected individual to achieve and maintain sobriety, physical and mental health, and a maximum functional ability.

Compulsory treatment: Substance use disorder treatment mandated by the courts after a determination that an individual's substance use causes them to be a danger to them- self and others.

Substance use disorder: The use of alcohol or narcotics in a way that risks damage to health.

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