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# Self-reported adverse experiences and age of opioid onset for first time admitted to opioid maintenance treatment

Siv-Elin Leirvaag Carlsen<sup>1</sup>, and Torbjørn Torsheim<sup>2</sup>

*1-Department for Addiction Medicine, Haukeland University Hospital, Bergen, Norway*

*2-Department of Psychosocial Science, University of Bergen, Norway*

### Summary

**Background:** Patients in opioid maintenance treatment might differ significantly on major life events, coping resources and living conditions. **Aim:** This study investigated patients' sociodemographic characteristics before first admission to opioid maintenance treatment, focusing on adverse experiences and their influence on age of opioid onset. **Methods:** Forty-seven participants were recruited from eight opioid maintenance treatment units in Bergen, Norway. Retrospective data on demographics, external potential adverse experiences and patients' history of drug use were collected using the National Quality Register for Substance Abuse Treatment. A Cox regression survival analysis was conducted to examine potential differences in sociodemographic characteristics compared to age of opioid onset and adverse experiences. **Results:** The mean age of opioid onset was 22.6 years (SD = 6.80). No significant differences between recruited patients were found for sociodemographic factors such as marital status, education level, living situation, parenthood and crime. Age of opioid onset use was strongly associated with being in care ( $b = 0.87$ ), family members that were or had been in prison ( $b = 0.83$ ) and drop-out from school ( $b = 0.77$ ). The participants' adverse experiences varied in number, with a mean exposure of 8.1 (SD = 4.0). **Conclusions:** Patients in this study had been exposed to many adverse experiences, yet these varied in both type and number. There was substantial variation in age of opioid onset. When new patients are enrolled in treatment, clinicians should consider this heterogeneity. It can be of importance in opioid maintenance treatment to distinguish between patients according to their number of adverse experiences.

**Key Words:** Opioid maintenance treatment; sociodemographic characteristics; adverse experiences; age of opioid onset; patient reported outcome

## 1. Introduction

Opioid dependence is a chronic lifelong disease [8, 18, 20, 29, 44]. A well-documented effective treatment for this disease is opioid maintenance treatment (OMT) [1, 8, 33]. A large body of research on OMT exists, including types of medication [39], physical and mental health [55, 68], the socioeconomic benefits of treatment [11, 45, 65] and retention in OMT [57, 64]. Despite this, less is known about patients' life events, coping resources and living conditions; these are factors that might differ significantly. Such differences can be important in treatment planning and prognosis.

Previous studies on sociodemographic factors

and OMT show a population that consists primarily of men in their thirties [16, 26, 43, 61, 70], with an education level of 11 to 12 years (SD = 2.2) [21, 31, 41, 61, 62]. Some research shows that about half of the OMT population is unemployed [17, 21, 25, 43, 60], while other studies report an employment rate from 67 to 81% [4, 8]. Research on living arrangements for OMT populations is inconsistent. Some studies show that 40 to 60 % live with a partner [8, 43, 46, 72], while others report 46 to 85% to be single or unmarried [18, 25, 40, 42]. Men are more likely to live alone [4, 72], while women are more likely to live with their children [72]. People with opioid dependence become less involved in criminal activity after starting OMT [10, 11, 32, 65, 67].

Kopak et al. [38] examined risks associated with demographic characteristics among substance use treatment patients. They found that demographic risk factors, (e.g. age, marital status, employment and education) interact with clinical risks (i.e. substance use severity) and adolescent behavioural risks (e.g. school drop-out, arrests, shoplifting, several sexual partners), and increase the chance of relapse to substance use after treatment. According to Getz and Bray [23] the number of adverse experiences in a persons' life had a greater impact on substance use than the number of protective factors. Risk factors can be understood as characteristics or hazards that increase the likelihood of a person developing a disorder [49]. Drug dependence is often predicted by family history [22]. Poor family functioning increases the risk of developing early substance use and future heavy/problematic use [5, 30]. In general, cumulative risk factors in early childhood predict behaviour problems in adolescents [2, 22, 47]. The earlier the onset of opioid use, the greater the chance of problems later in life [50]. Factors related to the individual itself, school engagement, and peers are also linked to adolescent problem behaviours [13]. In addition, there is a strong association between childhood physical and/or sexual abuse and adult substance use [14, 24, 27]. Adverse experiences tend to predict and correlate with substance use to a greater degree than protective factors [13, 36, 54]. Childhood and adolescence, the period that generally shapes the individual, is a myriad of different and unique stages that is important to investigate.

Age of onset is an essential adverse experience for, and a well-documented predictor of, alcohol dependence and substance use disorder [6, 13, 35, 48, 66]. However, age of opioid onset as an important factor has been less researched.

In referring to age of onset, research often distinguishes between early onset and late onset. Clark et al. [12] distinguished between adolescent ( $\leq 17$  years), early-adult (18-24 years) and late adult ( $25 \leq$  years) onset groups with regard to substance use disorders. Others have defined early onset as age  $< 18$  years and late onset as 18 years or older [3], or early onset as mean age 21 years and late onset as mean age 27 years [19]. Age of onset of opioid use varies from the early to late twenties [18, 25, 70], and Basu et al. [5] found that the early onset opioid group had a mean age of 18 years, while the late onset group had a mean age of 23 years.

Age of onset is significantly associated with an increased risk of comorbidity [50], and when viewed as a background characteristic, age of opioid onset

correlates with post-treatment substance use [38]. This shows that identifying potential adverse experiences is central, as age of opioid onset is an important marker for the duration of substance use. In order to understand the life OMT patients have lived, it is vital to understand the background to the individual's onset of opioid use. To the best of our knowledge, the current study is the first to focus on age of opioid onset and self-reported adverse experiences.

**Aim:** We aimed to investigate a) the patients' sociodemographic characteristics at first admission to opioid maintenance treatment, and b) how exposure to potential adverse experiences is associated with patients' age of onset of opioid use.

## 2. Methods

### 2.1. Design of the study

This longitudinal registry study was conducted at the Department of Addiction Medicine, Haukeland University Hospital, Bergen, Norway. Data was provided by the National Quality Register for Substance Abuse Treatment (NQR-SAT). NQR-SAT is a registry for treatment for harmful use or addiction to substance abuse, substance use disorders. This register is structured around three main areas: basic registration, repeated data measures every third month in treatment, and at the end of treatment. In the current study data from basic registration are used, for more information see section about measures.

The inclusion criteria were: opioid dependence according to ICD-10 or DSM-IV [53], first-time admittances to OMT, living in the Haukeland University Hospital catchment area, and commencement of OMT medication before the first registration. The only exclusion criterion was lack of competence to consent.

The sample was recruited from eight OMT outpatient units within the catchment area of Haukeland University Hospital; one unit was located in the prison in Bergen County. Due to low recruitment in the first year of the study, eligible participants were enrolled in OMT in two periods. The first recruitment period was from January to December 2013, and the second period was from September 2015 to June 2016.

### 2.2. Sample

Fourth-eight opioid-dependent persons participated in our study, 11 women and 37 men. Twenty-three participants were recruited in the first period

and 25 in the second period. One participant withdrew due to lack of interest and these data are not included in the analysis, leaving a total sample of 47 participants.

### 2.3. Instruments

Data collected by NQR-SAT was based on Patient Reported Outcome Measures (PROM-data) and Patient Reported Experience Measure (PREM-data). PROMs include patients' reports of health, experiences during treatment and the impact of the treatment on their quality of life [7, 51, 63]. PREMs capture patients' perceptions of their experience with health care or treatment [63]. The NQR-SAT contains several items such as sociodemographic status, life events, drug history, mental and physical health, quality of life and participants' actions for reducing their drug problems. In the current article, background data on sociodemographic status, life history, and drug history are used. These topics include various sub-questions.

**Sociodemographic status:** Eleven questions measured the respondents' sociodemographic status such as: age, education level, living arrangements, children and criminality, see Table 1.

**Negative life events:** Twenty-one questions were related to negative life events, and covered domains such as family (e.g. addiction, financial difficulties, jail, mental issues, long-lasting somatic disease, divorce and neglect), and community (e.g., drop-out, break-ups, dismissal, housing, and being under care). In order to measure whether participants had or had none adverse experiences the answers were dichotomized as yes or no. Seventeen of these 21 negative life events were included in the analysis.

**Drug history:** Seventeen questions covered history of drug use. Age or year of onset was self-reported. Participants reported abuse of up to 18 specific substances from onset to enrolment in OMT. Frequency was measured by six categories: daily use, 5-6 times a week, 2-4 times a week, weekly, periodically or seldom. Route of administration was a dichotomous variable measured by yes or no to injected substance abuse. The reasons for onset of drug use were categorized into: curiosity, influenced of others, by coincidence, having one's own problems or other reasons. The main reasons for substance abuse were mutually exclusive and categorized into: medical, social, coercion, getting high or other reasons.

### 2.4. Procedure

In 2013, the local OMT advisors informed newly enrolled patients about the study. Also, a letter with study information and an invitation to participate was sent to all first time enrolled patients. In 2015/2016, unit managers in OMT informed their employees about the study, ensured that information leaflets were visible at all OMT units, and contacted the research unit when new patients were enrolled. Furthermore, a study researcher was present in the waiting rooms in the OMT units. All patients interested in participating, or in need of more information were contacted by phone, SMS or face-to face of a researcher by the research unit.

Written informed consent was obtained from participants who agreed to join the study. Data were collected as structured registrations through face-to-face interviews. A researcher from the research unit was responsible for recruitment, registration, calling in the participants and data management. The study was approved by the Regional Committee for Medical and Health Research Ethics (2013/429/REK south-east C).

### 2.5. Data analysis

In order to get a better understanding of participants' life cycle until enrollment in OMT, it is important to study crossroads and events in the participants' life. This was the reason why a survival analysis was chosen as the statistical approach.

Descriptive statistics were used to examine the participants' demographic characteristics. A survival analysis was conducted using Cox regression to examine if there were significant differences in sociodemographic characteristics, compared to age of opioid onset (heroin, methadone, buprenorphine, and other opioids) and potential adverse experiences. For the results to be reliable, the number of events must be higher than 10 events per investigated variable [56, 73]. In the current study a total of 1026 observations were available in the data analysis. A confidence interval of 95% was set.

Age of opioid onset was the dependent variable. Included as independent variables seventeen adverse childhood/adolescents experiences were included in the analysis.

### 3. Results

Descriptive variables of the participants' characteristics are shown in Table 1. The mean age was 37.8 years, ranging from 23 to 61 years ( $SD = 8.58$ ). With regard to education level, none of the female participants had higher education than high school, while nine of 36 men had a certificate of apprenticeship or had studied at university. Half of the participants lived in their own apartment, and among these 79 % were 40 years or older. Participants younger than 40 years had mainly temporary living arrangements. Seven of 11 females and half of the male participants had children; however, a minority had custody or visitation rights. More than 63% had no legal problem or contact with the justice system the previous months before OMT enrolment.

**Table 1.** Baseline sociodemographic characteristics for first time enrollees in opioid maintenance treatment

Type of risk exposure	N = 47	%
Gender, Male	36	76.6
Age, M	37.8	
Age of onset opioid use <sup>a</sup>	22	
Ethnicity, Norwegian	45	95.7
Marital status		
Single	37	78.7
Married	10	21.3
Education		
No education	4	8.5
Primary/secondary school	21	44.7
High school	13	27.7
Higher education	9	19.1
Living situation		
Own apartment	24	51.1
Permanently with family	7	14.9
Temporary living arrangement <sup>b</sup>	14	29.8
Homeless	2	4.3
Children		
Parenthood, yes	25	53.2
Custody of children <18 years	4	8.5
Visitation rights children <18 years	14	29.7
No custody/visitation rights	4	8.5
Adult children	7	14.9
Criminality		
Waiting to serve a sentence, Yes	5	10.6
Unresolved issues with the police/justice system, Yes	17	36.2

Note. <sup>a</sup>Missing data for three participants. <sup>b</sup>Temporary living arrangements = prisons, rehabilitation homes and treatment institutions.

**Table 2.** Number of patients exposed to adverse experiences

Type of adverse experiences	n	%
Loss of family members/other close ones (deaths)	42	89.3
Conflict with the justice system/police	38	80.8
Drug (ab-)use in the family	27	57.4
Drop out from school	27	57.4
Mental issues in the family	26	55.3
Caregivers (parents) separation	26	55.3
Had been beaten	26	55.3
Protracted physical illness in the family	24	51.0
Had been bullied	22	46.8
Neglected over time	22	46.8
Sexually violated	21	44.6
Negative relationship with partner	20	42.5
Family members in prison	18	38.2
Financial problems for caregivers	17	36.1
Being in care	11	23.4
Suicide in the family	9	19.9
Sex work	7	14.8

The mean age for substance use onset was 14.3 years ( $SD = 4.87$ ). Sixty-two percent started with alcohol and 23.4 % with cannabis. At age sixteen, 89 % had used a substance. Curiosity was the main reason for onset for 55 % of the participants, while being influenced by others (21.3%) and chances (15%) were other reasons for substance use debut. The mean age of opioid onset was 22.6 years, ranging from 14 to 43 years ( $SD = 6.80$ ). Over 60 % of participants used opioids (heroin, methadone, buprenorphine or other opioids) on a daily basis before enrolling in OMT. The main reason given for opioid use was a medical purpose to regulate emotions.

Exposure for adverse experiences differed among participants. Adverse experiences such as conflict with the justice system/police and loss of family members or other close ones by death were highly frequent (see Table 2), while working as a sex worker or experience suicide in the family were infrequent adverse experiences. More than half of the participants had been exposed to at least eight adverse experiences, see Table 2. When a Bonferroni adjusted alpha level of .002 was used, there were no statistically significant observed differences between participants from the two periods.

A survival analysis by Cox regression revealed a statistically significant association between adverse

**Table 3.** Exposure to adverse experiences before enrolment in OMT and age of onset of opioid use

Adverse experiences	B	SE	p	Exp B	95 % CI	
Being in care	0.87	0.09	<.001*	2.40	1.98	2.91
Family members in prison	0.83	0.08	<.001*	2.30	1.95	2.72
Drop-out from school	0.77	0.08	<.001*	2.16	1.84	2.54
Financial problems for caregivers	0.71	0.09	<.001*	2.04	1.71	2.43
Sex work	0.69	0.10	<.001*	1.99	1.62	2.45
Drug abuse in the family	0.64	0.08	<.001*	1.90	1.62	2.23
Suicide in the family	0.61	0.09	<.001*	1.85	1.52	2.24
Caregivers (parents) separation	0.61	0.08	<.001*	1.84	1.56	2.17
Sexually violated	0.56	0.08	<.001*	1.75	1.50	2.05
Mental issues in the family	0.48	0.08	<.001*	1.62	1.38	1.91
Protracted physical illness in the family	0.48	0.08	<.001*	1.61	1.38	1.89
Conflict with the justice system/police	0.45	0.10	<.001*	1.58	1.28	1.94
Had been bullied	0.37	0.08	<.001*	1.45	1.24	1.69
Had been beaten	0.21	0.08	.009	1.23	1.05	1.44
Neglected over time	0.03	0.08	.680	1.03	0.88	1.21
Loss of family members/other close ones	-0.01	0.13	.913	0.98	0.75	1.28
Negative relationship with partner	-0.03	0.08	.636	0.96	0.82	1.12

Note. CI = confidence interval; \*P <.002

experiences and age of onset of opioid. There were no statistically significant association for three adverse experiences and age at opioid onset (Table 3). A strong association to age of opioid onset use was identified for being in care ( $b = 0.87$ ), family members that were or had been in prison ( $b = 0.83$ ) and drop-out from school ( $b = 0.77$ ). Family relations were systematically linked to age at opioid onset. Family members in prison, caregivers with financial issues, drug abuse or suicide in the family all had a substantial association with age of opioid onset, unlike severe somatic disease or mental issues in close family members. There was a stronger association between sex work and age of opioid onset than traumas such as having been beaten or bullied.

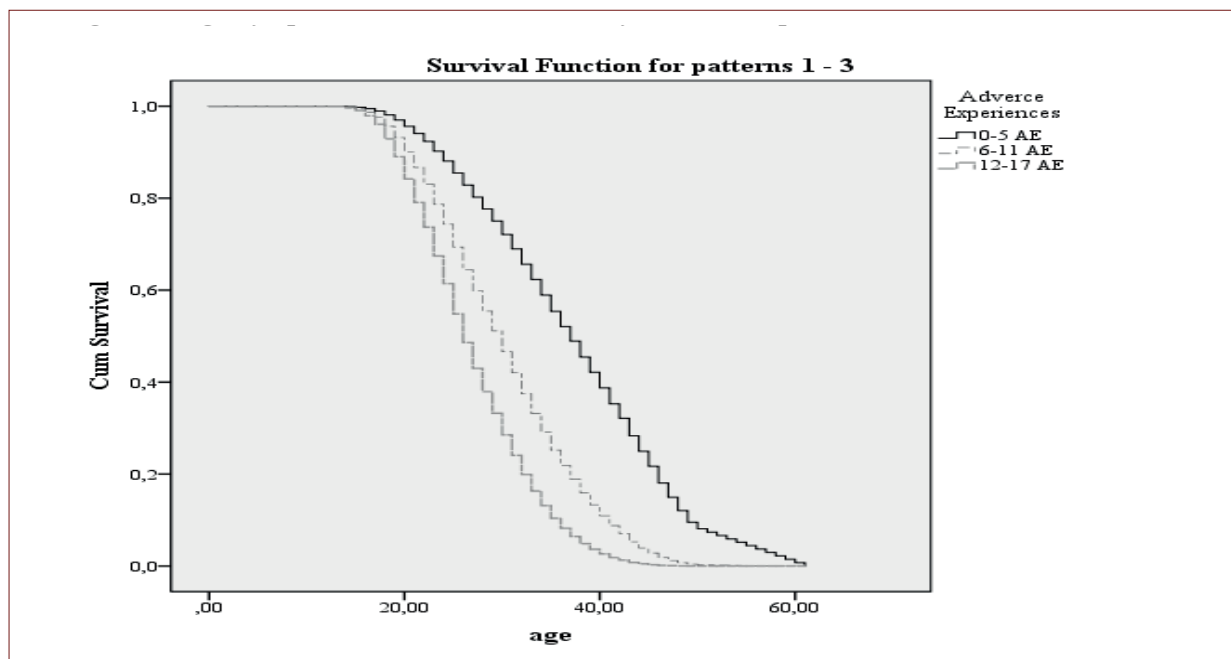
The number of adverse experiences participants had been exposed to varied significantly. The mean exposure was 8.1 (SD = 4.0). Based on the total number of adverse experiences, three groups were constructed: a low risk group exposed to zero to five adverse experiences, a medium risk group exposed to six to 11 adverse experiences, and a high risk group exposed to 12 to 17 adverse experiences. Fifty-nine percent had a medium risk exposure, while belonging to the high risk group, reported by 17.4 %, was associated with lower age of opioid onset, as shown in Figure 1.

#### 4. Discussion

The present study investigated the sociodemographic factors and the relationship between potential adverse experiences and age of onset of opioid use for first-time admittances to OMT. Our main finding was that OMT patients differed in their exposure to adverse events. These differences in exposure were systematically associated with differences in age of opioid use onset [18, 69, 70]. Education level is a year or two less than in other studies [21, 31, 65]. Norwegian research shows that 69 % of OMT patients have learning- and behaviour problems in primary school [40], which may explain the variation in education level.

Research has shown that the number of risk factors, individuals must cope with, is more important than the type of applicable risks [9, 52]. Our study did not include exact information about the timing of adverse experiences. However, due to the diversity of examined adverse experiences and that these are strongly related to family relationships, it is reasonable to assume that may have occurred in participants' childhood or adolescence, and thereby before opioid age of onset.

Cumulative adverse experiences may explain the high number of adverse experiences [2, 22]; the early-onset users had been exposed to a higher number of potential adverse experiences compared to the late-onset opioid users. It seems like the early-onset users have a lower level of protection against new potential



**Figure 1** Age of opioid onset and number of adverse experiences

adverse experiences, which add to the total number of adverse experiences they have to manage. On the other hand, the late-onset opioid users may have a higher protection against or awareness of potential adverse experiences. They might live in low-risk environment where new adverse experiences are more distinct to earlier life experiences. This study has not taken into consideration that there might be different protective factors for the late-onset and early-onset users. Based on the systematic connection between adverse experiences and age of opioid onset, the late-onset individuals, compared to the early-onset individuals, bring other life experiences with them into treatment from e.g. school, family life or work. Timing of opioid onset is therefore significant.

Moreover, unlike Bry et al. [9] our study showed that the type of adverse experiences was indeed important for the participants. School drop-out was a high frequent experience, 27 of 47 participants reported school drop-out, and a strong predictor for age of opioid onset; the younger the age at opioid onset, the greater the probability of school drop-out. The link between alcohol/drug abuse and school drop-out is well documented [15, 34, 71], and the negative effect has recently been confirmed by Heradstveit et al. [28]. They found that an increasing number of alcohol/drug related problems and levels of consumption were associated with negative school-related outcomes. During adolescence, school is an important

socializing agent when it comes to societal norms and prohibitions. Drop-outs from school tend to seek for companionship with like-minded peers, and this provides an entrance into environment where other rules apply compared to the socially accepted norms. With regard to school drop-out, Kolar et al. [37] reported that 41% of children of OMT patients were truant, and 30% had been suspended from school.

Family-related factors are predictors with a strong influence on a patient's life. Multiple risks in early childhood explain differences in predicting adolescent behaviour outcomes [2]. According to Lauritzen et al. [40], 54 % of OMT patients have parents with mental issues and 57 % have parents with alcohol problems. Our study showed that adverse experiences such as family members in prison, financial problems for caregivers and drug abuse in the family had a significant effect on age of opioid onset. It is interesting to note, that despite of the small sample, being in care is significantly associated with age of opioid onset. School drop-out, being in care and troublesome family relations can be indicators of non-supportive homes. These results can indicate that OMT patients in the current study often had a stressful family situation, and support from parents was more or less lacking which has a negative effect on their development into adults. Adolescents from such homes may be more likely to engage with deviant peers to gain social support and a sense of belonging [30].

The current study had an observational design that prevents any conclusions of causal interference. Based on previous research on risk factors [30, 37], family relationships can be considered a causal explanation for substance abuse. A common influence of heritage, both genetic and social can be another possible explanation. The variation in adverse experiences may indicate differences in living conditions of participants enrolled in OMT. Alternatively, participants exposed to adverse experiences do not perceive them as such, or they do not notice any negative effect.

The sample in this study was self-selected, and may therefore not be representative of the population. Participants in a self-selection sample are more likely to be committed to the study, which may help the attendance and willingness to answer questions. Previous work concluded that validity and reliability of substance abusers' self-reports are generally accurate [38, 58, 59].

Based on the small sample size we cannot claim any generalization of the results presented. However, the sociodemographic characteristics of the participants in this study did not differ significantly from the OMT population in Norway. The exception is age; participants in the current study were younger than OMT patients at national level, 37.8 years vs. 44 years.

The fact that participants were recruited for two time periods may have influenced the representativeness of the study. A change in intake regimes during the study recruitment might have had an effect. In 2014, the open drug scene in the city closed. In connection with the closure, several low-threshold services for substance abusers were offered, including faster entry into OMT. Also, low-threshold OMT units often hold a homogeneous clientele of poorly functioning patients. Well-functioning patients have little or no contact with OMT units or other care schemes. This may affect the cohort selection. However, the Fisher's exact test showed no gender or sociodemographic background differences between the cohorts.

#### *Clinical Implications*

This study intended to improve conceptual understanding of patients' sociodemographic characteristics and the relationship between adverse experiences and age of opioid use onset. Sociodemographic characteristics are often taken-for-granted and rapidly noted in patient records before the focus shifts to drug use and treatment experiences. An important

implication of this study is that clinical work should distinguish between patients who have been exposed to few versus many adverse experiences. If clinicians closely examined patients' background and adverse experiences at first time enrolment, they could indicate and facilitate a treatment with a more individual approach to a greater extent than today. That would be of benefit both for patients and clinic.

#### **5. Conclusions**

There is a substantial variation related to sociodemographic characteristics and adverse experiences for participants in this study. This heterogeneity ought to be taken into consideration when new patients are enrolled in OMT. This study shows that both type and the number of adverse experiences can be associated to age of opioid onset. Although the results cannot be generalized to the OMT population per se, it can be important for treatment to distinguish between people enrolled in OMT with few versus several adverse experiences.

#### **References**

1. Amato L., Davoli M., A. Perucci C., Ferri M., Faggiano F., P. Mattick R. (2005): An overview of systematic reviews of the effectiveness of opiate maintenance therapies: available evidence to inform clinical practice and research. *J Subst Abuse Treat.* 28(4): 321-329.
2. Appleyard K., Egeland B., Van Dulmen M. H. M., Sroufe L. A. (2005): When more is not better: the role of cumulative risk in child behavior outcomes. *J Child Psychol Psychiatry.* 46(3): 235-245.
3. Bakken K., Landheim A. S., Vaglum P. (2004): Early and late onset groups of substance misusers: Differences in primary and secondary psychiatric disorders. *J Subst Use.* 9(5): 224-235.
4. Bartu A., Freeman N. C., Gawthorne G. S., Allsop S. J., Quigley A. J. (2002): Characteristics, retention and readmissions of opioid-dependent clients treated with oral naltrexone. *Drug Alcohol Rev.* 21(4): 335-340.
5. Basu D., Ghormode D., Madan R., Mattoo S., Nehra R., Prabhakar S. (2014): Age of onset of dependence: Does it help our understanding of opioid dependence by generating meaningful categories or by acting as a useful dimension? A critical examination of the classic debate in psychiatry. *Indian J Psychiatry.* 56(3): 228-237.
6. Behrendt S., Wittchen H. U., Höfler M., Lieb R., Beesdo K. (2009): Transitions from first substance use to substance use disorders in adolescence: Is early onset associated with a rapid escalation? *Drug Alcohol Depend.* 99(1): 68-78.
7. Black N. (2013): Patient reported outcome measures

- could help transform healthcare. *BMJ (Clinical research ed)*.
8. Brands B., Blake J., Marsh D. (2002): Changing patient characteristics with increased methadone maintenance availability. *Drug Alcohol Depend.* 66(1): 11-20.
  9. Bry B. H., Mckeon P., Pandina R. J. (1982): Extent of drug use as a function of number of risk factors. *Journal of Abnorm Psychol.* 91(4): 273-279.
  10. Bukten A., Roislien J., Skurtveit S., Waal H., Gossop M., Clausen T. (2013): A day-by-day investigation of changes in criminal convictions before and after entering and leaving opioid maintenance treatment: a national cohort study. *BMC Psychiatry.* 13.
  11. Bukten A., Skurtveit S., Gossop M., Waal H., Stangeland P., Havnes I., Clausen T. (2012): Engagement with opioid maintenance treatment and reductions in crime: a longitudinal national cohort study. *Addiction.* 107(2): 393-399.
  12. Clark D. B., Kirisci L., Tarter R. E. (1998): Adolescent versus adult onset and the development of substance use disorders in males. *Drug Alcohol Depend.* 49(2): 115-121.
  13. Cleveland M. J., Feinberg M. E., Bontempo D. E., Greenberg M. T. (2008): The Role of Risk and Protective Factors in Substance Use across Adolescence. *J Adolesc Health.* 43(2): 157-164.
  14. Cohen L. R., Tross S., Pavlicova M., Hu M.-C., Campbell A. N., Nunes E. V. (2009): Substance Use, Childhood Sexual Abuse, and Sexual Risk Behavior among Women in Methadone Treatment. *Am J Drug Alcohol Abuse.* 35(5): 305-310.
  15. Cook P. J., Moore M. J. (1993): Drinking and schooling. *J Health Econ.* 12(4): 411-429.
  16. Corsi K. F., Lehman W. K., Booth R. E. (2009): The effect of methadone maintenance on positive outcomes for opiate injection drug users. *J Subs Abuse Treat.* 37: 120-126.
  17. Daneshmand R., Mehrjerdi Z. A., Samiee M. (2014): Maintenance Treatment with Opium Tincture: A Preliminary Qualitative Study of the Factors Related to Treatment entry. *Iran J Public Health.* 43(8): 1123-1131.
  18. Davstad I., Stenbacka M., Leifman A., Romelsjo A. (2009): An 18-year follow-up of patients admitted to methadone treatment for the first time. *J Addict Dis.* 28(1): 39-52.
  19. De B., Mattoo S. K., Basu D. (2003): Age at Onset Typology in Opioid-dependent Men: An Exploratory Study from India. *Am J Addict.* 12(4): 336-345.
  20. Dennis M., Scott C. K. (2007): Managing addiction as a chronic condition. *Addict Sci Clin Pract.* 4(1): 45-55.
  21. Dreiffuss J. A., Griffin M. L., Frost K., Fitzmaurice G. M., Potter J. S., Fiellin D. A., Selzer J., Hatch-Maillette M., Sonne S. C., Weiss R. D. (2013): Patient characteristics associated with buprenorphine/naloxone treatment outcome for prescription opioid dependence: Results from a multisite study. *Drug Alcohol Depend.* 131(1-2): 112-118.
  22. Enoch M.-A. (2011): The role of early life stress as a predictor for alcohol and drug dependence. *Psychopharmacology.* 214(1): 17-31.
  23. Getz J. G., Bray J. H. (2005): Predicting heavy alcohol use among adolescents. *Am J Orthopsychiatry.* 75(1): 102-116.
  24. Gilbert L., El-Bassel N., Schilling R. F., Friedman E. (1997): Childhood Abuse as a Risk for Partner Abuse among Women in Methadone Maintenance. *Am J Drug Alcohol Abuse.* 23(4): 581-595.
  25. Griffin M. L., Dodd D. R., Potter J. S., Rice L. S., Dickinson W., Sparenborg S., Weiss R. D. (2014): Baseline characteristics and treatment outcomes in prescription opioid dependent patients with and without co-occurring psychiatric disorder. *Am J Drug Alcohol Abuse.* 40(2): 157-162.
  26. Havnes I., Bukten A., Gossop M., Waal H., Stangeland P., Clausen T. (2012): Reductions in convictions for violent crime during opioid maintenance treatment: a longitudinal national cohort study. *Drug Alcohol Depend.* 124: 307-310.
  27. Heffernan K., Cloitre M., Tardiff K., Marzuk P. M., Portera L., Leon A. C. (2000): Childhood trauma as a correlate of lifetime opiate use in psychiatric patients. *Addict Behav.* 25(5): 797-803.
  28. Heradstveit O., Skogen J. C., Hetland J., Hysing M. (2017): Alcohol and Illicit Drug Use Are Important Factors for School-Related Problems among Adolescents. *Front Psychol.* 8(1023): 1-11.
  29. Hser Y. I., Hamilton A., Niv N. (2009): Understanding Drug Use Over the Life Course: Past, Present, and Future. *J Drug Issues.* 31(1): 231-236.
  30. Hummel A., Shelton K. H., Heron J., Moore L., Van Den Bree M. B. M. (2013): A systematic review of the relationships between family functioning, pubertal timing and adolescent substance use. *Addiction.* 108(3): 487-496.
  31. Jamison R. N., Kauffman J., Katz N. P. (2000): Characteristics of Methadone Maintenance Patients with Chronic Pain. *J Pain Symptom Manage.* 19(1): 53-62.
  32. Kakko J., Svanborg K. D., Kreek M. J., Heilig M. (2003): 1-year retention and social function after buprenorphine-assisted relapse prevention treatment for heroin dependence in Sweden: a randomised, placebo-controlled trial. *Lancet.* 361(9358): 662-668.
  33. Kayman D. J., Goldstein M. F., Deren S., Rosenblum A. (2006): Predicting treatment retention with a brief "opinions about methadone" scale. *J Psychoactive Drugs.* 38(1): 93-100.
  34. Kelly A. B., Evans-Whipp T. J., Smith R., Chan G. C. K., Toumbourou J. W., Patton G. C., Hemphill S. A., Hall W. D., Catalano R. F. (2015): A longitudinal study of the association of adolescent polydrug use, alcohol use and high school non-completion. *Addiction.* 110(4): 627-635.
  35. King K. M., Chassin L. (2007): A prospective study of the effects of age of initiation of alcohol and drug use



- on young adult substance dependence. *J Stud Alcohol Drugs*. 68(2): 256-265.
36. Kliewer W., Murrelle L. (2007): Risk and protective factors for adolescent substance use: findings from a study in selected Central American countries. *J Adolesc Health*. 40(5): 448-455.
  37. Kolar A. F., Brown B. S., Haertzen C. A., Michaelson B. S. (1994): Children of substance abusers: The life experiences of children of opiate addicts in methadone maintenance. *Am J Drug Alcohol Abuse*. 20(2): 159-171.
  38. Kopak A. M., Proctor S. L., Hoffmann N. G. (2017): The cumulative risk associated with demographic background characteristics among substance use treatment patients. *Addict Res Theory*. 25(3): 216-224.
  39. Kornor, H., A. Bjørndal and G. Welle-Strand (2006). Medikamentell behandling av opiatavhengighet (Pharmacological therapies for opiate dependence. Norwegian Research Centre for Health Services) Nr. 23-2006.
  40. Lauritzen, G., E. Ravndal and J. Larsson (2012). Gjennom 10 år. En oppfølgingsstudie av narkotikabrukere i behandling (Through 10 years. A follow-up study of drug users in treatment). SIRUS. 6.
  41. Lofwall M. R., Brooner R. K., Bigelow G. E., Kindbom K., Strain E. C. (2005): Characteristics of older opioid maintenance patients. *J Subst Abuse Treat*. 28(3): 265-272.
  42. Lugoboni F., Levin F. R., Pieri M. C., Manfredini M., Zamboni L., Somaini L., Gerra G., Gics (2017): Co-occurring Attention Deficit Hyperactivity Disorder symptoms in adults affected by heroin dependence: Patients characteristics and treatment needs. *Psychiatry Research*. 250: 210-216.
  43. Mayet A., Lions C., Roux P., Mora M., Maradan G., Morel A., Michel L., Marimoutou C., Carrieri M. P. (2015): Variations in Cannabis Use Level and Correlates in Opiate-Users on Methadone Maintenance Treatment: A French Prospective Study. *J Subst Abuse Treat*. 58: 100-105.
  44. McLellan A. T. (2002): Have we evaluated addiction treatment correctly? Implications from a chronic care perspective. *Addiction*. 97(3): 249-252.
  45. Melberg, H. O., G. Lauritzen and E. Ravndal (2004). Hvilken nytte, for hvem og til hvilken kostnad? (What benefit, for whom and at what cost?), Norwegian Institute for Alcohol and Drug Research (SIRUS). 4/2003.
  46. Metz V. E., Comer S. D., Wuerzlj., Pribasni A., Fischer G. (2014): Characteristics and quality of life of opioid-dependent pregnant women in Austria. *Arch Womens Ment Health* 17(6): 529-539.
  47. Meyers J. L., Dick D. M. (2010): Genetic and Environmental Risk Factors for Adolescent-Onset Substance Use Disorders. *Child Adolesc Psychiatr Clin N Am*. 19(3): 465-477.
  48. Moss H. B., Chen C. M., Yi H.-Y. (2014): Early adolescent patterns of alcohol, cigarettes, and marijuana polysubstance use and young adult substance use outcomes in a nationally representative sample. *Drug Alcohol Depend*. 136: 51-62.
  49. Mrazek P. J., Haggerty R. J. (1994): Risk and Protective Factors for the Onset of Mental Disorders In: R.J. H. (Ed.) *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*. National Academies Press (US), Washington (DC). pp. 636.
  50. Naji L., Dennis B. B., Bawor M., Varenbut M., Daiter J., Plater C., Pare G., Marsh D. C., Worster A., Desai D., Mackillop J., Thabane L., Samaan Z. (2017): The association between age of onset of opioid use and comorbidity among opioid dependent patients receiving methadone maintenance therapy. *Addict Sci Clin Prac*. 12: 9.
  51. Neale J., Vitoratou S., Finch E., Lennon P., Mitcheson L., Panebianco D., Rose D., Strang J., Wykes T., Marsden J. (2016): Development and validation of 'SURE': A patient reported outcome measure (PROM) for recovery from drug and alcohol dependence *Drug Alcohol Depend*. 165: 159-167.
  52. Newcombe D., Felix-Ortiz M. (1992): Multiple Protective and Risk Factors for Drug Use and Abuse: Cross-Sectional and Prospective Findings. *J Pers Soc Psychol*. 63(2): 280-296.
  53. Norwegian Directorate of Health (2015). ICD-10: Den internasjonale statistiske klassifikasjonen av sykdommer og beslektede helseproblemer 2015. (ICD-10: The international statistical classification of diseases and related health problems 2015).
  54. Ostaszewski K., Zimmerman M. A. (2006): The effects of cumulative risks and promotive factors on urban adolescent alcohol and other drug use: a longitudinal study of resiliency. *Am J Community Psychol*. 38(3-4): 237-249.
  55. Padaiga Z., Subata E., Vanagas G. (2007): Outpatient methadone maintenance treatment program. Quality of life and health of opioid-dependent persons in Lithuania. *Medicina (Kaunas)*. 43(3): 235-241.
  56. Peduzzi P., Concato J., Feinstein A. R., Holford T. R. (1995): Importance of events per independent variable in proportional hazards regression analysis II. Accuracy and precision of regression estimates. *J Clin Epidemiol*. 48(12): 1503-1510.
  57. Proctor S. L., Copeland A. L., Kopak A. M., Hoffmann N. G., Herschman P. L., Polukhina N. (2015): Predictors of patient retention in methadone maintenance treatment. *Psychol Addict Behav*. 29(4): 906-917.
  58. Reinert D. F., Allen J. P. (2007): The alcohol use disorders identification test: an update of research findings. *Alcohol Clin Exp Res*. 31(2): 185-199.
  59. Robinson S. M., Sobell L. C., Sobell M. B., Leo G. I. (2014): Reliability of the Timeline Followback for cocaine, cannabis, and cigarette use. *Psychol Addict Behav*. 28(1): 154-162.
  60. Roncero C., Barral C., Rodriguez-Cintas L., Perez-Pazos J., Martinez-Luna N., Casas M., Torrens M., Grau-Lopez L. (2016): Psychiatric comorbidities in opioid-dependent

- patients undergoing a replacement therapy programme in Spain: The PROTEUS study. *Psychiatry Res.* 243: 174-181.
61. Saxon A. J., Wells E. A., Fleming C., Jackson T. R., Calsyn D. A. (1996): Pre-treatment characteristics, program philosophy and level of ancillary services as predictors of methadone maintenance treatment outcome. *Addiction.* 91(8): 1197-1210.
  62. Sharif B., Nosyk B., Sun H., Marsh D. C., Anis A. (2013): Changes in the Characteristics and Levels of Comorbidity Among New Patients Into Methadone Maintenance Treatment Program in British Columbia During Its Expansion Period From 1998–2006. *Subst Use Misuse.* 48: 671-682.
  63. SKDE (2017): PROM. Retrieved from: [www.kvalitetsregistre.no/artikkel/information-english](http://www.kvalitetsregistre.no/artikkel/information-english).
  64. Strike C. J., Gnam W., Urbanoski K., Fischer B., Marsh D. C., Millson M. (2005): Factors predicting 2-year retention in methadone maintenance treatment for opioid dependence. *Addict Behav.* 30(5): 1025-1028.
  65. Sun H.-M., Li X.-Y., Chow E. P. F., Li T., Xian Y., Lu Y.-H., Tian T., Zhuang X., Zhang L. (2015): Methadone maintenance treatment programme reduces criminal activity and improves social well-being of drug users in China: a systematic review and meta-analysis. *BMJ Open.* 5(1).
  66. Tanaree A., Assanangkornchai S., Kittirattanapaiboon P. (2017): Pattern and risk of developing alcohol use disorders, illegal substance use and psychiatric disorders after early onset of alcohol use: Results of the Thai National Mental Health Survey 2013. *Drug Alcohol Depend.* 170: 102-111.
  67. Teesson M., Mills K., Ross J., Darke S., Williamson A., Havard A. (2008): The impact of treatment on 3 years' outcome for heroin dependence: findings from the Australian Treatment Outcome Study (ATOS). *Addiction.* 103(1): 80-88.
  68. Torrens M., San L., Martinez A., Castillo C., Domingo-Salvany A., Alonso J. (1997): Use of the Nottingham Health Profile for measuring health status of patients in methadone maintenance treatment. *Addiction.* 92(6): 707-716.
  69. Unger A. S., Martin P. R., Kaltenbach K., Stine S. M., Heil S. H., Jones H. E., Arria A. M., Coyle M. G., Selby P., Fischer G. (2010): Clinical characteristics of central European and North American samples of pregnant women screened for opioid agonist treatment. *Eur Addict Res.* 16(2): 99-107.
  70. Weinstein Z. M., Kim H. W., Cheng D. M., Quinn E., Hui D., Labelle C. T., Drainoni M. L., Bachman S. S., Samet J. H. (2017): Long-term retention in Office Based Opioid Treatment with buprenorphine. *J Subst Abuse Treat.* 74: 65-70.
  71. Yamada T., Kendix M., Yamada T. (1996): The impact of alcohol consumption and marijuana use on high school graduation. *Health Econ.* 5(1): 77-92.
  72. Zippel-Schultz B., Specka M., Cimander K., Eschenhagen T., Gözl J., Maryschok M., Nowak M., Poehlke T., Stöver H., Helms T. M., Scherbaum N. (2016): Outcomes of Patients in Long-Term Opioid Maintenance Treatment. *Subst Use Misuse.* 51(11): 1493-1503.
  73. Zwiener I., Blettner M., Hommel G. (2011): Survival Analysis: Part 15 of a Series on Evaluation of Scientific Publications. *Dtsch Arztebl Int.* 108(10): 163-169.

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#### Conflict of interest

All authors have no conflict of interest.

#### Ethics

Authors confirm that the submitted study was conducted according to the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects.

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