

# Predisposing, enabling and need factors of heroin addicts' using prescribed methadone or buprenorphine for a year or longer: An exploratory study of drug treatment for heroin addicts in the Swedish welfare system

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## ABSTRACT

**AIM** – This exploratory study draws on national register data for 2,638 opioid users from 2004–2008 to examine whether or not certain predisposing, enabling and need factors are associated with taking methadone or buprenorphine continuously on doctor's orders for one year or more. **DESIGN** – Chi-square analysis, one-way Anova and logistic regression methods were used to explore the association between self-reported demographic characteristics, alcohol/drug use severity, substance use disorder treatment history, criminal justice history, level of mental health symptomatology, mental health treatment history, and whether or not adult opioid users had taken methadone or buprenorphine continuously on doctor's orders for one year or longer. **RESULTS** – Having a job and having had more voluntary treatment episodes were significantly associated with using methadone or buprenorphine. Those opioid users who had a job were 19 times more likely to be on methadone or buprenorphine than opiate users who did not have a job. **CONCLUSIONS** – In our study, individuals who were working were significantly more likely to medicate against their opioid abuse. This suggests that they may be more socially integrated than their non-medicating counterparts.

**KEYWORDS** – opioid, heroin, methadone, buprenorphine, work

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## Introduction

Abuse of heroin is often associated with suffering for the individual, family and society (Johnsson, 2010). For example, the relationship between heroin use and increased mortality is established in research: compared to the rest of the population, an active heroin addict is about 20–60

times more likely to die a premature death (Heilig, 2004). Also, heroin use is linked with criminal activity, illness, etc. (Lundgren, Sullivan, Maina, & Schilling, 2007; Sand & Romelsjö, 2005).

Sweden has since the mid-1960s within the voluntary treatment system used meth-

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adone in the treatment of heroin addiction as a complement to traditional psychosocial treatment (Grönbladh, Öhlund, & Gunne, 1990; Törnqvist, 2009; Jonsson, 2005). Maintenance treatment with methadone or buprenorphine is now considered an established part of the substance abuse treatment system in the Nordic countries (Skretting & Rosenqvist, 2010; Törnqvist, 2009) in the treatment of opioid dependence and is generally prescribed along with psychosocial counselling (SOFS, 2009:27).

In comparison to other countries, however, Swedish methadone maintenance treatment has been severely limited and has accounted for only a small part of the overall substance abuse care. Although methadone maintenance treatment has been used in Sweden since the mid-1960s (Grönbladh et al., 1990; Steentoft et al., 2006; Socialstyrelsen, 2007; Törnqvist, 2009), we know very little about how individual factors affect the maintenance treatment use of methadone or buprenorphine, as most of the research has exclusively focused on studying efficiency or the effect of treatment based on retention. (Fugelstad, Stebacka, Leifman, Nylander, & Thiblin, 2006; Kakko, Svanborg, Kreek, & Heilig, 2003; Davstad, Stenbacka, Leifman, Beck, Korkmaz, & Romelsjö, 2007; Romelsjö et al., 2010; Kakko, Grönbladh, Svanborg, Wachenfeldt, Rück, Rawlings, Nilsson, & Heilig, 2007).

National and international research shows that there are between 7,000 to 10,000 opioid-dependent individuals in Sweden (Socialstyrelsen, 2012) and that the average age when regular use of illicit opioids begins is in the early twenties (Sand & Romelsjö, 2005; Chatham, Hiller,

Rowan-Szal, Joe, & Simpson, 1999; Giacomuzzi et al., 2005), usually through a close male person (Giacomuzzi et al., 2005; Svensson, 2005; Chantham et al., 1999; Hser, Anglin, & McGlothlin, 1987; Hser, Huang, Teruya, & Douglas Anglin, 2003). Psychiatric morbidity (Sand & Romelsjö 2005; Palmstierna, 2004; Giacomuzzi et al., 2005; Karow et al., 2011) and criminal activity (Hser et al., 2003; Lundgren, Sullivan, Maina, & Schilling, 2007) are much more common among illicit opioid users than in the general population. The number of people working while on heroin varies between countries (Karow et al., 2011; Chantham et al., 1999; Powis, 1996; Horton, 1993), but is estimated to be approximately 10% in Sweden (Sand & Romelsjö, 2005; Nilsson, Johansson, & Olsson, 2001).

The recently published government report *Missbruksutredningen* (Misuse inquiry) stresses the importance of medical treatment for addiction. It suggests, for instance, an expansion of the group of clients to whom maintenance treatment with methadone or buprenorphine is available (SOU 2011:35). Despite the expansion of treatment with methadone or buprenorphine in the first years of the twenty-first century, maintenance treatment with methadone or buprenorphine and its utility are still controversial and are seen as a threat to Swedish drug policy, affected by political and ideological overtones, including those from NGOs such as KRIS (Criminals Return into Society) and SNPF (Swedish Narcotics Officers Association), which is also consistent with other countries (Fischer, 2000; Nilsson, 2011; Törnqvist, 2009; Johnsson, 2003; Heilig, 2003).

Many studies recommend (Sand & Romelsjö, 2005; Engdahl, Romelsjö, &

Sand, 2006; Socialstyrelsen, 2007; Grönbladh, 2004; Socialstyrelsen, 2006) that treatment with methadone or buprenorphine should primarily be offered to those with long-term histories of heroin dependence. This implies that we would be likely to identify that heroin users in maintenance treatment with methadone or buprenorphine would be older<sup>1</sup> with more severe drug use histories. However, no register-data base study has yet been conducted which would indicate whether age or other demographic characteristics are associated with use of methadone or buprenorphine maintenance treatment among opioid users. Our article responds to this gap in knowledge. The article uses as a theoretical framework the health services utilisation theory which posits that age and other demographics are predisposing characteristics influencing service utilisation. This theoretical framework is described below.

### Conceptual framework guiding the study

The theoretical framework used in this study is the Andersen conceptual model of health care utilisation (Andersen, 1995), originally intended to identify factors that are important to understand how health care is utilised. However, this conceptual model has also been used in a number of studies examining addiction treatment utilisation (Lundgren, Amodeo, Ferguson, & Davis, 2001; Saum, Hiller, Leigey, Inciardi, & Surratt, 2007).

We have applied the Andersen model to further understand factors associated with using methadone or buprenorphine in treatment for heroin addiction. The model argues that decisions regarding health care

use can be categorised based on *predisposing*, *enabling* and *need* factors. *Predisposing* factors include demographics or other individual characteristics (such as beliefs). *Enabling* factors are personal or (social) resources, such as insurance, network or transportation, and factors that act to permit or impede the propensity to use the health care system. The *need* category includes such characteristics as diagnoses or symptoms of a disease that affect an individual's perception on need of care.

In our study, *number of years of education*, *age* and *gender* are defined as *predisposing* variables (Burns et al., 2009). *Having a job* is defined as an *enabling* variable (Lundgren et al., 2007; Noysk et al., 2011). With regard to *need* factors, research has shown that the level of *mental health status*, *addiction treatment*, *severity of drug use* and *criminal justice status* are often associated with need for treatment. That is, a high level of illicit behaviour correlates with a low level of treatment/recovery and vice versa (Hser, 2003; Puigdollers et al., 2004; Chantham et al., 1999; Lundgren et al., 2007). Hence, in our study, *need* factors include a person's *mental health status* (ever been in outpatient treatment for psychiatric problems, ever been in inpatient treatment for psychiatric problems), *addiction treatment* (number of drug treatment episodes, ever been in compulsory treatment), *severity of drug use* (treatment for drug problems, number of years of heroin and/or other opiate use for three days or more per week) and *criminal justice status* (ever been charged with a crime).

### Research question

This exploratory study aims to examine, through the use of national Swedish Social

Services register assessment data for 2,638 opioid users from 2002–2008 whether the following *predisposing*, *enabling* and *need* factors are associated with the *dependent variable* of taking methadone or buprenorphine continuously on doctor's orders for one year or more. This study does not focus on outcomes regarding maintenance treatment with methadone or buprenorphine and there are to our knowledge no large register-data base studies conducted in Sweden showing whether maintenance treatment in Sweden reaches intended goal according to the framework guiding the treatment.

- Predisposing factors: age, gender and number of years of education
- Enabling factors: having a job
- Need factors: treatment history (number of drug treatment episodes, ever been in compulsory treatment for alcohol or drug problems, ever been in outpatient treatment for psychiatric problems, ever been in inpatient treatment for psychiatric problems); drug use severity (number of years of heroin and/or other opiate use for three days or more per week, ever been charged with a crime).

## Methods

### *Database/Study sample*

Around half (n=169) of all Swedish municipalities use the Addiction Severity Index (ASI) (McLellan et al., 1992) as the key instrument for their baseline assessment of individuals presenting with addiction-related problems. Most municipalities use the Addiction Severity Index (ASI) as the key instrument for baseline assessments of individuals presenting with addiction-related problems. Around 70% (n=204) of

all municipalities 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, extracted from the larger ASI database and excluding duplication of cases, was created by Armelius, Nyström, Engström & Brännström (2009). A comparison of the results from the Armelius database with the Swedish Census data indicates that the data of Armelius and colleagues (2009) is highly representative of the Swedish population data. However, there is an over-representation from municipalities with larger populations (Armelius et al., 2011). The data for our study was received from the different local Swedish governments which adhered to all Swedish and EU regulations on ethics and confidentiality of Human Subjects. The study was approved and monitored by the Boston University institutional review board (IRB) and the Regional Ethical Review Board of Umeå (REPN Dnr-2013-31Ö).

The 2,638 individuals in the study sample are clients who at baseline reported heroin use three or more days per week for at least one year and/or other opiate use three or more days per week for at least one year, and who had never been in treatment for alcohol use. In the logistic regression model presented below, less than one percent of cases were dropped for missing data in the analysis. Complete cases data are presented in all tables.

### *Variables*

#### Independent variables

*Demographics: age and level of educa-*

tion are continuous level variables. *Gender* is a dichotomous variable, male and female. These variables are characterised as *predisposing* factors. *Employment*, which measures whether the client had a job at the time of the interview (yes or no), is characterised as an *enabling* factor. The following variables are regarded as *need* factors. *Addiction treatment* is measured in two ways: 1) number of times a client has been in addiction treatment; and, 2) whether the client has ever been in compulsory addiction treatment. *Mental health treatment history*. Two variables measure mental health treatment: history of outpatient treatment for psychiatric problems, and history of inpatient treatment for psychiatric problems. *Severity of drug use*. A continuous-level variable measures the total number of years of heroin and/or other opioid use for three days or more per week. *Criminal justice involvement* is a dichotomous (yes or no) composite variable combining answers from three variables (number of drug crimes, number of property crimes and number of violent crimes the client been charged with).

#### Dependent variable

A dichotomous variable measures whether the client has taken methadone or buprenorphine continuously on doctor's orders one year or more (yes or no).

#### *Data analysis*

Bivariate analyses, including chi-square analyses and one-way Anova tests, were used to determine significant relationships between the independent variables and the dependent variable<sup>2</sup>. A binomial logistic regression model where all variables were entered as a single block measured

the statistical association between the independent variables and the one dichotomous dependent variable of having taken methadone or buprenorphine continuously on doctor's orders for one year or longer.

## **Results**

### *Sample description*

Of the 2,638 clients in our study, 1,875 were male (71.2%) and 759 were female (28.8%), with an average age of 34 years. Ten percent of the sample reported having a job and 78.6% reported having been charged with a crime. Outpatient psychiatric treatment services had been used by 44.0% of the clients while one quarter (24.6%) had used inpatient psychiatric treatment. About a third of the sample (38.2%) reported having a history of compulsory treatment for substance use problems, and 191 clients (7.2%) said that they had taken methadone or buprenorphine continuously on doctor's orders for one year or more (see Table 1, p. 180).

### *Bivariate results*

Of predisposing factors, clients who were older, male and those who had more years of education were more likely to have taken methadone or buprenorphine continuously on doctor's orders for one year or more. Of enabling factors, clients who had a job were more likely to report taking methadone or buprenorphine continuously on doctor's orders one year or more compared to those not working. Of need factors, clients with more drug treatment episodes were more likely to report taking methadone or buprenorphine continuously on doctor's orders one year or more compared to clients with fewer drug treatment episodes. Clients in compulsory

**Table 1.** Sample description (univariate) statistics: Factors associated with taking methadone or buprenorphine continuously on doctor's orders one year or more for opioid abuse (N=2638).

Variables	N	% or Mean (SD)
<i>Predisposing</i>		
Age	2634	34.3 (10.3)
Gender	2634	
Male	1875	71.2
Female	759	28.8
Number of years of education	2628	10.5 (2.6)
<i>Enabling</i>		
Has a job	2638	
Yes	262	9.9
No	2376	90.1
<i>Need</i>		
Number of drug treatment episodes	2638	3.3 (6.9)
Ever been in compulsory treatment for drug problems	2638	
Yes	1008	38.2
No	1630	61.8
Ever been in outpatient treatment for psychiatric problems	2638	
Yes	1160	44.0
No	1478	56.0
Ever been in inpatient treatment for psychiatric problems	2638	
Yes	1988	24.6
No	650	75.4
Number of years of heroin and/or other opioid use for three days or more per week	2638	8.5 (8.4)
Ever charged with a crime	2638	
Yes	2074	78.6
No	564	21.4
Been taking methadone or buprenorphine continuously on doctor's orders one year or more	2638	
Yes	191	7.2
No	2447	92.8

**Table 2.** Descriptive statistics: Factors associated with taking methadone or buprenorphine continuously on doctor's orders one year or more for opioid abuse (N=2638).

Variables	Taken methadone or buprenorphine continuously on doctor's orders one year or more for opioid abuse % or Mean (SD)	Has not taken methadone or buprenorphine continuously on doctor's orders one year or more for opioid abuse % or Mean (SD)
<i>Predisposing</i>		
Age *	36.0 (9.67)	34.1 (10.3)
Gender*		
Male	7.9%	92.1%
Female	5.7%	94.3%
Number of years of education **	11.1 (2.3)	10.5 (2.6)
<i>Enabling</i>		
Has a job***		
Yes	38.9%	61.1%
No	3.7%	96.3%
<i>Need</i>		
Number of drug treatment episodes ***	5.4 (7.2)	3.1 (6.9)
Ever been in compulsory treatment for alcohol or drug problems **		
Yes	5.5%	94.5%
No	8.3%	91.7%
Ever been in outpatient treatment for psychiatric problems		
Yes	6.6%	93.4%
No	7.7%	92.3%
Ever been in inpatient treatment for psychiatric problems		
Yes	7.2%	92.8%
No	7.2%	92.8%
Number of years of heroin and/or other opioids use for three days or more per week**	10.3 (8.9)	8.3 (8.3)
Ever charged with a crime**		
Yes	8.0%	92.0%
No	4.6%	95.4%

\*p<.05 \*\*p<.01 \*\*\*p<.001

treatment were *less* likely to have taken methadone or buprenorphine continuously on doctor's orders for one year or more compared to those who had never been in compulsory addiction treatment<sup>3</sup>. Number of years of heroin and/or other opioid use for three days or more per week was significantly and positively associated with taking methadone or buprenorphine continuously on doctor's orders one year or more, as was having ever been charged with a crime (see Table 2, p. 181).

In order to assess the relationship between the independent variables and the dependent variable, we developed a logistic regression model where the independent variables significant at the bivariate level were entered as a single block.

#### *Logistic regression model*

Four of the independent variables remained significant in the logistic regression model. Specifically, clients who had a job, those who had more drug treatment episodes, those who had more years of heroin and other opioid use for three days or more a week and those who had been charged with a crime were significantly more likely to have taken medications continuously for substance abuse on doctor's orders for one year or more. The variable which had the strongest association with the likelihood of having taken methadone or buprenorphine for substance abuse was having a job (see Table 3).

## **Discussion**

This study responds to the lack of research in Sweden on patterns of use of methadone or buprenorphine treatment among heroin addicts. The purpose of this exploratory study was to identify predisposing, ena-

bling and need factors associated with taking methadone or buprenorphine continuously on doctor's orders for at least one year in a sample of 2,638 heroin addicts.

Of enabling factors, having a job was significantly and positively associated with being prescribed methadone or buprenorphine for one year or more. This is interesting, especially since there is currently a concern that clients on maintenance treatment with methadone or buprenorphine are less socially integrated (Petersson, 2013). The fact that having a job had such a strong association with the use of medication as a treatment for opiate abuse in our study suggests the opposite: those who were currently on treatment with methadone or buprenorphine may be more socially integrated in that they work. Notably, those opioid users who had a job were 19 times more likely to be on prescribed methadone or buprenorphine for opioid dependence for one year or more than opioid users who did not have a job. This suggests a strong association between employment and use of prescribed methadone or buprenorphine.

Also, it is interesting to note that need factors – number of years of heroin and/or other opiate use for three days or more per week and having had more voluntary behavioural treatment episodes and been charged with a crime – was positively associated with being on prescribed methadone or buprenorphine for opioid dependence for one year or more. These findings imply that those on methadone or buprenorphine has had a history of more severe opioid abuse and more experience of behavioural treatment than the other clients, and are in line with the framework guiding the admission to the treatment.

**Table 3.** Logistic regression: Factors associated with taking methadone or buprenorphine continuously on doctor's orders one year or more for opioid abuse (N=2638).

Variables	Odds Ratio	CI (lower; upper)
<i>Predisposing</i>		
Age	0.99	(.97, 1.01)
Gender	0.83	(.55, 1.25)
Number of years of education	1.02	(.96, 1.08)
<i>Enabling</i>		
Has a job***	19.53	(13.43, 28.41)
<i>Need</i>		
Number of drug treatment episodes**	1.03	(1.01, 1.05)
Ever been in compulsory treatment for alcohol or drug problems	0.81	(.55, 1.20)
Number of years of heroin and/or other opioid use for three days or more per week**	1.03	(1.01, 1.05)
Ever charged with a crime***	2.67	(1.60, 4.47)
Model Chi Square X2 306.069, df = 8, p<.000		
Nagelkerke R Square = .27		

\*p<.05 \*\*p<.01 \*\*\*p<.001

They had also been criminally involved to a greater extent, which suggests a more severe drug use. These findings are consistent with previous research (Hser et al., 2003; Puigdollers et al., 2004; Chantham et al., 1999; Lundgren et al., 2007; Stenbacka, Romelsjö, 1997; Grönbladh, 2004; Socialstyrelsen, 2001).

Moreover, our findings indicate that prescribed methadone or buprenorphine are not used as a substitute or instead of traditional behavioural treatment. Indeed, reporting a greater number of drug treatment episodes was significantly associated with

taking medications. Again, this is a positive finding, which suggests that heroin users have access to and use a range of treatment options.

The aforementioned suggests that the clients receiving maintenance treatment, at the time of our study did so according to existing requirements regarding admission to the treatment. (SOSFS, 1990:16; SOSFS, 2004:8; Socialstyrelsen, 2006).

From a historical point of view, the Swedish methadone maintenance programme has a high proportion of clients who have a regular job, are in relief work

or studying full-time (Gunne, Grönbladh, & Öhlund, 2002). However, the number of clients who hold a job while in treatment has since the 1970s decreased to 20–30%. This trend is often associated with the deterioration in the economy during the 1990s and a harsher climate in the labour market. It is also attributed to a liberalisation of criteria guiding treatment admission, leading to a greater number of clients receiving the treatment (Johnsson, 2007; Gunne et al., 2002; Socialstyrelsen, 2001). Regardless of the changes in the target group and on the labour market it is important that the different programmes providing maintenance treatment with methadone or buprenorphine enable clients to combine employment and treatment. However, this is not a given, and the experience of attempting to combine work and treatment is not entirely positive. One challenge lies in the perceived difficulty of combining treatment with full-time work, because medication dispensing and urine tests generally take place at fixed times during working hours (Pettersson, 2013). Based on this, the different facilities providing maintenance treatment with methadone or buprenorphine should schedule medication dispensing and tests in such a way that it enables clients who are and clients who intend to start working to combine work with treatment. It has proved to be an essential component in achieving successful treatment of heroin-addicted clients (Socialstyrelsen, 2004).

There are limitations to this study. First, our study only includes self-reported data. Second, given that this is a retrospective database study, we are only able to identi-

fy possible associations rather than causal connections between the selected factors studied under a given period of time. Third, our results should be understood in relation to that maintenance treatment during and after our study period, 2002–2008 has expanded and become more accessible

In conclusion, the results presented in this study are interesting, as they highlight that heroin addicts treated with methadone or buprenorphine, even if they have a history of criminal activity and a greater number of years on heroin or other opioids, may actually be more socially integrated by being in employment than is often considered in the debate on this treatment. Furthermore, the results also suggest that treatment with methadone or buprenorphine is not used as a substitute for traditional psychosocial treatment; on the contrary, clients in treatment with methadone or buprenorphine have a history of utilising more behavioural treatment than other clients with a heroin addiction.

**Declaration of interest** None.

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## NOTES

- 1 To enter maintenance treatment, at the time for our study, required that the client; were 20 year of age, had a history of trying and failing non medication treatment, at least a four year registered intravenous opiate abuse and to be able to show records of non existing poly drug use (SOSFS, 1990:16). In line with the new guidelines, in 2004 the criteria regarding admission to maintenance treatment changed to; 20 years of age, two years documented opiate abuse and to have the capability to understand and give consent regarding treatment entry (SOFSS, 2004:8; Socialstyrelsen, 2006). Finally, maintenance treatment could not during the study period be given within

the context of compulsory care with support from, Lagen (1988:870) om vård av missbrukare i vissa fall (Care of Substance Abusers (Special Provisions) Act) (SOSFS, 1990:16; SOFS, 2004:8; Socialstyrelsen, 2006).

- 2 IBM SPSS Statistics version 20 was used in order to assess the relationship between the independent variables and the dependent variable.
- 3 At the time of the study period, 2001–2008 maintenance treatment with methadone or buprenorphine were not given within the context of compulsory care (SOSFS, 1990:16; SOSFS, 2004:8).

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