

Integrating addiction and mental health treatment within a national addiction treatment system: Using multiple statistical methods to analyze client and interviewer assessment of co-occurring mental health problems

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ABSTRACT

AIMS – For a Swedish national sample of 12,833 individuals assessed for a substance use disorder (SUD) (2002–2008) in the Swedish welfare system, client self-report and clinical staff Addiction Severity Index (ASI) assessment data were used to assess mental health problem severity and needs. **METHODS** – Analysis of client self-report data using regression methods identified demographic characteristics associated with reporting significant mental health problems. Clinical staff assessment data from the ASI Interviewer Severity Rating (ISR) score were used to develop a K-means cluster analysis with three client cluster profiles: Narcotics (n=4795); Alcohol (n=4380); and Alcohol and Psychiatric Problems (n=3658). Chi-square and one-way ANOVA analyses identified self-reported mental health problems for these clusters. **RESULTS** – 44% of clients had a history of using outpatient mental health treatment, 45% reported current mental health symptoms, and 19% reported significant mental health problems. Women were 1.6 times more likely to report significant mental health problems than men. Staff assessed that 74.8% of clients had current mental health problems and that 13.9% had significant mental health problems. Client and staff results were congruent in identifying that clients in the Alcohol profile were less likely (5%) to report having significant mental health problems compared to the other two profiles (30% each). **CONCLUSIONS** – About 19% of clients with SUDs reported significant mental health problems, need integrated addiction and mental health treatment, and these clients are clustered in two population groups. An additional 25% of the addiction treatment population report current mental health symptoms and have at some point used mental health treatment. This national level assessment of the extent and severity of co-occurring disorders can inform decisions made regarding policy shifts towards an integrated system and the needs of clients with co-occurring disorders.

KEYWORDS – substance abuse and mental health, integration, substance abuse and mental health treatment, substance abuse and mental health systems, Sweden, addiction prevalence.

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Introduction

National prevalence measures on co-occurring addiction and mental health disorders

In the US, it is estimated that approximately 4% of all adults have co-occurring addiction and mental health disorders, with 8.9 million suffering from any mental illness and substance use dependence and 2.8 million suffering from serious mental illness and substance use dependence (SAMHSA, 2010). Also, of those with a substance use disorder (20.8 million), it is estimated that 42.8% had co-occurring mental illness, and of those with any mental illness, 19.7% have co-occurring substance use dependence (SAMHSA, 2010).

With respect to the Scandinavian countries, only a few studies have been conducted that explore the presence of co-occurring addiction and mental health disorders. A summary by Öjehagen (2011) concludes that the prevalence of co-occurrence in Sweden is very similar to those found in international studies. In 1995, among a sample of Icelandic clients in addiction treatment, 76% had a lifetime prevalence of mental disorders including antisocial personality disorder (Tómasson & Vaglum 1995). Clients in compulsory care for addiction in Sweden were found to have a lifetime prevalence of mental disorders ranging from 52% to 82% (Gerdner, 2004). From Norway, Landheim, Bakken and Vaglum (2002) report lifetime prevalence of agoraphobia to be 48%, social phobia to be 47%, and depression to be 44% according to a computerized structured interview (CIDI) used in a survey on clients from different parts of the addiction treatment system.

Why integrate addiction treatment and mental health systems; pros and cons

Pros

There are several reasons why an integrated model of combined addiction treatment with mental health treatment has emerged as an effective and useful method for approaching recovery from co-occurring disorders. For one, the integrated service model responds to the multiple needs of persons with substance abuse disorders in the likelihood that they will also suffer from mental health or serious mental health disorders and be exhibiting psychological distress at the time of entry (Clark, Power, Le Fauve & Lopez, 2008; Drake, Mueser & Brunette, 2007; SAMHSA, 2010). Secondly, persons receiving integrated services may also have a better chance of a speedier and more successful addiction recovery and retention in treatment than do individuals receiving non-integrated care (Grella & Stein, 2006; Drake, Mercer-McFadden, Mueser, McHugo, & Bond, 1998). Third, at the organizational level, integrated services allow mental health clinicians and addiction treatment specialists to collaborate and fully attend to client needs using a team approach to maximize opportunities for a positive and long-term recovery and for both disorders to be addressed simultaneously.

In many cases, integrated treatment means a client has a treatment team – that is, clinicians, doctors, and case managers that are not just aware of the client's multiple disorders but implement treatment based on the experience of co-occurring issues. In this way, integration of services requires programs and counselors to be prepared to screen, assess, diagnose, and treat a range of addiction and mental disorders

and to possess a nuanced understanding of co-occurring disorders. In contrast to receiving non-integrated services, clients can expect their treatment plan to incorporate objectives and respond to needs of not only the substance abuse and mental health disorders but the combined experience of co-occurring disorders.

Also, there are significant numbers of evidence-based practices that are tailored for integrated services, merging substance abuse, mental health, and trauma-informed treatment approaches to offer the client a unified approach to receiving services (CSAT, 2006; CSAT, 2007a).

Cons

Because there are multiple models of integrated services (Brouselle, Lamothe, Mercier, & Perreault, 2007; Rush, Fogg, Nadeau, & Furlong, 2008), a general shift to integrated services presents a debate about how to best offer clinical services: the merging of addiction expertise with mental health expertise to have a multi-disciplinary treatment team; or, forming new blended services whereby substance use and mental health disorders are treated as one (Brouselle, Lamothe, Sylvain, Foro, & Perreault, 2010; Mueser, Noordsy, Drake, & Fox, 2003). In this vein, it may be true that some integrated programs continue to offer both types of “siloeed” treatment services and in fact do not address the co-occurrence of both disorders at all. We know that co-occurring disorders may have a synergistic effect, that is, the sum of both a substance abuse and mental health disorder may be greater than the two parts, and the possibility of specialized, individual services under an “integrated” label may be less useful to clients and their families.

There is some evidence that the successful implementation of an integrated clinical model is dependent on the extent to which the system supports and replicates this shift (Drake et al., 1998; Minkoff, 2001), and so without administrative and systemic support, a shift to integrated services may prove futile. It also may be the case that because many organization and systems-level components must occur symbiotically for successful integrated services, some providers may face too many barriers for implementation as they must consider funding, conflicting treatment philosophies, administrative and accountability challenges, and the need for coordinated, multi-dimensional approaches to training and client care (Burnam & Watkins, 2006; Sacks et al., 2013). In Sweden, a barrier to integration may be the diffuse division of responsibilities for services provided. For example, the local authorities are largely responsible for compulsory care in addiction treatment and the county councils are responsible for detoxification and any measures of medical treatment.

Additionally, despite the existence of a number of compelling evidence-based practices, there is a lack of research evidence regarding the benefits of an integrated system over separate treatment systems, which also can be effective (CSAT, 2007b; Wahlbeck, 2010). Robust standards of care for combined services cannot replace the need for evaluative studies that identify whether an integrated treatment system is truly more effective than a separate system. Finally, while there are a several study reviews that support the effectiveness of integrated treatment interventions for recovery from co-occurring disorders (Drake, Mueser, Brunette, &

McHugo, 2004; Brunette, Mueser, & Drake, 2004), integration cannot necessarily be universally applied at a systems level without understanding of client needs including local, regional, and cultural needs of clients and their families. Furthermore, integrated treatment may not be appropriate in the cases of clients who are not dually diagnosed or who have either more severe mental health issues or more severe substance abuse needs, although very few studies address the possible ineffectiveness of integrated treatment on clients for whom a dual diagnosis is not relevant. A review by Jeffery, Ley, McLaren, and Siegfried (2007) determined that there may not be a benefit of any type of substance abuse program for those with serious mental illness, and others have suggested that patients with single or sub-diagnostic disorders are more likely to be excluded from treatment or to have unmet individual needs (Institute of Medicine, 2006; Sterling, Chi, & Hinman, 2011). A review by Donald, Dower, & Kavanagh (2005) emphasizes the complexity and variability of client problems and treatment programs that make analysis of integrated treatment so challenging.

Extent to which integration has occurred

Implementation of integrated services offering combined addiction and mental health treatment has already occurred at organizational, local, regional, and national levels. A shift to such a model can take place under a variety of different circumstances, and several examples can offer insight into the climate necessary for such a change to occur. Wahlbeck (2010) points out that several driving forces across countries for system change include the need to

develop cost effective treatment approaches; the need to respond to increasingly complex client needs and increase accessibility; the desire to empower service users; and the acknowledgement of a shift from downstream to upstream services, that is, with a focus on prevention, well-being, and earlier interventions (Kuussaari & Partanen, 2010; Wahlbeck, 2010; WHO, 2010).

In the past few decades, national steps have been taken to integrate addiction treatment and mental health services in the United States. The Substance Abuse and Mental Health Services Administration (SAMHSA) emphasizes the treatment of co-occurring disorders and supports infrastructure that promotes integrated services across the country and across multiple sectors, and has produced several reports on the subject (CSAT, 2007b; CSAT, 2007c).

Especially with the implementation of the Affordable Care Act (ACA), addiction and mental health treatment are scheduled to increasingly merge with primary health care services (U.S. House Report 109–143, 2006; Weisner, Hinman, Lu, Chi, & Mertens, 2010). Other policy changes in the U.S. have come in the form of the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008, which provides parity insurance coverage for substance abuse and mental health disorders equal to other chronic health conditions and has the potential to greatly widen accessibility and increase usage of mental health and substance use treatment services (Health Care Cost Institute, 2013), and could strengthen the need for integrated systems.

In terms of Nordic countries that have attempted to implement merged or inte-

grated systems, Finland and Norway stand out as countries that have adopted this model. In Norway, substance abuse reform came on the coattails of a larger reform that transferred all county level services to state-owned regional healthcare enterprises, and primarily involves the integration of substance abuse treatment services with the already established structure of the national health care system, with an emphasis on patient rights and the purchaser-provider system (Nesvaag & Lie, 2010). Nesvaag & Lie (2010) describe a strong central steering of this shift that, while well-orchestrated, present challenges to local service providers to maintain continuity of care and increase organizational capacity to serve increasing numbers and increasing demands of clients. The authors describe local responses to the broader health reform that include better collaboration between service providers and better accountability for continuation of care (Nesvaag & Lie, 2010). Notably, one caveat of these local responses is of the unique and complex problems of those clients with co-occurring disorders, whereby integrated treatment, in direct contrast to specialized treatment models, has become a new and increasingly present establishment in the Norwegian healthcare system, but is of little to no use if continuity of care or retention are compromised on a local level (Nesvaag & Lie, 2010).

In Finland, mainstreamed service provisions with decentralized steering have resulted in heterogeneous service systems with an emphasis on locally-based merging initiatives. Mental health and addiction treatment services are regulated by law, yet municipalities have the responsibility to organize services and to cater

programs to meet the needs of the local population (Kuussaari & Partanen, 2010). While the Finnish model lacks broader reform language that explicitly supports the merging of addiction and mental health services, there is some evidence that municipalities are doing just that to respond to the complex needs of their geographical region and to increase efficacy and streamlining of services (Kokko et al., 2009; Kuussaari & Partanen, 2010).

In Sweden, it is the health care system, most often the mental health care system, which provides the medical treatment of addiction problems, while the municipalities provide most psychosocial treatment and other services. Recently, an official report (SOU, 2011) suggested that the responsibility for all addiction treatment should be within the mental health care system. Based on the comments of the report, the government is proposing a new law requiring a formal agreement of co-operation between the municipalities and the local mental health care system (Council on Legislation, 2013) rather than giving all responsibility to the mental health care system alone.

Assessment of co-occurring substance use and mental health in light of integrated treatment

Increasingly, national, and community level policy efforts in different Nordic countries are developed with the aim to integrate their addiction treatment system into their mental health system. However, these types of policy shifts would benefit from national level assessments of the extent of co-occurring substance use and mental health problems in their addiction treatment population. One explanation for

why there have been few attempts to conduct prior national level assessments of need for integrating addiction and mental health in Nordic countries has been a lack of national level addiction treatment systems data and no standardization between states and counties (or private providers) with respect to assessment and/or follow-up tools, which result in little capacity to generalize about the client groups entering addiction treatment and their specific treatment needs.

However, Sweden is one of the few countries where the majority of individuals in need of addiction treatment are initially assessed by trained social workers, with more than half of all counties using the Addiction Severity Index as their primary assessment instrument. At the end of the 1990s the Addiction Severity Index (ASI) (McLellan et al., 1992) was introduced within the Social Services as the primary tool to assess people's needs associated with substance abuse or dependence. A national database of ASI data has been developed entitled ASI-08. The results presented in this study uses the ASI-08 national register data base from Sweden to examine for a population of individuals who were assessed for a substance use disorder between 2002 and 2008, the extent of co-occurring mental health problems as reported both by clients and by the staff who conducted the assessment interviews.

In the study presented here, the authors will first describe the extent to which clients describe having any mental health problems, significant mental health problems, and use of mental health services. Second, staff ratings of mental health severity will be presented. Third, we will present results from prior studies (Arme-

lius & Armelius, 2011; Lundgren et al., 2012), where the authors used ASI-client and staff assessment data from the ASI-08 national database and identified through k-means cluster analysis methods three homogenous and separate clusters of clients who had distinct needs and problem profiles. These three groups (clusters) were entitled: 1) Narcotics profile; 2) Alcohol profile; and, 3) Alcohol and Psychiatric Problems profile to summarize the extent to which for these three clusters mental health problems were reported by clients and by staff. This article utilizes previous findings associated with this cluster analysis to explore more deeply the mental health problems and needs

Methods

Use of Swedish national data from the addiction treatment system

The Swedish National Board of Health and Welfare is responsible for supervision on the fields of social services and health services at the national level. The local authorities and the county councils are self-governed with their own parliaments and raise taxes to finance the services. There is a field of tension between the government level, represented by the National Board of Health and Welfare, and the local and regional levels. The Swedish National Board of Health and Welfare has made significant inroads in promoting and stimulating the local authorities to implement empirically supported screening, assessment, and treatment programs in Sweden. This board has promoted the implementation of standardized assessment and screening instruments- the Addiction Severity Index (ASI) was implemented in the late 1990s, and more recent instruments include AU-

DIT (Alcohol Use Disorder Identification Test), DUDIT (Drug Use Disorder Identification Test), and SUDDS (Substance Use Disorders Diagnostic Schedule).

It is important to note that while the ASI has been widely implemented as a screening tool in Sweden since the late 1990's, there have been several fundamental challenges to eliciting widely consistent data. Sweden has seen challenges in the training of the instrument to providers in social services and health care settings, such as staff resistance, organizational capacity, and client acceptance (Wicks, 2004; Engström, 2005). In light of this and the fact that interviews are conducted by hundreds of different treatment providers, it is possible that the quality of the dataset is less consistent than is desirable. However, it should be noted that most interview studies use a number of different interviewers who often receive significantly less training than the social work staff have received in Sweden. ASI and register based studies are well-respected studies published in a range of national and international journals and government reports. Furthermore, using only client reporting data presents its own limitations to the quality of the data, such as confusion as to past treatment history or understanding of time periods in the ASI interview questions. In light of the widespread reliability and validation of the tool, especially in Sweden (Wicks, 2004; Engström, 2005; Nyström, Andréén, Zingmark, & Bergman, 2010), as well as the use of ASI data as a research tool in Sweden and other countries and the number of publications from the existing data base, the quality of the database used for this study can be determined to be of good quality.

Database/ Study Sample

In Sweden, most counties use the Addiction Severity Index (ASI) as the key instrument for baseline assessments of individuals presenting with addiction related problems. Approximately 70% (n=204) of all counties enter these assessment interviews into a national database created on the initiative of the National Board of Health and Welfare. This national ASI database includes client level data from 2002 and onwards. 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/counties in Sweden, representing close to a third of all counties 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 counties with larger populations and 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 12,833 individuals from the Armelius database were included in this effort.

Variables used in statistical analyses using client-self report data

Mental health

To measure self-report of current psychiatric symptoms the *Addiction Severity Index (ASI) mental health symptom composite*

score was developed (McGahan, Griffith, Parente, & McLellan, 1986; (McLellan et al., 1992)). The score combines eleven different measures including mental health symptoms during the past 30 days (depression, anxiety, trouble concentrating or remembering, hallucinations, difficulty controlling violent behavior, serious thoughts of suicide, attempted suicide, and having been prescribed medications for psychological or emotional problems), 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, with higher scores indicating higher psychological or emotional distress. The composite score, initially scaled as 0-1, was rescaled to 0 -10 to better reflect gradations among the scores.

It is important to address the content and potential problems associated with mental health questions in the ASI. In earlier manuals of ASI, some mental health questions refer to periods when the client may not be using alcohol, drugs, or was not suffering from withdrawal, therefore the reported mental health status may not be associated with the clients' substance abuse. This poses problems in differentiating between whether a client has experienced mental health symptoms as a direct result of or in conjunction with substance abuse and whether the symptoms exist independently of substance abuse. However, later versions of the ASI have compensated for this by offering more response categories that allow the client to clarify the cause of their symptoms as it relates to substance use or withdrawal (i.e., "No", "Yes", "Yes but only while under the influence of drugs or alcohol"). Mental health

questions utilized in this study allowed the client to make this differentiation, and results regarding mental health symptomatology reflect those client responses that report 'pure' mental health symptoms ("No" or "Yes"), that is, mental health issues that were not associated with being under the influence of drugs or alcohol.

Clients were also assessed on whether they had ever received inpatient treatment for psychiatric problems or had ever received outpatient treatment for psychiatric problems, using two dichotomous variables (yes/no): *ever having received inpatient treatment for psychiatric problems*, and *ever having received outpatient treatment for psychiatric problems*.

Significant mental health problems

This variable combines two measures of mental health: the ASI mental health symptoms composite score and whether or not the client had a history of receiving either inpatient or outpatient treatment for psychiatric problems. A client who in the study sample reported that they had an ASI mental health score at the 75th percentile or above (i.e., a score of 4.5 or greater) and a history of having ever received inpatient or outpatient treatment for psychiatric problems was coded as having significant mental health problems.

Demographic variables

Seven demographic variables were used: *Age* was measured as a continuous level measure. *Gender* had two categories, male and female. *Housing status* was measured by a nominal variable describing eight types of housing situations. *Education* was measured as number of years of education. *Employment status* was measured

by a question that asked whether the client currently had a job (yes or no). *Severity of drug and alcohol* were measured by two composite variables. *Severe drug use* measured whether the client had used any of the twelve listed illicit drugs for more than 24 days during the last 30 days. *Severe alcohol use* was measured as using alcohol for more than 24 days during the last 30 days. *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).

Variables used in statistical analyses using interviewer assessments on client mental health

Mental health severity

The mental health Interviewer Severity Rating (ISR) measures the interviewer's assessment of the client's need for mental health treatment. A high score on the ISR, on a scale of 0-9 (0 = no treatment neces-

sary, 9 = treatment needed to intervene in life-threatening emergency), indicates a greater need for treatment (McLellan et al., 1992). The interviewers used the client's history, current status, and his or her own subjective assessment of treatment needs to rate the client (McLellan et al., 1992).

Variables used in the cluster analysis

Variables used in the cluster analysis were based on interviewer ratings and have been used in prior analyses in previously published articles using the same database sample (Armeliu & Armeliu, 2011; Lundgren et al., 2012). Seven input variables were included in the k-means cluster analysis to form three clusters of clients. The seven input variables were interviewer (clinical social workers) assessment severity rating scores (McLellan et al., 1992) from the baseline interview in the following subject areas: alcohol use, drug use, psychiatric status, physical health status, strength of family and social connections, employment status, and level of criminal justice system involvement.

The reason we include the cluster analysis in this article, despite the analysis having already been published in the past (Armeliu & Armeliu, 2011), is that this study specifically focuses on comparing these clusters which were developed through interviewer/social work ratings to client self-report measures of mental health symptoms, mental health severity, and mental health treatment. Hence, by doing this we not only get a better understanding of whether clients with more mental health problems are clustered in specific groups, but we also provide data comparing client and interviewer ratings on client mental health.

Data analysis

Bivariate and multivariate statistical methods

Chi-square and one-way ANOVA methods were used to describe demographic characteristics of clients with significant mental health problems and those without significant mental health problems. Next, a logistic regression analysis was conducted using demographic variables significant at the bivariate level, with significant mental health problems (yes/no) as the dependent variable.

K-means cluster analysis

To identify whether Swedish clients assessed for substance use disorders can be separated into clusters based on problem severity expressed in the clinical staff assessments at baseline interviews a k-means cluster analysis was conducted. A cluster is a group of clients with a similar pattern or structure on a number of specified variables. Thus, the requirement is that the clients are homogeneous within the cluster but also clearly separated from clients in other clusters. The analysis determines where each individual fits best, grouping like clients together. For this analysis, three clusters was the most productive and theoretically sensible result. The clusters are composed of a pattern of variable values that defines a group of individuals, rather than a simple grouping based on the level of a single variable (see Figure 1 below). To understand the statistical relationship of client self-reported mental health characteristics to the three staff assessment clusters, bivariate analyses were conducted. Chi-square analyses were used to examine the relationships between the problem profile variable and each of the

other variables, with the exception of the ASI mental health composite score. To examine the relationship between the problem profile variable and the ASI mental health composite score a oneway ANOVA was performed, using post-hoc analyses to understand the relationships among the profiles and the ASI mental health composite score.

Results

Univariate statistics

As Table 1 describes, of the individuals assessed for substance use disorder in 2002-2008, 31.6% reported that they had experienced depression, 44.4% anxiety, 45.1% had experienced trouble concentrating and remembering, 5.2% had experienced hallucinations, 10.4% had experienced difficulty controlling violent behavior, 13.3% had seriously considered suicide, 2.1% had attempted suicide, and 7.7% had been prescribed medications for psychological or emotional problems. Also, 44.2% reported they had ever been in outpatient mental health treatment, 23.5% had ever been in inpatient mental health treatment and 18.6% reported significant mental health symptoms (measured as having a score in the 75th percentile of the ASI mental health score plus having had any mental health treatment.)

Bivariate statistical analysis: demographic characteristics and significant mental health problems

Bivariate analyses using Chi-square and one-way ANOVA examined associations between client demographic characteristics and significant mental health problems. As Table 2 shows, clients who were younger, female, living in a hotel (com-

Table 1: Univariate statistics: Self-reported mental health symptoms and mental health treatment use (N = 12833)

Independent variables	N	% or Mean (SD)
<i>Mental health in the past 30 days</i>	12833	
ASI mental health composite score	12635	2.7 (2.3)
Depressed	12833	
Yes	4055	31.6
No	8778	68.4
Anxious	12833	
Yes	5695	44.4
No	7138	55.6
Difficulty concentrating	12833	
Yes	5785	45.1
No	7048	54.9
Had hallucinations	12833	
Yes	664	5.2
No	12169	94.8
Difficulty controlling violent behavior	12833	
Yes	1335	10.4
No	11498	89.6
Thought seriously about suicide	12833	
Yes	1711	13.3
No	11122	86.7
Attempted suicide	12833	
Yes	272	2.1
No	12561	97.9
Prescribed medications for psychological or emotional problems	12833	
Yes	988	7.7
No	11845	92.3
<i>Mental health treatment (ever)</i>		
Ever been in inpatient treatment for psychiatric problems		
Yes	3021	23.5
No	9812	76.5
Ever been in outpatient treatment for psychiatric problems		
Yes	5670	44.2
No	7163	55.8
Significant mental health problems	12635	
Yes	2352	18.6
No	10283	81.4

pared to other housing categories), who had slightly more years of education and were employed were significantly more likely to have significant mental health problems compared to older clients, men, those who had fewer years of education and were unemployed. (It should be noted that differences in number of years of education, while significant, were very slight. With a large sample size, as in this dataset, highly significant statistical results may describe very small differences which may be of little importance.) In addition, clients with severe drug use and clients with severe alcohol use were more likely to have significant mental health problems compared to those without severe drug or alcohol use problems. Clients born in Sweden but who had at least one parent born outside of Sweden, Norway, Denmark, or Finland had the highest percentage of significant mental health problems compared to clients with other immigration statuses (22.6%), while 21.0% of clients born outside of Sweden, Norway, Denmark, or Finland had significant mental health problems ($p<.000$).

Multivariate statistical analysis: demographic characteristics and significant mental health problems

A logistic regression model (Table 3) indicated that when age, gender, housing status, education, employment, severity of drug use, severity of alcohol use, and immigrant status were entered in to the model, each of these variables had at least one category significantly associated with having reported significant mental health problems in the past 30 days. Women were 1.6 times more likely than men to report significant mental health problems

in the past 30 days, and those with a job were 55% more likely to report significant mental health problems. Severe drug users were nearly two times more likely to report significant mental health problems and severe alcohol users were about 35% more likely to report significant mental health problems than those with less severe alcohol use problems. Younger clients were less likely to have significant mental health problems, and clients living with family or friends, or in institutions were less likely to have significant mental health problems than clients living in their own or rented homes. Differences were small though significant for number of years of education: given the sample size and the mean differences seen at the bivariate level, these differences are not likely to be of import. Immigrant status was not significant at the multivariate level.

Interviewer Severity Rating

With respect to staff assessment of the mental health status of their clients, using the Interviewer Severity Rating (ISR), these scores identified that on a scale of 0 to 9, with 9 being the most severe needs, the average mental health score for clients was 3.5 (SD 2.6). With respect to interpreting this score, Cacciola, Pecoraro and Alterman (2008) used ROC analyses to determine ISR cutoff scores for “the presence or absence of a current non-SUD Axis I psychiatric disorder” (p. 83). The cut-off they provide is ≥ 3 . In the current study, 62.5% of clients are at or above this score, while 54.1% of clients are above an ISR score of 4. Also, it should be noted that 70.6% of females were above the ISR cutoff, compared to 58.9% of males ($p<.000$).

Table 2: Descriptive statistics for clients with and without significant mental health problems¹

Independent variables	Significant mental health problems % or Mean (SD) N = 2352	No significant mental health problems % or Mean (SD) N = 10,283
<i>Demographics</i>		
Age***	37.0 (11.6)	40.5 (13.0)
Gender***		
Male	16.2	83.8
Female	23.9	76.1
Housing**		
Own or rent	18.3	81.7
Sublet	20.5	79.5
Live with family or friends in group situation or share apartment	19.1	80.9
Training apartment	18.6	81.4
Institution (kategorihus eller familjevård)	11.7	88.3
Hotel	26.6	73.4
Homeless	17.3	82.7
Other	19.6	80.4
Number of years of education***	11.1 (2.8)	10.9 (2.8)
Has a job***		
Yes	23.1	76.9
No	17.8	82.2
Severe drug use***		
Yes	28.6	71.4
No	16.6	83.4
Severe alcohol use***		
Yes	24.6	75.4
No	17.8	82.2
Immigration status (one five category variable)***		
Individual and their parents born in Sweden	17.9	82.1
Individual born outside Sweden but inside Norway, Denmark, or Finland	15.4	84.6
Individual born outside of Sweden, Norway, Denmark and Finland	21.0	79.0
Individual born in Sweden and at least one parent born in Norway, Denmark or Finland	20.2	79.8
Individual born in Sweden and at least one parent born outside Sweden, Norway, Denmark and Finland	22.6	77.4
*p<.05, **p<.01, ***p<.000		

¹Chi-square tests were used to examine the associations between nominal or ordinal level independent variables and the nominal dependent variable, significant mental health problems.

The oneway ANOVA test was used to examine the associations between interval/ratio level measures (e.g., number of years of education, age, ASI composite mental health score) and the nominal dependent variable, significant mental health problems.

Table 3: Logistic Regression model: Characteristics of clients with significant mental health problems (n = 12,401)

	Significant mental health problems	
	Odds Ratio	(95%CI: lower, upper)
Age***	.98	(.97, .98)
Gender***		
Male1		
Female	1.60	(1.45, 1.77)
Housing status		
Own or rental		
Sublet	1.04	(.86, 1.25)
Live with family or friends in group situation or share apartment*	.86	(.75, .99)
Training apartment	1.01	(.73, 1.40)
Institution (kategorihus eller familjevård)*	.66	(.49, .91)
Hotel	1.57	(.89, 2.79)
Homeless	.90	(.75, 1.08)
Other	1.07	(.81, 1.40)
Number of years of education**	1.02	(1.01, 1.04)
Has a job***		
Yes	1.55	(1.37, 1.75)
No		
Severe drug use***		
Yes	1.99	(1.78, 2.22)
No		
Severe alcohol use***		
Yes	1.35	(1.27, 1.44)
No		
Immigrant status (one five category variable)		
Individual and their parents born in Swedena		
Individual born in either Norway, Denmark, or Finland	.97	(.78, 1.20)
Individual born outside of Sweden, Norway, Denmark and Finland	1.16	(.99, 1.35)
Individual born in Sweden and at least one parent born in Norway, Denmark or Finland	1.03	(.87, 1.23)
Individual born in Sweden and at least one parent born outside Sweden, Norway, Denmark and Finland***	1.11	(.93, 1.32)
Model Chi Square X2 = 528.44 df =17, p <.000		
Nagelkerke R Square = .07		
a Reference group		
*p<.05 **p<.01 ***p<.001		

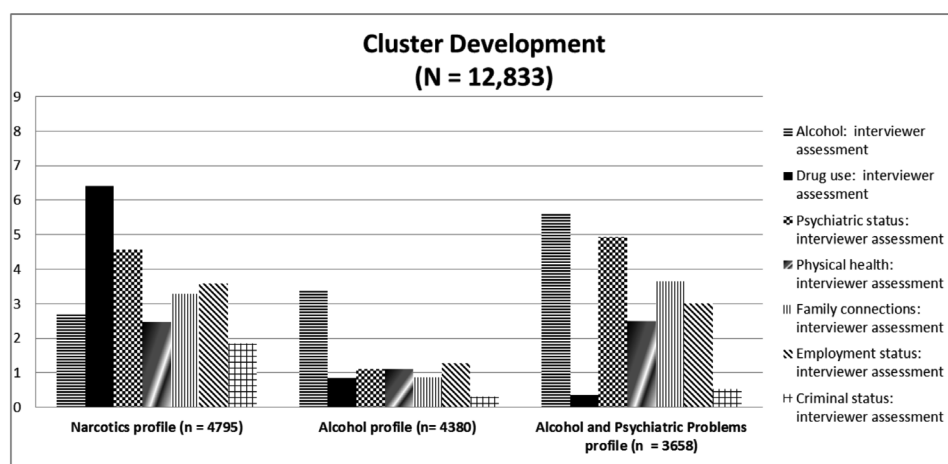


Figure 1. Interviewer Severity Rating scores in the development of the cluster variable

Cluster analysis-staff assessment data

In Figure 1, we summarize results from a cluster analyses originally presented in Armelius and Armelius (2011) and Lundgren et al., (2012) with a focus on mental health. These cluster results suggest that staff, on average, score clients in the Narcotics profile on a scale of psychiatric severity at the level of 4.6 (SD 2.3) on a 9 point scale. The figure also identifies that interviewers score those in the Alcohol and Psychiatric Problems profile 4.9 (SD 1.9) on a 9 point scale. On the other hand, clients in the Alcohol profile are assessed to have significantly lower rates of mental health problems with a score of 1.1 (SD 1.6). Further, as discussed in prior studies, clients in the Narcotics profile and in the Alcohol and Psychiatric Problems profile also were reported to have significantly higher and more complex needs for other services (Armelius & Armelius 2011; Lundgren et al. 2012).

To explore if these interviewer assessments were consistent with client percep-

tion of their mental health needs, bivariate statistical analyses were conducted comparing client level data for each cluster.

Bivariate results: client self-report data by cluster

As shown in Table 4, clients in the Alcohol and Psychiatric Problem profile and those in the Narcotics profile had similar ASI mental health symptoms score (3.5) while clients in the Alcohol profile had the lowest ASI mental health score (1.2) among clients. Notably, the differences between these profile groups were greater when it came to their reports of significant mental health problems. When reporting significant mental health problems, (defined as being in the 75th percentile of the ASI mental health score and having had treatment for psychological problems), 26.0% of clients in the Narcotic profile reported significant mental health problems, 25.8% of clients in the Alcohol and Psychiatric Problems profile reported having significant mental health problems,

while only 4.4% of clients in the Alcohol profile reported significant mental health problems.

For all three groups the level of history of psychiatric medications used was relatively low (13.7% for the Narcotics profile group, 15.4% for the Alcohol and Psychiatric Problems profile and 10.3% for those in the Alcohol profile). Also, 54.8% of clients in the Alcohol and Psychiatric Problems profile reported any history of outpatient treatment for psychiatric problems, compared to 46.2% of clients in the Narcotics profile and 33.0% of clients in the Alcohol profile. Twenty-eight percent of clients in both the Alcohol and Psychiatric Problems (28.3%) profile and the Narcotics (28.1%) profile cluster reported a history of inpatient treatment for psychiatric problems, compared to 14.5% of clients in the Alcohol profile.

Conclusion and discussion

First, clients and interviewer assessment data indicate that between half to three-quarters of all clients reported some mental health symptoms when they were assessed for substance abuse. Also, 18.6% of clients were reported to have significant mental health problems at assessment.

Client and interviewer assessment data also suggest that clients in Sweden who are assessed for a substance use disorder are not proportionately distributed in this population. Instead, as Figure 1 indicates, they may be clustered into one of two groups which have multiple and complex problems and needs (Narcotics and Alcohol and Psychiatric Problems profiles). On the other hand, for those individuals clustered in the Alcohol profile (about one-third of all individuals assessed for a

substance abuse disorder), not quite 5% report significant levels of mental health problems, as well as other needs and social problems.

Clients in the severe Alcohol and Psychiatric Problems profile were the most likely to have received medications for psychological or emotional problems compared to clients in the other two clusters. Further, in some respects these clients were more similar to the Narcotics profile and less similar to the Alcohol profile. For example, clients in the severe Alcohol and Psychiatric Problems profile were more likely to have reported mental health problems or mental health treatment (e.g., severe problems, higher ASI score, inpatient or outpatient mental health treatment, and/or medications for psychological problems) in contrast to the clients in the Alcohol profile.

Implications for integrating mental health and addiction

As described above, the approximately nineteen percent (18.6%) percent of clients in Swedish addiction treatment with significant mental health problems clearly would benefit from both addiction treatment and mental health treatment and would benefit from an integrated instead of a sequential or parallel treatment approach. In this vein, a policy shift that supports the integration of addiction and mental health treatment in Sweden would benefit from a national level assessment of the extent of co-occurring substance use and mental health problems, as this study outlines. Additionally, this study helps to elucidate the importance of standardization between states and counties (or private providers) in regards to assessment

and/or follow-up tools. Additionally, the data also suggest that for about one-third of clients in the population, those in the Alcohol profile, both clients and interviewers reported low levels of mental health needs as well as other problems and needs. Hence, this is a group where complex integrated services probably are less needed and traditional addiction treatment approaches are likely to be useful.

In summary, these analyses suggest that in Sweden there are different clusters of clients with different mental health and other service needs. Most likely about one-third of clients have few mental health treatment needs and almost nineteen percent (18.6%) have significant mental health treatment needs. An optimal integrated service system should however put emphasis on the early assessment of clients' needs, whereby the correct mix of services can be delivered from an individual client perspective.

Research implications

One of the findings is that client self-report of severity of mental health were generally found to be fairly consistent with interviewer scorings of this problem area. The psychometric properties of the ASI have been tested extensively (for reviews of the ASI, see for example, Samet, Waxman, Hatzenbuehler, & Hasin, 2007; Pankow et al., 2012) with a large number of studies having demonstrated good to excellent reliability and validity for the instrument, and other studies finding that the reliability of composite scores ranges from high to low. One concern has been with under-reporting of mental health problems, and a number of studies suggest high likelihood of this (see for example, Dahlberg, Waern,

and Runeson, 2008 for a Swedish study on this topic).

Interestingly, the only, and minor, inconsistency we found between interviewer scoring and client self-report was in the area of mental health. When the researchers in this study developed a composite score of severe mental health (scoring in the 75th percentile of the ASI mental health composite score and having had a history of any mental health treatment), the client cluster that had the highest percentage of clients reporting significant mental health problems was in the Narcotics profile, not in the Alcohol with Psychiatric Problems profile which the initial clustering based on interviewer assessments may suggest. However, it should be noted it was only a .2% differences in percentage of clients likely to report severe mental health problems between these two clusters. More importantly, these data suggest that close to a third of clients in both the Narcotics profile and in the Alcohol with Psychiatric Problems profile (26.0% and 25.8%, respectively), reported significant mental health problems. More research is needed with more sophisticated assessment measures to examine the mental health and trauma experiences of these two clusters of clients.

Limitations

Given that the sample in this study were assessed for a substance use disorder through the Swedish national public welfare system, the individuals studied are more likely to have lower incomes and be more marginalized than the general population. Even though those conducting the assessment interviewers were trained in using the ASI, they were clinical social workers and not trained research inter-

viewers. While, there are more sophisticated substance use assessment measures than the Addiction Severity Index, the benefit of the ASI is that this measure has been used in Sweden since the 1990s and that it has been used with a range of populations and in a range of societies.

Declaration of interest None.

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