

Opioid maintenance treatment and social aspects of quality of life for first-time enrolled patients.

A quantitative study.

Siv-Elin Leirvåg Carlsen

Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
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UNIVERSITY OF BERGEN



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Scientific environment

During this PhD I have been employed at the Department of Addiction Medicine at Haukeland University Hospital, which also funded my PhD studies. I have been a PhD student at the Department of Psychosocial Science, University of Bergen, Norway. I have also been a member of the Graduate School of Clinical and Developmental Psychology, and the Addiction Research Group at the Faculty of Psychology, University of Bergen, Norway.

Professor Torbjørn Torsheim, my main supervisor, and Associate Professor Linn-Heidi Lunde, my co-supervisor, are affiliated, respectively, with the Faculty of Psychology, University of Bergen, at the Department of Psychosocial Science and at the Department of Clinical Psychology.

During the development of the Norwegian National Quality Register for Substance Abuse Treatment (KVARUS) there was close cooperation between the Department of Addiction Medicine and Alcohol and Drug Research Western Norway (KORFOR). The head of research at KORFOR and the leader of KVARUS, Sverre Nesvåg, along with the person responsible for the development phase of the registry Amund Aakerholt, also from KORFOR, have been important collaborators.

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When I left home to study at the university, I do not think my parents envisioned that their daughter would achieve a doctoral degree. Neither did I.

However, you have always believed in me and supported me. Thanks to my parents and parents-in-law for all the support and love you have given me, and for providing a helping hand with my three wonderful children during the past years.

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Bergen, April 2020

Siv-Elin Leirvåg Carlsen

Contents

Scientific environment	3
Acknowledgements.....	4
Contents.....	6
Abstract	8
List of Publications	10
List of abbreviations and definitions	11
1. Introduction	14
1.1 Background.....	14
1.2 Opioid maintenance treatment	17
1.2.1 OMT in Norway	20
1.2.2 Characteristics of OMT patients	22
1.3 Theoretical framework	24
1.3.1 Adverse experiences and risk factors.....	24
1.3.2 Quality of life	26
1.4 Quality of life in the field of illicit drug addiction.....	30
1.5 KVARUS.....	32
2. MAIN AIMS	35
2.1 Research aim 1: OMT patients' sociodemographic characteristics, adverse experiences and age at opioid onset.....	35
2.2 Research aim 2: Predictors of OMT patients' quality of life	35
2.3 Research aim 3: Opioid and polydrug use among patients in OMT	35
3. METHODS.....	36
3.1 Study design.....	36
3.2 Sample	38
3.3 Measures	40
3.4 Statistical analysis	44

3.4.1	<i>Paper I</i>	45
3.4.2	<i>Paper II</i>	46
3.4.3	<i>Paper III</i>	47
3.5	<i>Ethics</i>	47
4.	RESULTS	49
4.1	<i>Paper I</i>	49
4.2	<i>Paper II</i>	50
4.3	<i>Paper III</i>	51
5.	DISCUSSION	53
5.1	<i>Adverse experiences</i>	53
5.2	<i>Quality of life as a term</i>	57
5.3	<i>Quality of life among study participants</i>	59
5.4	<i>Concurrent use of legal and illegal substances while in OMT</i>	66
5.5	<i>Heterogeneity</i>	69
5.6	<i>Methodological considerations</i>	70
5.6.1	<i>Sample and selection bias</i>	70
5.6.2	<i>Information bias</i>	73
5.6.3	<i>Missing data and confounding factors</i>	76
5.6.4	<i>Validity and reliability</i>	80
5.7	<i>Ethical considerations</i>	84
5.8	<i>Strengths</i>	86
6.	CONCLUDING REMARKS	88
7.	REFERENCES	90
	<i>KVARUS (Beta version)</i>	115

Abstract

Opioid dependence is a chronic lifelong disease, and opioid maintenance treatment is a well-documented effective treatment for this disease. A vast research exists on opioid maintenance treatment; however, research has primarily investigated socially desirable outcome goals such as reduced overdose deaths, criminality and drug use. The focus on other outcomes has been inadequate. This thesis contains three papers that are based on patients' own reported outcomes; they examine patients' natural treatment progression and changes in their life course with a specific focus on social factors and quality of life.

In Paper I, we described the patients' sociodemographic characteristics at first admission to opioid maintenance treatment and investigated how being exposed to potential adverse experiences could be associated with their age at opioid onset. The results indicated that the participants were heterogeneous; they differed in their sociodemographic characteristics, age at opioid onset, and exposure to potentially adverse events in life. We did find a strong association between age at opioid onset and being in care, family members that had been in prison or that were currently in prison, and school dropouts. Based on the total number of adverse experiences, 59% of all participants had a medium risk exposure in their childhood and adolescent.

Paper II examined patients' overall quality of life during the first year after enrolment in opioid maintenance treatment. In addition, we investigated potential correlations with overall quality of life to domain-specific quality of life indicators such as housing, relationship with children and friends, work, leisure, health and financial situation. According to the results, patients differed in their level of quality of life at baseline as well as in their change across time. However, the overall quality of life increased significantly during the first 12 months. There was a positive rate of change for all specific quality of life domains, but the financial domain was the only domain that achieved statistical significance. Overall quality of life regressed on domain-specific quality of life, indicating that housing, leisure and financial situation were positively associated with a higher overall quality of life.

In Paper III, we focused on the effects that opioid maintenance treatment had on substance/polydrug use and whether social factors were associated with substance/polydrug use during the first 12 months. Polydrug use consisted usually of substances such as benzodiazepines, cannabis, amphetamine and alcohol. We did not find an effect of time on polydrug use. However, a relationship between time and use of opioids was found, indicating a significant reduction in opioid use during the first 12 months. Age of substance use onset was associated with polydrug use, indicating that the older the age at onset, the lower the polydrug use in opioid maintenance treatment. Furthermore, opioid use was associated with overall quality of life, but we did not find any domain-specific quality of life-indicators for polydrug or opioid use. Polydrug use/opioid use was not associated with domain-specific quality of life-indicators. In addition, we did not find any Time by Total adverse experiences interaction, Time by Total resources interaction, or Time by Age of substance use onset interaction.

In summary, the thesis' results suggest that participants have different sociodemographic characteristics, come from diverse social strata and bring various life experiences and traumas into treatment. By addressing this heterogeneity as new patients are enrolled in OMT, clinicians may induce a more individually adapted treatment for patients in OMT. Besides, participants vary in overall quality of life, yet their overall quality of life improves during the first 12 months in opioid maintenance treatment. The fact that patients perceive enhanced quality of life may highlight the importance of emphasizing the psychosocial aspects that are important to patients in OMT.

List of Publications

Carlsen, S-E.L. and Torsheim, T. (2019). Self-reported adverse experiences and age of opioid onset for first time admitted to opioid maintenance treatment, *Heroin Addiction and Related Clinical Problems*, 21(3):17-26

Carlsen, S-E.L., L-H. Lunde & Torsheim, T. (2019). Predictors of quality of life of patients in opioid maintenance treatment in the first year in treatment, *Cogent Psychology*, 6: 156524
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Carlsen, S-E.L., L-H. Lunde & Torsheim, T. (2020). Opioid and polydrug use among patients in opioid maintenance treatment, *Substance Abuse and Rehabilitation*, 11: 9-18
<https://doi.org/10.2147/SAR.S221618>

List of abbreviations and definitions

AE: *Adverse experiences* are events in a person's life that increase the probability of a negative outcome in the future.

AFR: *Department of Addiction Medicine* at Haukeland University Hospital, the department responsible for OMT and for the present study.

KORFOR: Alcohol and Drug Research Western Norway, KORFOR, initiates and participate in local, national and international projects.

KVARUS: *The National Quality Register for Substance Abuse Treatment* (KVARUS) is a newly developed registry that is being implemented in all multidisciplinary specialised treatment (MST). Data on patient reported outcomes (PRO-data) are collected in KVARUS, and primarily patient reported experience measures (PREM data). KVARUS 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 two papers, KVARUS is referred to as NQR-SAT.

MAT: *Methadone-assisted treatment*, the term used for OMT when methadone was the only medicine used in OMT.

OMT: *Opioid Maintenance Treatment* is a medication-assisted treatment for individuals diagnosed with opioid dependence. Individuals are treated with either buprenorphine (Subutex or Suboxone) or methadone. The treatment is organised as collaboration between the specialist health service, the social service in the municipality and the primary health service, with the patient in the middle.

POLYDRUG USE: The use of, legal or illegal, multiple substances consumed sequentially or at the same time, to get intoxicated. Additionally, the use of prescribed substances in a non-medical manner, higher doses than recommended by the doctor.

PRO: *Person-reported outcome or patient-reported outcome*, often reported as PROMs or PREMs. In this thesis, patient-reported outcome (PRO) will be the term used.

PREM: *Patient-reported experience measure*. PREMs capture patients' perceptions of their experience with health care or treatment.

PROM: *Patient-reported outcome measure*. PREMs capture patients' perceptions of their experience with health care or treatment.

QOL: *Quality of life* is defined by the World Health Organization as: "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHO, 1995, p. 1405)". While this is a widely used definition, researchers also use terms such as health-related quality of life, well-being, and life satisfaction when referring to QOL. In this thesis, QOL refers to the individual experience from several domains in life summarised in an overall appraisal of QOL.

SA: The *Special Advisors* at the Department of Addiction Medicine, who are responsible for the treatment follow-up of OMT patients.

SUD: *Substance use disorder* encompasses the categories of substance abuse and substance dependence and is a diagnosis listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and in the International Classification of Diseases (ICD-10). SUD refers to an individual's recurrent use of alcohol and/or substances to such extent that it causes significant impairment in physical and mental health, and entails legal, social-life and other negative consequences for his/her life. Level of SUD severity can be defined as mild, moderate, or severe.

T0: *Time* at baseline, the first registration of data.

T1-T4: *Time of the follow-up periods*. T1 is at three months follow-up, T2 is at six months follow-up, T3 is at nine months follow-up, and T4 is at 12 months follow-up.

TSB: *The Norwegian multidisciplinary specialized treatment* of substance use disorders and dependence. These services are interdisciplinary, meaning that medical doctors, psychologists, nurses and social care workers provide them.

1. Introduction

1.1 Background

Substance use disorder, heroin addiction, and addicts are concepts we mostly have negative associations with - and words we do not classify as congruent with quality of life (QOL) or having a good life. The QOL of people with substance use disorders (SUD) and patients in Opioid Maintenance Treatment (OMT) are rarely examined.

When we live longer, the social focus shifts from longevity to the content and quality of life, if we live good lives (Laudet, 2011; Schalock, 2004; Schuessler & Fisher, 1985). Recently, there has been a more noticeable focus in Norway on mental health and factors influencing the population's health and well-being. In this regard, QOL is important because it gives a holistic perspective and useful information on the lives of individuals and groups, both at a given time but also in a life-course perspective.

Norwegian people represent one of the happiest populations in the world (Helliwell, Layard, & Sachs, 2019). In general, people in Norway have a good financial status, a high degree of social support, a healthy life expectancy, freedom to make their own life choices, a high level of generosity, and a low level of corruption in society (Helliwell et al., 2019). To improve public efforts to ensure mental health and well-being, the Norwegian government required specific information and validated data on QOL and decided to examine their citizens' QOL on a regular basis (The Norwegian Directorate of Health, 2016). However, people with SUD are seldom represented in these QOL surveys.

SUD is considered a chronic disease, and about 50-60% of people with SUD relapse to substance use within six months following treatment termination (McLellan, McKay, Forman, Cacciola, & Kemp, 2005). For individuals and groups with chronic disorders, such as SUD, QOL is an especially important outcome, particular over time.

Addiction to substances negatively affects different areas of life (Laudet, Becker, & White, 2009; Strada et al., 2017). The use of opioids poses a great risk of premature death (B. Smyth, Hoffman, Fan, & Hser, 2007; Whiteford et al., 2013). Opioid dependent individuals were five to ten times more likely to die compared to non-addicted peers in the general population. Premature death caused by overdose remains the leading cause of death among opioid dependent individuals (Degenhardt et al., 2011), however deaths related to falls, traffic accidents and drowning are more common among opioid dependent individuals than non-using peers (Degenhardt & Hall, 2012). In Europe, the mean age at drug-induced death is 39 years (EMCCDA 2018). Approximately 12% of premature deaths among young adults aged 15-39 years in Norway are related to injecting a combination of various substances (EMCCDA, 2015).

Other aspects of life among people with SUD are also considered important for their QOL. The average education level among people with SUD is low, namely completion of primary/secondary school (Lauritzen, Ravndal, & Larsson, 2012; Svendsen, Fredheim, Romundstad, Borchgrevink, & Skurtveit, 2014). Amongst OMT patients, 12% had started higher education after finishing upper secondary school (Lauritzen et al., 2012). For most people, work, next to school, is particularly important because it provides a feeling of belonging, identity and the possibility to interact socially. Although opioid dependent individuals have little affiliation with the labour market (The Norwegian Department of Health and Care, 2012), some have work experience but fewer have a job (Vassenden, Bergsgard, & Lie, 2012). Due to low education level, little work experience and a long life with substance misuse, OMT patients often live on social benefits or disability pension (Lauritzen et al., 2012; Waal, Bussesund, Clausen, Lillevold, & Skeie, 2018).

There is an association between lack of adequate housing and misuse of substances (Koegel, Sullivan, Burnam, Morton, & Wenzel, 1999; Shelton, Taylor, Bonner, & van den Bree, 2009). In Norway, approximately 80% of all people with SUD have their own home, while eight percent are homeless (Hustvedt, Bosnic, Håland, & Lie, 2019; Waal et al., 2018). However, individuals with SUD often live in

neighbourhoods with low-socioeconomic status (Carlsen, Gaulen, Alpers, & Fjaereide, 2019; Latkin & Curry, 2003; Vassenden et al., 2012). Living in such areas has several negative aspects, such as social isolation, poverty, illicit substance use and increased depression (Galea et al., 2007; Latkin & Curry, 2003; Santiago, Wadsworth, & Stump, 2011). Moreover, living in such areas, opioid dependent individuals rarely get desired social visits from family members or friends outside the drug environment, while they often get unwanted visits from people engaged in use of substances who need a place to stay or who want to sell or buy substances (Vassenden et al., 2012). Opioid dependent individuals often have little contact with people outside their own milieu, and loneliness is a well-known issue (Armstrong, 2015; Conner & Rosen, 2008; Mannes et al., 2016; Y.-J. Yang et al., 2017). However, 25% of opioid dependent individuals spend most of their time with family members without substance misuse issues (Lauritzen et al., 2012). Many opioid dependent individuals have children, although they do not have daily custody and care. This illustrates that opioid dependent individuals have other social roles, they are not merely someone who misuses substances; they are parents, sisters or brothers, and they are lovers, ex-spouses or former colleagues (Neale, Bloor, & McKeganey, 2007). Besides, opioid dependent individuals have the same dreams and wishes as people in the general society: living a normal life in a nice house with their family, having a job, relationships, friends, and to feel a sense of belonging to and participate in society as equal with everyone else (De Maeyer, Vanderplasschen, Camfield, et al., 2011; Nettleton, Neale, & Pickering, 2013).

The negative consequences of living a life with opioid addiction, and the hope of a better life are two reasons why people apply for OMT (Laudet, Becker, et al., 2009). Research has established that OMT medicine is effective (Barnett, Rodgers, & Bloch, 2001; Corsi, Lehman, & Booth, 2009; Kornør, Bjørndal, & Welle-Strand, 2006). However, previous OMT research has mainly focused on the cost-benefit aspect of treatment (Lauritzen et al., 2012; Melberg, Lauritzen, & Ravndal, 2003), types of medicine and dosage (Kornør et al., 2006), and health-related quality of life

(HRQOL) (Baykara & Alban, 2019; De Maeyer, Vanderplasschen, Lammertyn, et al., 2011; Padaiga, Subata, & Vanagas, 2007).

The main focus, in both clinical practice and research, is often on socially desirable outcomes such as reduced overdose deaths, criminality and drug use. These are all important outcomes. However, outcomes important and relevant to the patient themselves, their personal well-being and having a meaningful life, have received little attention (De Maeyer, Vanderplasschen, & Broekaert, 2010; Strada et al., 2017). With this background, the overall aim of this thesis was to broaden the understanding of social dimensions that are important for OMT patients' QOL and the potential changes in their lives after OMT enrolment. The three articles included in this dissertation deal with different aspects of the important social factors for patients in OMT. The first article addresses patients' social background and the association of adverse experiences with age of opioid onset. The second article examines the patients' overall QOL starting OMT and the associations between domain-specific QOL factors and overall QOL. The third article focuses on social factors associated with opioid and polydrug use after enrolment in OMT, and whether social factors, adverse experiences, social resources and QOL are related to opioid use and/or polydrug use.

1.2 Opioid maintenance treatment

Substance use disorder, including opioid dependence, is understood as a lifelong chronic, relapsing disorder (Dennis & Scott, 2007; Fowler, Volkow, Kassed, & Chang, 2007; Leshner, 1997; McLellan, Lewis, O'Brien, & Kleber, 2000) with repeated treatment-relapse-treatment episodes. Internationally, opioid dependence is primarily classified as a disease by the WHO's International Classification system of Diseases, ICD-10, but the American Psychiatric Associations' Diagnostic and Statistical Manual of Mental Disorders, DSM-IV is also used. ICD-10 and DSM-5 distinguish between dependence and abuse/harmful substance use. Dependence implies chronicity, and indications and criteria for the diagnosis are increased tolerance to the substance and inability to abstain from opioid use, preference for

such use over other activities despite physical, mental and/or social problems, and presence of these indications for longer than 12 months (WHO, 1993). Substance abuse applies when the dependence criteria are not met, but when at least one substance-related symptom puts the person at great risk of harming themselves or others and at risk of developing dependence (Saunders, 2017).

Opioid use produces tolerance and subsequent dependence by repeated administration. The chronicity of opioid dependence causes a need for constant medication, which can be met by prescribing substitution medicines such as methadone or buprenorphine (Dole & Nyswander, 1968; Kumar, 2012; WHO, 2009). Methadone was the first medication used in OMT (Dole & Nyswander, 1967), it is one of the most cost-effective methods to reduce use of opioids among individuals enrolled in OMT programs, and it is still the most widely prescribed drug in OMT (EMCCDA, 2019; Mattick, Breen, Kimber, & Davoli, 2009). Buprenorphine first became available to treat opioid dependence in Europe in 1996 and in 2003 in the USA (Dreifuss et al., 2013). Due to the high risk of overdose on methadone, buprenorphine became the first-choice medicine in Norway in 2004.

Methadone is a full agonist that stimulates all types of opioid receptors and has a long half-life, while buprenorphine is a partial agonist providing less attenuation to the respiratory centre (Lobmaier, Gossop, Waal, & Bramness, 2010; McLellan et al., 2000; Norwegian Directorate of Health, 2010). Opioid substitution medication blocks the acute narcotic effects of other opioids, and a long-term adequate dosage (high dosage) prevents withdrawal symptoms, keeps the patient stable and compatible to a functioning life (Dole, 1994; Dole & Nyswander, 1968; Gordon, 1970). OMT patients take buprenorphine or methadone on a daily basis and under supervision, in outpatient units, in pharmacies, inpatient facilities or in prisons. There is evidence showing that high doses (> 60 mg methadone, 16-32 mg buprenorphine) are more effective than lower doses (Coplehorn, Bell, Kleinbaum, & Gebiski, 1993; Gerra et al., 2003; WHO, 2009). An average dose of methadone amounts to 92 mg/day, while it is between 13-15 mg/day for buprenorphine (Waal et al., 2018). The recommended dosage in Norway is 80-110 mg/day for methadone and 12-24 for buprenorphine.

This is in accordance with the international standard OMT dose (Faggiano, Vigna-Taglianti, Versino, & Lemma, 2003). Unauthorized use of opioids poses a serious danger to public health. To reduce the risk of diversion of prescribed OMT medicine, OMT programmes implement strict control regimes for administration (Wagner et al., 2018; WHO, 2009).

The opioid dependence diagnosis is based on a biopsychosocial principle. This posits that there is a mutual interaction between biological, psychological and social factors when it comes to development of opioid dependence, healing and recovery. Therefore, to target OMT, we need to combine specific pharmacological as well as psychosocial approaches to reduce illicit opioid use as well as reduce opioid-related harms and improvement of their QOL (Kumar, 2012; Waal, Bussesund, et al., 2019; WHO, 2009). A biopsychosocial approach often deals with how the municipality guides and helps OMT patients in establishing a life different from the day-to-day life they had as an active opioid user. The psychosocial approach may include services ranging from assistance with basic needs, such as finding safe accommodation, a social network and social integration through work, education or leisure activities, financial guidance, to supportive psychotherapy or other structural psychological techniques to help with their often extensive mental illnesses (WHO, 2009). The psychosocial follow-up will depend on the preferences and prerequisites of the individual patients (Norwegian Directorate of Health, 2010).

Despite treating the same condition, the approaches to OMT vary significantly across the world, both in terms of access to treatment, available medication options and doses, the level of control and level of psychosocial support (Fischer & Stöver, 2012). Some OMT models emphasise harm-reduction while others have a recovery approach. The harm-reduction model aims to reduce negative consequences of opioid use, e.g. crime, overdose deaths, and blood-borne viruses. The recovery model emphasises broader social and health-related outcomes such as improved health, wellbeing and reintegration into society (Fischer & Stöver, 2012). Norway has clear political guidelines that emphasise how OMT patients should be assisted to change their life situation in order to achieve their optimal level of coping and functioning

(Norwegian Directorate of Health, 2010). To reach this goal, the Norwegian OMT model has adopted a biopsychosocial approach, by including a collaboration between the multidisciplinary specialised treatments of addictions, TSB, the municipality, the patients' general practitioners and the patients themselves (Norwegian Department of Health and Care Services, 2015).

1.2.1 OMT in Norway

Rising numbers of overdose deaths in the 1990s, primarily heroin-related, actualised a new treatment option in Norway viz. methadone-assisted treatment (MAT). Despite a resistance to MAT in the addiction field, a small pilot project started in Oslo with strict admission criteria and control regime in the mid-1990s (Skretting, 1997). As time passed, the initial opposition to MAT turned into a more positive attitude that resulted in OMT becoming a national treatment alternative in Norway in 1998 (Frantzen, 2001). In 2017, 38% of all OMT patients in Norway were prescribed methadone while about 60% were prescribed buprenorphine. During the past 20 years, approximately 12,000 individuals have accepted this treatment in Norway (Waal et al., 2018), and by the end of 2018, enrolment accounted for 7,622 patients.

Until 2004, the municipality and county council were obliged, pursuant to the Norwegian Social Services Act, to provide treatment to individuals with opioid dependence. In January 2004, there was a change in the legislation, and the overarching responsibility for treatment of people with SUD was transferred from the county council to the state and the specialist health service, TSB (NOU 2019:26, 2019; The Norwegian Department of Social Affairs, 2002-2003). People with SUD were then granted legal rights to necessary specialist health care on equal terms with somatic patients.

To be eligible for OMT, patients must meet the requirements for opioid dependence as classified in ICD-10. An interdisciplinary specialist treatment team at all health trusts assess whether the patient meets the requirements for OMT

(Norwegian Directorate of Health, 2010). OMT in Norway is considered a long-term treatment (Bukten, Stavseth, & Clasuen, 2019). In the twenty years OMT has been available in Norway, there has been a change in the treatment philosophy, from rehabilitation to harm reduction. However, this philosophy is not well incorporated in all the health trusts (Waal, Bussesund, et al., 2019). The long-term desired effect of OMT is that people with opioid dependence can enter a new phase of life where they can address their issues of substance use and life problems (Lie & Nesvåg, 2006; Norwegian Department of Health and Care Services, 2015). The purpose of OMT in Norway is that: “*people with opioid dependence should have an **increase in quality of life** and that individuals receive assistance to change their living situation through improvement of their optimal mastering and functional level*” (The Norwegian Ministry of Health and Care Services, 2009§ 2).

In Norway, OMT is integrated into the specialist health service, and is often organised as outpatient units; nevertheless organisational models in the different health trusts still vary (Waal, Bussesund, et al., 2019). At Haukeland University Hospital, OMT is organised as eight outpatients units. One unit is a low-threshold unit, implying that people who use opioids and are in need of treatment can get a quick assessment as to whether they meet the requirements for OMT, without applying through the usual channels, viz. general practitioners or social service (Waal, Clausen, & Lillevold, 2019). If they meet the requirements, medication will be initiated at the low-threshold unit, and when the patients have been stabilised at the appropriate dose, they will be transferred to the unit in the district where they live. Each outpatient unit employs counsellors, primarily nurses, who are responsible for day-to-day patient follow-up. There is a senior physician and a specialist doctor on all the units, and some units have a psychologist as well. All OMT patients have approximately the same treatment options in all units, including the distribution of medicine, opportunities for therapeutic conversation with a therapist, a medical consultation mainly related to OMT, or counselling/referral to a psychologist, along with meetings with the patient care team. At national level, applications for OMT have levelled off, which may suggest that OMT has largely reached the heroin-

injecting population, and future efforts should be directed more towards other heroin-using groups than those who inject (Waal, Bussesund, et al., 2019).

1.2.2 Characteristics of OMT patients

Comparative data on OMT patients' characteristics in Europe is limited and difficult to compare due to different methodologies (Goulão & Stöver, 2012). However, on an international basis, some similarities are reported. OMT patients are mainly white men (Goulão & Stöver, 2012; Pani et al., 2011; SAMHSA, 2017; Zippel-Schultz et al., 2016). Contrary to this rule, there are a higher odds in the USA of receiving OMT among people of African-American and Hispanic ethnicity compared to those of white ethnicity (Krawczyk, Feder, Fingerhood, & Saloner, 2017). The average age of OMT patients varies. In Europe, the average age is 36.5 years (Fischer & Stöver, 2012), while a meta-analysis by Sun et al. (2015) found an average age of 34.4 years for Chinese OMT patients. In Norway, the average age was 42.7 years in 2013; it increased to 44.3 years in 2016, and in 2018 the average age was 45.6 years (Waal, Bussesund, et al., 2019). In both Europe and Norway, the majority of OMT patients are single and live in their own flat (Goulão & Stöver, 2012; Waal, Bussesund, et al., 2019). In terms of education level, most OMT patients in Europe had secondary school level or lower (Goulão & Stöver, 2012). There is no clear trend in relation to employment rate: some studies show that approximately half of OMT patients are unemployed (Dreifuss et al., 2013; Griffin et al., 2014), while other studies found a higher employment rate (Goulão & Stöver, 2012; Le et al., 2019). In terms of work, only 20% of OMT patients in Norway have a job (Waal et al., 2018), and social benefit is the most common source of income for OMT patients.

Both internationally and in Norway, frequent substance use and polydrug use before and while in OMT remains a problem (Heikman, Muhonen, & Ojanperä, 2017; Le et al., 2019). Misuse of substances such as alcohol, benzodiazepines (BZD), amphetamines, cannabis, cocaine, and OMT medications are reported from several sources (Backmund et al., 2006; Specka, Bonnet, Heilmann, Schifano, & Scherbaum, 2011; Srivastava, Kahan, & Ross, 2008; Waal, Bussesund, et al., 2019). In general,

polysubstance use is related to risk of somatic and psychiatric problems (Connor, Gullo, White, & Kelly, 2014), and OMT patients are frequently affected by comorbidity (De Ruyscher, Vandeveld, Vanderplasschen, De Maeyer, & Vanheule, 2017; Kessler, 2004; Naji et al., 2017; Parmar & Kaloiya, 2018; Ross et al., 2005). Mental health disorders, e.g. anxiety and depression, as well as schizophrenia (Grant et al., 2004; Whiteford et al., 2013), psychological distress, and a lifetime history of post-traumatic stress disorders (Ross et al., 2005), personality disorders, especially borderline and antisocial personality (Darke, Williamson, Ross, Teesson, & Lynskey, 2004; Parmar & Kaloiya, 2018), and physical illness, e.g. chronic pulmonary disease, hepatitis C, and musculoskeletal disorders, are common among opioid dependent individuals (Bahorik, Satre, Kline-Simon, Weisner, & Campbell, 2017; EMCDDA, 2018). Patients with SUD have a higher disease burden compared to people without SUD (Bahorik et al., 2017; Parmar & Kaloiya, 2018). Opioid dependent individuals gets the same diseases and ailments as the rest of the population; only they usually get it at an earlier age and often several ailments at the same time. As a result, the health situation for opioid dependent individuals is poor.

Research has often highlighted the impact risk factors have on substance use. In our context, a risk factor is understood as characteristics, hazards or variables that increases a persons' likelihood to develop a disorder (Mrazek & Haggerty, 1994). Age of onset is a risk factor for alcohol dependence and SUD (Backmund et al., 2006; Behrendt, Wittchen, Höfler, Lieb, & Beesdo, 2009; Kopak, Proctor, & Hoffmann, 2017), and the earlier the onset of opioid use, the greater the chance of problems later in life (Naji et al., 2017). Besides, having more risk factors present in early childhood predicts later behaviour problems in adolescents (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Fergusson, Horwood, & Ridder, 2007; Kopak et al., 2017). In the general population of the USA, the prevalence of dependence and abuse rises during the teen years, with a peak at 20% at the age of 18-20 years. Over the next four decades, the prevalence gradually declines (Dennis & Scott, 2007). Naji et al. (2017) found that OMT patients having an age of opioid onset of <18 years had higher odds for having comorbid disorder compared to OMT patients with an age of onset of opioid use of > 31 years or older. Moreover, age of opioid onset is also

correlated with post-treatment substance use (Naji et al., 2017). Furthermore, people with SUD have often experienced violence and/or other traumas through their upbringing, or in their lives as active substance abusers (Norwegian Department of Health and Care Services, 2015). Among heroin users entering treatment (OMT, detoxification or drug-free residential rehabilitation), 92% had experienced traumatic events capable of triggering post-traumatic stress disorder (Ross et al., 2005).

1.3 Theoretical framework

To understand the potential social dimensions and implications on OMT patients' lives, OMT patients' views are important. Therefore, the approach of this thesis is by person/patient-reported outcomes (PRO). PRO is information that originates directly from the patient on any aspects of their lives, often in relation to health status, but without any interpretation of their response (U.S. Department of Health and Human Services, 2006). The idea is to yield insights into people's experiences and opinions. PRO is often reported as PROMs and PREMs. PROMs are data on patient's perception of their health (Black, 2013; Neale et al., 2016; SKDE, 2017), whereas PREMs are data on patient's perception of their experience with health care or treatment (SKDE, 2017). KVARUS uses mainly PREMs.

1.3.1 Adverse experiences and risk factors

One framework in this thesis can be described as the impact of adverse experiences or life event research. Experiences can generally be divided into good or bad experiences. Good experiences can have a positive influence on a person and thus act as a protective factor on events later in life. A protective factor refers to conditions that improve or buffer people's resistance to risk factors (Clayton, 1992; Kraemer et al., 1997). Bad experiences may have negative influence and thereby act as risk factors for facing other negative events later in life. Types of events that constitute risk factors vary, but are often defined by characteristics within the person, conditions in which the person lives, or a combination of these. Adverse experiences are any untoward incidences in a person's life, e.g. unexpected loss of a loved one,

household dysfunction, being placed in foster care, that may affect them negatively and increase the probability of a negative outcome in the future, and thereby become a potential risk factor (Ali et al., 2011). Risk factors are often divided into social and contextual factors, family factors, or factors related to peers during adolescence, and individual factors (Ali et al., 2011; Degenhardt & Hall, 2012; Gilbert et al., 2009). In our context, a risk factor is an individual attribute or characteristic, or situation, conditions or environmental contexts that are associated with a higher likelihood of negative outcomes, e.g. opioid dependence.

Early life stress has been found to be a vital risk factor for the development and persistence of mental disorders (Heim & Nemeroff, 2001). The structure and activity of the human brain is deeply affected by early experience (Perry & Pollard, 1998; Weiss & Wagner, 1998). Furthermore, an adverse experience in childhood has been found to increase the probability of experiencing another one (Felitti et al., 1998).

There is a relationship between early age of use onset, substance use, and mental health issues in adolescents (Dennis & Scott, 2007). Among Norwegian adolescents in general, there is a clear relationship between socioeconomic status and mental health: higher levels of mental health problems are found in children living in families where parents have low education and where the economic status is poor (A. Bakken, 2019; Bøe, 2015; The Norwegian Department of Health and Care, 2017). Poor quality of parent-child relationship, parental conflict and substance abuse in close family are family-related factors that increase the risk during adolescence (Ali et al., 2011; Degenhardt & Hall, 2012; Gilbert et al., 2009). Substance use is known as a factor that increases the risk of sexually transmitted diseases, injuries, cardiac problems, violence, disability, and crime (Dube et al., 2003). Evidence suggests that people exposed to four or more types of childhood exposure have a four to 12-fold increased risk of drug abuse, depression, and attempted suicide, and a two to four-fold increase in poor self-rated health. In other words, adverse childhood experiences have a strong and cumulative impact on adult health status (Felitti et al., 1998). Likewise, in-treatment psychiatric patients with a history of childhood abuse had a

2.7 increase in risk of opioid use (Heffernan et al., 2000). Furthermore, age of onset, understood as a background characteristic, correlates with post-treatment substance use (Kopak et al., 2017).

1.3.2 Quality of life

Although the concept of quality of life (QOL) is a relatively new term in the field of drug addiction research, the content of the concept is not necessarily new. The social sciences have always been interested in how different social aspects and social structures affect the individual and vice versa, and how society changes over time. Terms such as social inequality, socio-economic status, social participation, crime and family have been used to grasp potential structural as well as individual changes and conditions of living (Ferriss, 2004). However, the concept of QOL has not been used per se to describe various aspects in life satisfaction. A society's culture, structure and development may have consequences for the individual's development. Thus, societal factors might have an impact on a person's QOL. By taking a social science perspective on OMT patients' QOL one can highlight social processes, values, societal norms and at the same time increase understanding of social actions.

QOL is a socially constructed ubiquitous term which we cannot observe directly, although we might have an interpretation and understanding of the term (Cummins, 2005; Fayers & Machin, 2015). QOL is about what matters to people, what gives life value and meaning; it is an evaluation of important aspects of a life or society (Næss, Moum, & Eriksen, 2011; The Norwegian Directorate of Health, 2016; Veenhoven, 2012). Quality of life implies a desire for change but also an acceptance of one's life circumstances.

In 1948, the concept of QOL was recognised by the World Health Organization (WHO). The WHO stated that health is "*physical, mental, and social well-being and not merely the absence of disease or infirmity*" (WHO, 2014, p. 1). This definition is widely used but is basically a QOL definition of health. This

definition is broadened to include environmental aspects, and QOL is defined as “*an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns*” (WHO, 1996, p. 3). The medical perspective towards QOL has entailed a more holistic approach to QOL.

Increasing attention is being given to the concept of QOL and it is used in a number of research fields such as medicine, literature, geography, architecture, environment, economics etc. (Barcaccia et al., 2013; Cummins, 2005; Ferriss, 2004; Næss et al., 2011). The concept QOL can be viewed as an umbrella term, encompassing other terms such as life satisfaction (LS), subjective well-being (SWB), health-related quality of life (HRQOL), and happiness. These terms can be mutually interrelated (Camfield & Skevington, 2008; De Maeyer et al., 2010; Schuessler & Fisher, 1985), yet they are different constructs (Barcaccia et al., 2013; Moons, Budts, & De Geest, 2006; Phillips, 2006). HRQOL has frequently been used synonymously with QOL (De Maeyer, Vanderplasschen, Lammertyn, et al., 2011). Humans live complex and dynamic lives, where different domains influence one another. Although health is highly intertwined with the social, economic, and environmental conditions of people, health does not represent the entirety of QOL (Moons et al., 2006; WHO, 1996). Limitations caused by disease and treatment are the main focus of HRQOL, where they measure a patient’s self-reported perception of how health status affects their physical, mental and social functioning (De Maeyer, Vanderplasschen, Lammertyn, et al., 2011; Laudet, 2011).

There are three main approaches to define QOL (Diener & Suh, 1997). One approach is the normative perspective, where normative values and what one considers correct is the basis of the understanding of QOL. The normative values can be based on philosophical, religious or other systems. The second approach is based on people’s choices, i.e. their satisfaction of preferences. From the utility perspective, individuals make choices in life to enhance their QOL; people, presented to be rational, make cogent choices. However, individuals do not always make rational choices that are consistent with normative ideals or increase their QOL. The last

approach is based on individual experience, where life is defined as good as long as the individual defines it as good. Factors such as satisfaction and feelings of joy appear to be significant (Diener & Suh, 1997).

While there is no consensus on the content of the term QOL (Moons et al., 2006; Schuessler & Fisher, 1985), researchers agree that QOL is subjective and multidimensional (De Maeyer et al., 2010; Fayers & Machin, 2015; Laudet, Becker, et al., 2009; Van Hecke et al., 2018; WHO, 1995). The subjective dimension refers to the individual perception, attitudes and feelings (Cummins, 2005; Moons et al., 2006; Schuessler & Fisher, 1985). Since QOL is a subjective judgement, it includes both an emotional and cognitive component (Theofilo, 2013). An objective dimension refers to observable life conditions, material and environmental conditions measurable by others (Cummins, 2005; Moons et al., 2006; Schuessler & Fisher, 1985). Both are valid indicators of QOL (Cummins, 2005; Van Hecke et al., 2018); however peoples' QOL cannot be quantified in the same way as one can quantify objective QOL dimensions such as income, reduced unemployment etc. (Gasper, 2010; Sousa & Lyubomirsky, 2001). Besides, there is often a weak link between objective dimensions and people's own reports on QOL (Sousa & Lyubomirsky, 2001), and an understanding of QOL as purely a subjective dimension is receiving growing support (Moons et al., 2006). By having a subjective approach to QOL, one emphasises both the positive and negative conditions, while former research primarily focused on negative conditions (Næss et al., 2011).

QOL can be divided into global or overall QOL and domain-specific QOL (Schuessler & Fisher, 1985). The global approach views QOL as unidimensional where limited domains add up to one global score. The domain-specific QOL views several domains, such as work, social relationships, financial well-being, and spiritual, simultaneously and produces individual sub-scores for those domains (De Maeyer et al., 2010). There is a high degree of mutual influence both between various specific QOL domains and within them (Hörnquist, 1989). Overall QOL and domain-specific QOL are also generally correlated (Pavot & Diener, 2008). When changes occur in a specific QOL domain that the person perceives as important, this will

entail a change in overall QOL (Van Hecke et al., 2018). Moreover, QOL is influenced by a person's personality traits, values and priorities, and changes in their QOL will be linked to more systematic changes than random contextual and transient changes in the person's mood (Carr & Higginson, 2001; Pavot & Diener, 2008).

Furthermore, instruments measuring QOL can be generic or disease specific. Generic instruments examine satisfaction with life in general, whereas disease-specific tools are mainly HRQOL instruments used in a specific group of patients or within a specific condition (Rudolf & Watts, 2002; Zubaran, Emerson, Sud, Zolfaghari, & Foresti, 2012).

The concept of QOL is value-laden, because it is an attempt to emphasise something that is considered important (Gasper, 2010; Næss et al., 2011; Phillips, 2006). All societies have value systems that are distinctive, and variations between and within the same society can occur (Gasper, 2010; Næss et al., 2011). In earlier drug addiction research, a widely applied focus was on how a disease affects a person's functioning, where the absence of disease is essential (De Maeyer et al., 2010; Moons, 2004; Zubaran & Foresti, 2009). Currently, a more wide-ranging approach recognises QOL as a reflection of how people perceive and react to different aspects of a person's life (Gill & Feinstein, 1994). In this context, eight core domains are suggested as representatives for the range of factors that constitute QOL. These are personal development, self-determination, interpersonal relations, social inclusion, rights, emotional well-being, physical well-being and material well-being (Schalock, 2004; Schalock, Bonham, & Verdugo, 2008). These domains are also applicable to opioid dependent individuals (Strada et al., 2017).

To give attention to social aspects and provide a better understanding of patients' satisfaction with life, it has been suggested that QOL is the preferred patient-reported outcome measure to use (De Maeyer et al., 2010; Muller, 2017).

1.4 Quality of life in the field of illicit drug addiction

There has been an exceptional growth in QOL research in the course of recent years, however QOL in the drug addiction field still lags behind other clinical research such as mental health and nursing (Laudet, Becker, et al., 2009; Tiffany, Friedman, Greenfield, Hasin, & Jackson, 2012).

During active substance use the individual's overall QOL is poor (Laudet, Becker, et al., 2009), and poorer compared to the normal population (Karow et al., 2011); however, a significant improvement in QOL after OMT enrolment is reported (De Maeyer, Vanderplasschen, Lammertyn, et al., 2011; Feelemyer, Jarlais, Arasteh, Phillips, & Hagan, 2014; Nosyk et al., 2011). Having satisfying life conditions was highly valued by individuals dependent on drugs and/or alcohol; if they resumed substance misuse, their QOL could decrease (Laudet, Becker, et al., 2009). Although the treatment outcome may be affected by the patients' QOL (Muller, Skurtveit, & Clausen, 2017), the main component of improved QOL and accepted end-point of treatment success for SUD has mainly been reduced substance use (Kiluk, Fitzmaurice, Strain, & Weiss, 2019; Laudet, Becker, et al., 2009; Muller et al., 2017; Tiffany et al., 2012). Nosyk et al. (2011) found that a decrease in illicit substance use had the largest effect on HRQOL for OMT patients. However, research has shown that there is no clear relationship between abstinence and QOL (De Maeyer et al., 2010); therefore, other predictors may be of great importance for QOL.

A structured everyday life, and meaningful activities are predictors of improvements in QOL in all dimensions (Best et al., 2013; De Maeyer, van Nieuwenhuizen, Bongers, Broekaert, & Vanderplasschen, 2013; von Greiff & Skogens, 2012). A meaningful activity is found to be more strongly related to improved health and QOL than is abstinence (Best et al., 2013; De Maeyer, Vanderplasschen, Lammertyn, et al., 2011).

Social support and a good social network are also related to QOL (Best et al., 2013; Muller et al., 2017; Nordfjaern, Hole, & Rundmo, 2010; von Greiff & Skogens, 2012), and in particular, support from family and friends (De Maeyer,

Vanderplasschen, Camfield, et al., 2011; Laudet, Savage, & Mahmood, 2002). For persons with SUD, general social support and informal engagement with individuals are found to be more important for mental health than having additional friends who support their abstinence (McGaffin, Deane, Kelly, & Blackman, 2018). Physical activity can also improve patients' QOL (Best et al., 2013; Giesen, Zimmer, & Bloch, 2016; Muller & Clausen, 2015).

Several studies explain the positive effects in QOL through improvements in health. Research has shown a positive development in physical and psychological health components of QOL (Karow et al., 2011; Mitchell et al., 2015; Padaiga et al., 2007; B. P. Smyth, Ducray, & Cullen, 2018). According to Padaiga et al. (2007), OMT patients had fewer musculoskeletal, gastrointestinal and cardiorespiratory issues at three- and six-months follow-up. Besides, OMT patients reported a decrease in anxiety, depression and anger issues at four months follow-up (B. P. Smyth et al., 2018). Nosyk et al. (2015) found a significant moderate improvement in HRQOL after OMT enrolment and suggested a threshold effect of HRQOL after week 24. A study by Pasareanu, Opsal, Vederhus, Kristensen, and Clausen (2015), showed a correlation between QOL and the load of psychiatric symptoms, where a high baseline psychological burden was associated with low QOL. However, patients generally had a positive improvement in QOL at six months follow-up. An improved health related quality of life (HRQOL) at three months follow-up was found among persons approaching substance use disorder services in spite of high psychological burden and low HRQOL at treatment initiation (Stallvik & Clausen, 2017). Strada et al. (2019) found that patients in OMT have high comorbidity, and that OMT only briefly improves the mental health outcomes.

Work or education may be other important QOL-related factors for many OMT patients. Patients with substance use disorders report getting a job as the most important goal when in treatment (Laudet, Magura, Vogel, & Knight, 2000; Zanis, Metzfer, & McLellan, 1994). Best et al. (2013) found that patients engaged in education, training or employment had a significantly higher QOL compared to those who had no such commitments.

An association between patients in substance use treatments perceived stigma and QOL, where stigmatisation impacts QOL negatively, has been identified (Luoma et al., 2007; Rosenfield, 1997; Singh, Kumar, Sarkar, & Balhara, 2018). Society's generally negative attitudes towards OMT patients as a group and citizens' resistance to having OMT clinics in their neighbourhoods may, directly or indirectly, have an impact on OMT patients' QOL. Shame is often the main limitation on wellness and recovery (Vigilant, 2004). It is therefore crucial to understand the stigma's impact on OMT patients.

Language and terms used to label persons with SUD contributes to the stigma. In the research field, various terms are used to describe people with SUD, e.g. addict, drug misuser, abuser, substance user, patient, and people with addictive disorders. In this thesis, the term opioid dependent individuals is chosen as terminology, based on the desire to not stigmatise and in order to emphasise their identity as individuals.

1.5 KVARUS

There are few longitudinal studies in the addiction field in Norway (Lauritzen et al., 2012), and generally there are few studies with repeated measurements where attention is placed on OMT and QOL as outcome measures (Laudet, 2011). Information that emerges in the interaction between treatment system and the patient is lost if one examines a limited set of time points using simple tools (Stout, 2007). The addiction research field needs more systematic knowledge about other outcome measures and information on predictors of QOL (Strada et al., 2019; Tiffany et al., 2012). Limitations of previous research on OMT patients' QOL are that the research has primarily had a health-related focus on QOL; the tools used were generic (Laudet, 2011; Zubarán et al., 2012) and developed for patients with other chronic diseases; and questions and topics did not fit the OMT population (Strada et al., 2017).

The main approach to increase knowledge about the OMT population in this thesis is based on a Norwegian initiative, viz. The National Quality Register for Substance Abuse Treatment (KVARUS). KVARUS originates in Western Norway

and is a national register for information about individuals in treatment for harmful use or addiction to substances with a view to obtaining their perception and experiences of treatment. KVARUS was approved as a national register in December 2018, and is being implemented in 2020. Alcohol and Drug Research Western Norway (KORFOR) is the main developer and responsible for the implementation and operation of the registry.

When the current study was initiated in 2013, the KVARUS was under initial development, with several subsequent revisions. In the development processes patients in substance use treatment, user organisations, such as proLAR, RIO and Alarm, and clinicians contributed with issues, questions and structure to the registry. The participatory approach was chosen to assure that topics and questions were relevant and understandable.

The KVARUS is structured around three main areas: basic registration, repeated data measurements', and measurements' at the end of treatment. Information requested in basic registration includes patient data related to age, gender, nationality, history of substance use (age of onset use, type of substances used, reasons for use, frequency and route of administration), previous experience in substance use treatment (number of treatments, type of treatments and if they were helpful), adverse experiences and positive events in life, mental health (diagnoses, medical treatment, duration, and assessment of improvement), actions to change the patient's life situation. The repeated data measurements requested information on: type of current treatment, drug use during the past 30 days, social conditions (housing situation, children and possible care, education, specific QOL domains) physical and mental health (as above), self-activity, contact with social services in the municipality, specialised health care services, the Correctional Service, or general practitioner, and type of follow-up. The final registration solicits information about patients' health and living conditions (the same measures as mentioned above) at the time of treatment termination and, if applicable, the specific organisation responsible for patients' follow-up after treatment has ended.

In the development of KVARUS, validated instruments were used as prototypes and models, such as WHO-QOL, WHO-BRIEF, the Quality of Life Scale (QOLS) and Short Form Health Survey (SF-36). Some questions or sets of questions from these instruments are incorporated in KVARUS. For further information see Appendix A.

2. MAIN AIMS

According to previous research, patients in opioid maintenance treatment (OMT) improve their mental and physical health after commencement of this treatment. This health improvement is often used to explain improved quality of life (QOL) of OMT patients. However, research of other outcome measures predicting OMT patients' QOL are inadequate and insufficient. Social aspects are often ignored when measuring QOL. Quality of life is a useful concept because it captures social aspects that are important for OMT patients. Consequently, the overall aim of this thesis is to investigate newly enrolled OMT patients' treatment progression and changes in their life course with a specific focus on social factors and QOL.

2.1 Research aim 1: OMT patients' sociodemographic characteristics, adverse experiences and age at opioid onset

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 at onset of opioid use.

2.2 Research aim 2: Predictors of OMT patients' quality of life

To examine a) patients' overall QOL during the first year after enrolment in OMT, and b) to investigate potential correlations with overall QOL to domain-specific QOL indicators in housing, relationship with children and friends, work, leisure, health and financial situation.

2.3 Research aim 3: Opioid and polydrug use among patients in OMT

To examine a) the association between OMT and subsequent opioid use/polydrug use, and b) to examine whether social factors such as social background, adverse experiences, social resources, and QOL are associated with opioid use/polydrug use during the first 12 months after enrolment in OMT.

3. METHODS

3.1 Study design

The present study has a longitudinal, prospective study design. Longitudinal studies follow particular individuals or a group of individuals over a longer time period with repeated or continuous measures (Caruana, Roman, Hernández-Sánchez, & Solli, 2015; Cook & Ware, 1983). The present study aimed to examine changes over time and factors likely to influence change. A longitudinal design is appropriate as it eliminates inter-individual variability from the assessments of interests (Cook & Ware, 1983). Besides, it allows an unequal number of repeated observations per participant as well as variation in the time interval (Molenberghs & Verbeke, 2001).

Study inclusion began in summer 2013 and concluded in summer 2018. Data on topics of interest were collected by using the National Quality Register for Substance Abuse Treatment (KVARUS). Two main recruitment approaches were utilised in this study.

The first approach, used in 2013, was to use the Special Advisors (SA) in OMT as the main link to potential participants. The SA are health and social workers, with a minimum of a three-year education at college level, with responsibility for the treatment follow-up of OMT patients. The research unit contacted the SAs for names and contact information of newly enrolled OMT patients. In addition, the SAs also informed newly enrolled patients about the study and asked for approval for being contacted by the researcher if they were interested. The research unit attended some kick-off meetings to inform OMT patients about the project, when this had been approved by the SA. Patients who did not receive information about the research project as described received a short text message with a brief explanation of the project and were asked whether the researcher could contact them. If initial contact failed, a letter containing information about the study and an invitation to participate was sent to all eligible patients. The approach chosen in 2013 yielded an insufficient sample size, and the recruitment phase had to be prolonged.

During the second recruitment, in 2015/2016, the project was anchored at the management level at OMT. Unit managers in OMT then made sure that information leaflets were visible at all units, provided information about the study to their SAs, who in turn informed patients about the project. The SAs referred potentially interested patients to the researcher, and the research unit was contacted when new patients were enrolled. Moreover, the researcher was present in the waiting rooms at the OMT units. The recruitment in Bergen Prison was done by the SA working there, who gave an informational letter to all potential participants, and reported back with the names of those interested.

Data were collected as structured registrations through face-to-face interviews or by phone (where found appropriately by the participant and the researcher) every third month for a period of two years. Face-to-face interviews were conducted in a place deemed convenient for the participant, frequently the participant's outpatient unit, prison ward or treatment institution, or in an office at AFR. The interviews lasted from 45 to 150 minutes to complete, depending on how familiar the participant was with KVARUS, how communicative the participant was, and how many breaks were needed. In the interview setting, the researcher read the questions and response options before the participant's answer was registered directly in KVARUS. The KVARUS edition recorded data in an Excel-file, which in turn was imported into an SPSS-file.

The agenda of the first meeting with the participant was to provide information on the study in an oral briefing, to obtain a signed declaration of consent for study participation and to complete baseline data at treatment initiation. For specific information about the topics and questions in KVARUS used in this study, see section 3.3 about measures in this dissertation and Appendix A.

Repeated data points were collected, where all topics in the KVARUS were reviewed in detail, at a three-month intervals. Prior to each data point, the participants were contacted by phone/text message regardless of whether participants were retained in OMT, actively using legal/illegal substances, in prison, or inpatient

treatment. The interview had to be completed within a period of two weeks before or two weeks after the registration date. To illustrate, if the first data point was completed on 15 January, the next data point needed to be completed between the 1 and 29 April. If no contact was accomplished during the first two weeks, the researcher contacted the participants' SA, or other specified contacts, and asked for their assistance to locate and contact the participant. If this was unsuccessful, the data point was registered as lost. Nevertheless, the patient was kept in the study and the patient resumed participation at the next scheduled data point.

At study initiation, the Alfa version of KVARUS was used for data collection. In 2014, the Beta version was introduced with several changes to questions, response options and sub-theme. As a result of this change, not all of the data could be transferred directly to the Beta version. Non-transferable data were omitted or listed as missing. This applied to baseline data for the first 15 participants and data at three-month follow-up for six of these participants.

All participants were given unique identities in KVARUS, and data was stored on a secure research server at Haukeland University Hospital. The Regional Committee for Medical and Health Research Ethics approved this study (2013/429/REK South-East C).

Due to a delayed data collection, the timeperiod for inclusion in the data analysis needed to be adjusted from a 24-month follow-up to a 12-month follow-up. This decision was backed by several considerations. By focusing on the first 12-months participants were represented by a comparable set of data points, viz. four data points, and they had equal length of treatment in OMT. Moreover, a 12-month follow-up period enabled the dissertation to be completed within the stipulated time.

3.2 Sample

The present study uses a non-probability sample where participants are self-recruited, i.e. participants voluntarily signed up for the study. All first-time patients enrolled in OMT in the catchment area of Haukeland University Hospital were

eligible, under the condition that they: a) had started OMT medication before the first baseline registration, b) age > 18 years, and c) could provide informed consent. At study initiation we estimated inclusion of approx. 100 first-time enrolled OMT patients on an annual basis. One hundred and thirty-nine OMT patients were contacted and invited to participate in our study. Of these, 15 declined to participate, while 77 OMT patients did not respond to the invitation. Forty-seven self-recruited, opioid-dependent individuals from all eight OMT units were enrolled in the study. All participants were in active treatment at study inclusion. No participants were terminated in OMT while participating in this study. One participant died after having participated for 12 months.

Participants were recruited from Bergen municipality, including one unit located in the prison, and the surrounding municipalities. The majority of participants were outpatients; however, some were inpatients at some data points, while others were imprisoned during all or parts of the study. At the outpatient unit, patients picked up their daily medicine and had a brief conversation with one of the OMT staff members. Participants in prison got their medication from health professionals or prison staff, while participants with access to dispensing through pharmacies got their medication from pharmacists. The majority of the participants got their medication from outpatient units. Participants received either buprenorphine (4 to 20 mg/day) or methadone (80 to 100 mg/day). Two participants got a muscle injection of extended-release naltrexone once a month.

Lack of competence to consent was the only exclusion criterion. No assessment was made of the participants' cognitive function for participation in this study. One participant withdrew due to lack of interest, leaving a total sample of 47 participants. Twenty-three participants were recruited in the first period and 25 in the second period.

Follow-up rate for studies involving people with substance use disorder vary greatly, ranging from 50% to almost 100% (Cottler, Compton, Ben-Abdallah, Horne, & Claverie, 1996; Hansten, Downey, Rosengren, & Donovan, 2000). Our study

aimed to recruit 50 participants with a follow-up rate of 85%. Power calculations were conducted prior to the study implementation, for the scenario of eight measurements spread across a 24-month period. Setting power to 0.8, these calculations concluded that to be able to demonstrate a weak effect size and interaction ($\eta^2 = 0.01$) with eight data points, one would need 92 participants. For a more moderate change/interaction ($\eta^2 = 0.06$), 24 participants would be needed, and to demonstrate a strong effect/interaction ($\eta^2 = 0.14$), over eight measurement points, eight participants would be needed. However these power calculations were not made for the 12-month follow up situation.

In Paper I, the sample comprises baseline data from 47 participants. About two-thirds of the OMT patients at a national level are men (Waal, Bussesund, Clausen, Lillevold, & Skeie, 2018). Our study population consisted of 77% men. The mean age was 37.8 years, and 4.3% were of foreign origin. Papers II and III have a sample of 47 participants at baseline (T0), 38 participants at three- and six-months follow-up (T1 and T2), 34 participants at nine months follow-up (T3), and 36 participants at 12 months follow-up (T4). Due to non-response on some of the included variables, the n was low in some of the analysis. A total of 1,026 event period observations were available in the data analysis in Paper I. In Paper II, 193 observations were analysed, while Paper III included between 193 and 146 observations.

3.3 Measures

The KVARUS contains questions based on patients' reported outcomes (PRO's), that relate to several aspects such as socio-demographic status, life events, substance use histories and current use of substances, former treatment experiences, mental and physical health, QOL and participants' actions aimed at reducing their substance use problems, as well as the patient's own experiences of the treatment they received. These topics include various sub-questions (see appendix A). The entire KVARUS was used in the data collection, as the included variables were found

in different items and sub-issues. However all data are not used in this thesis. This thesis included sociodemographic characteristics, history of and current substance use, adverse experiences and resources, and QOL.

Sociodemographic characteristics were measured by the following questions at baseline: year of birth, gender (male, female), nationality (Norwegian, Nordic country except Norway, Western Europe except the Nordic countries, Eastern Europe, Asia, Africa, South and Central America, North America, Oceania and Australia), marital status (single, boy-/girlfriend, married), education level (no education, primary/secondary school (1-11 years of education), higher secondary education (12 years of education), certificate of apprenticeship, higher education (college and university level), housing (own apartment, permanently with family, temporary living arrangement such as prisons, rehabilitation homes and treatment institutions, homeless), children (parenthood, visitation rights, custody of children <18 years, adult children) and criminality (waiting to serve a sentence, having unresolved issues with the police/justice system). These measures were used in Paper I and II. In Paper III, age, gender, marital status, age at onset, age at opioid onset, education and housing were used.

Patients' history of substance use was measured by asking participants to report: type of substances used (alcohol, cannabis, benzodiazepine (BZD), GHB/GBL, hallucinogens, amphetamine, cocaine, other stimulants, heroin, methadone, buprenorphine-naloxone (Subuxone), buprenorphine, other opioids, and androgenic anabolic steroids), the duration of use (in years), injected (yes/no response), age at substance use onset, age at opioid onset, and the main reason for onset (being influenced by others, curiosity, due to own problems, by chances). Type of substances used, age at onset, and age at opioid onset was used in Papers I and III. The other measures were used in Paper I.

To measure participants' *current substance use*, the KVARUS uses the same question as in EuropASI: "How many days during the last 30 days have you used alcohol or drugs?" (Blacken et al., 1994). Participants were asked to specify the

frequency (number of days), the main reason for use (medical purpose or to regulate emotions, getting intoxicated, social causes, compulsory use), and if the substance was injected (yes/no response). The measure of current use was used in Paper III.

Adverse experiences (AE) were life events that participants reported as having a negative effect on their present day-to-day life. Adverse experiences were measured by twenty-one questions, and covered domains such as family (e.g. addiction, financial difficulties, jail, mental health, long-lasting somatic disease, divorce and neglect), and community (e.g. dropout, break-ups, dismissal, housing, and child welfare). These indicators were dichotomised as “yes” or “no” responses, and 17 of these 21 negative life events were included in the analysis in Paper I. In Paper III, these answers were grouped into one variable measuring the total AE that participants had been exposed to. Loss of custody and care for their own child/children, involuntary termination of work, loss of housing, and marital breakup were excluded from the analysis. They were excluded as these experiences most likely occurred after the patients’ adolescence, and after the age of onset use.

To measure *patients’ social resources*, 15 questions from KVARUS were used. These questions covered issues such as support from family members, significant others outside the family, having contact with former substance users, close drug-free friends, becoming a mother/father, a safe/good housing situation, and being in a stable relationship and so on. The response to these questions was dichotomised as a “yes” or “no” response. In Paper III, these answers were grouped into one variable measuring the total resources the participants accessed.

The *overall QOL* was measured by the question “How would you rate your quality of life as a whole?”, which is used in instruments such as WHOQOL-BRIEF and WHOQOL (WHO, 1995, 1996) and Personal Wellbeing Index (Cummins, Eckersley, Pallant, van Vugt, & Misajon, 2003). This question measures participants’ overall evaluation of their satisfaction with life, taking into account both positive and negative aspects relevant to *their* individual experience. In addition, eight specific indicators measured various social life domains. These consisted of the following

questions: “How satisfied are you with: a) your personal relationship with partner, b) your relationship with children, c) your relationship with friends (International Wellbeing Group, 2013; Tomy, Fuller, Matthew, & Cummins, 2013; WHO, 1996) d) housing (WHO, 1996, 2012), e) your health (International Wellbeing Group, 2013; WHO, 1996), f) work (WHO, 2012), g) leisure (WHO, 2012), and h) financial situation (WHO, 2012). The participants reported their QOL on a five-point Likert-type response scale, ranging from 1 = “very dissatisfied” to 5 = “very satisfied” at each data point as in line with the WHOQOL-BRIEF (WHO, 1996). These questions were used in Papers II and III.

The *time* variable consisted of the follow-up times every third month (T0-T4) and were used in Papers II and III.

An overview over included variables are found in table 1.

Table 1. Included variables in the published articles

Variables	Paper I	Paper II	Paper III
Sociodemographic			
<i>Age</i>	x	x	x
<i>Gender</i>	x	x	x
<i>Nationality</i>	x	x	
<i>Marital status</i>	x	x	x
<i>Education level</i>	x	x	x
<i>Housing situation</i>	x	x	x
<i>Children</i>	x	x	
<i>Criminality</i>	x	x	
Substance use			
<i>Age of onset use</i>	x		x
<i>Age of opioid onset use</i>	x		x
<i>Type of substances used</i>	x		x
<i>Main reason for onset use</i>	x		
<i>Duration of use</i>	x		
<i>Injecting use</i>	x		
<i>Frequency of substance use last 30 days</i>	x		x
<i>Main reason for use last 30 days</i>	x		
Life events			
<i>Adverse experiences</i>	x		x
<i>Social resources</i>			x
QOL			
<i>Overall QOL</i>		x	x
<i>QOL friends</i>		x	x
<i>QOL housing</i>		x	x
<i>QOL health</i>		x	x
<i>QOL financial</i>		x	x
<i>QOL leisure</i>		x	x
Time			
<i>Baseline</i>	x	x	x
<i>3 month follow-up</i>		x	x
<i>6 month follow-up</i>		x	x
<i>9 month follow-up</i>		x	x
<i>12 month follow-up</i>		x	x

3.4 Statistical analysis

The present study explores life trajectories of OMT patients, where life trajectories are understood as activities, roles and events the person or group experiences over time (Ringdal, 2013). We were interested in relating the expectation, the change in QOL, opioid and polydrug use, to the covariates, viz., time in OMT, adverse experiences, sociodemographic factors, and thereby a regression

model is appropriate. Furthermore, this approach fitted the data and made it possible to examine the course of treatment as a function of time.

The data in the present study contains two perspectives: the component between people at the different data points, and the individual level, i.e. the within-person level. The data analysis applied different statistical methods, such as survival analysis using Cox regression to adjust for confounding factors (Paper I), linear mixed models for repeated measures (Paper II) and multilevel binary logistic regression analysis (Paper III). These statistical approaches are suitable for longitudinal analysis of continues as well as dichotomous outcome variables (Twisk, 2006). Besides, there is no need for complete case analysis by using these approaches, because a multilevel analysis is flexible in handling missing data (Twisk, 2006). The data analysis was conducted in IBM SPSS Statistics 24 (IBM Corp., 2016) and Stata SE version 15 (StataCorp., 2017).

We intended to analyse all eight repeated measurements per participant, and we did not make a distinction between the recruitment periods participants belonged to in the sample. To examine the possibility of bias among the participants who dropped out and those who completed, we conducted an attrition analysis with an independent t-test.

3.4.1 Paper I

To examine participants' life cycle until enrolment in OMT and to examine potentially significant differences in sociodemographic characteristics compared to age at opioid onset and potential adverse experiences, a survival analysis with Cox regression was conducted. We chose the Cox regression because we wanted to ascertain the covariates (predictors) that contributed most/least to age at opioid use onset and adverse experiences. This statistical approach can handle non-constant covariates over time and thereby demonstrates the implications the explanatory variable has in a survival model (Bjørndal & Hofoss, 2015).

Demographic characteristics were examined by descriptive statistics. The dependent variable in these analyses was age at opioid onset. The independent variables were 17 adverse experiences that potentially could occur in childhood/adolescents. Adverse experiences related to adulthood, e.g. loss of housing, loss of custody of own children or dismissal from work, were excluded from the analysis. To examine the potential relationship between age at opioid onset and number of adverse experiences, the experiences were clustered into three additive categories, namely low, medium, and high exposure. An arbitrary cut-off was set for each group; low risk group exposed to zero to five AEs, medium risk group exposed to six to 11 AEs, and a high risk group exposed to 12 to 17 AEs.

Due to the low cell count for some of the variables a Fisher's exact test was performed for each potential risk factor to examine if there was a cohort effect. To examine if there were cohort differences in age, we conducted a Mann-Whitney U test.

3.4.2 Paper II

To estimate level and change in general and specific domains of QOL from baseline during follow up, we used linear mixed models for repeated measures. This approach was chosen because it is a flexible method related to change. Coefficients were tested with Satterthwaite's corrected F-test for main and interactive effects.

The analysis was conducted in two stages. In the first stage we wanted to establish a model of change, where we regressed the dependent variable on time and relevant group factors. The dependent variable was QOL, and independent variables were specific QOL domains such as housing, leisure, financial, health and friends. We compared a random intercept only model with a random intercept and random slope of time model. By using likelihood ratio tests for nested models, we compared the model fit.

In stage two the differences in intercept and change were tested by including time invariant baseline factors. Significance was assessed by omnibus F-tests per

factor term. We also tested whether the effect of time interacted with baseline characteristics such as level of education, marital status, and type of living situation. Maximum likelihood estimation was used when we had missing data on outcome variables. While the direct likelihood method includes all available data of the dependent variable, cases with missing on the covariates were excluded from the analysis.

3.4.3 Paper III

In this paper we conducted a multilevel binary logistic regression analysis in two stages. In the first stage we examined the association of use of opioids or other substances (polydrug use) and time in treatment. A two-level binary logistic regression with polydrug use/opioid use as the dependent variable was executed. The independent variables were time (T0 - T4), overall QOL, level of education, marital status, and living situation.

The main analysis included regressions of polydrug use/opioid use on time-invariant baseline adverse experiences and social resources, and time-varying reports of QOL, QOL, social factors such as marital status, housing, and education. We tested for associations between polydrug/opioid use and participants' self-reported social resources and adverse experience. In addition, domain-specific QOL such as participants' relationships with a partner, with children, with friends', and their health, leisure, housing, and financial situation on overall QOL were also tested.

Due to non-response on some of the included time-varying covariates, the n varied in the different analyses. Between 193 and 146 observations were used in the analysis. A Fisher exact test was utilised to test whether there was any dropout selecting or difference in use of opioids/polydrug use missing.

3.5 Ethics

The principles expressed in the Declaration of Helsinki were applied in this study, and the study was approved by the Regional Committees for Medical and

Health Research Ethics (2013/429/REK South-East C). Participants signed a written informed consent before they were included in the study and the data were collected. All participants were re-informed about the study's aim and purpose at the first data point. During the study, participants were continually informed about their opportunity to withdraw from the study without any impact on their treatment. We asked participants who withdrew for permission to use already collected data. No participants refused this request.

In cases where the participant was intoxicated, we ended the registration and agreed on a day in the near future to complete the registration. This was done based on ethical consideration, as intoxicated persons will not be cognitively intact, and their judgment may be impaired.

All personal information about the participants, such as listing of name, ID-numbers and registration sequences, was maintained under appropriate security measures, such as being stored and secured in a separate data area, to ensure anonymity.

4. RESULTS

4.1 Paper I

Forty-eight opioid-dependent persons, 95.7% ethnic Norwegians, participated in our study, 11 women and 37 men. One participant withdrew due to lack of interest and the data were not included in this analysis, leaving a total sample of 47 participants. The sample consisted of 77 % men, and the mean age was 37.8 years, ranging from 23 to 61 years. The majority, 78.7%, were single, and 51.1% lived in their own apartment. Primary/secondary school was the highest education level for 44.7% of the participants. None of the female participants had a higher education beyond upper secondary school, while nine of 36 men had a certificate of apprenticeship or had studied at university. One half of the male participants and seven females had children; however, a minority had custody or visitation rights.

The mean age for substance use onset was 14.3 years ($SD = 4.87$), and alcohol was the first substance used by 62 % of the sample, while cannabis was the first substance used by 23.4%. The main reason for onset was curiosity for 55% of the participants. Being influenced by others (21.3%) and by chance (15%) were other reasons for substance use debut. The mean age at opioid onset was 22.6 years ($SD = 6.80$), ranging from 14 to 43 years with a median at 21 years.

In terms of vulnerability to adverse experiences (AE), these differed among participants. Some AEs were high-frequency, such as conflicts with the justice system/police, loss of family members or other significant others by death, and misuse of substances in the family. Other factors were low frequency such as being in care, suicide in the family and sex work. However, results indicated that family-related factors, e.g. having family members in prison, are not always the most prominent AEs; nevertheless, when they first occur they have a substantial impact.

A statistically significant association between AEs and age at onset of opioid use was revealed by a survival analysis by Cox regression. A strong association to age at opioid onset use was identified for being in care, family members that were in

prison or had been in prison and dropping out of school. Moreover, age of opioid use was systematically linked to family related factors.

The mean exposure to which participants had been exposed was 8.1 (SD = 4.0). Three groups were constructed (low, medium, high) to measure the total exposure of adverse experiences. Twenty-four percent of participants had zero to five AE, while 59% of the participants had medium exposure. Categorisation in the high-risk group, reported by 17.4%, was associated with lower age at opioid onset.

4.2 Paper II

There was attrition from baseline to follow-up at 12 months. In total, 193 observations of 47 participants were analysed and distributed as follows: 38 participants at three- and six-months follow-up, 34 participants at nine-months follow-up and 36 participants at 12-months follow-up. There was no significant difference between the completers and attritions for levels of education, marital status and type of living situation for the first year.

According to QOL regressed on time, the overall QOL increased significantly during the first 12 months with a positive effect on .19 per time unit. However, participants differed with respect to their intercept at baseline in the random intercept model but shared the effect of time. In the model with random intercept and slope, individuals varied both in their intercept on time and in their slope of change. This indicated that some participants had a decline in overall QOL while others increased their QOL across time. The rate of change was positive for all specific social domains, except for leisure. The average patient was dissatisfied with their financial QOL at baseline. However, the only social domain that achieved a statistical significance of change per time unit was the financial QOL.

Specific domains such as friends, housing, relationship with children, and relationship with a partner had no significant rate of change across time. Also, no health-related quality of life achieved statistical significance, $F(1, 37.014) = 3.140, p = .085$. Overall QOL regressed on domain-specific QOL, using the specific QOL as

time-varying covariates, showed that housing, leisure and financial situation were positively associated with a higher overall QOL, where leisure had the strongest contribution.

4.3 Paper III

At baseline, 66% of participants reported polydrug use that usually consisted of cannabis, benzodiazepines (BZD), amphetamine and alcohol. Use of these substances was also reported in the follow-up periods. Benzodiazepines and cannabis were often used in combination with other substances. In addition, at baseline, 70.2% of the participants reported opioid use within the last 30 days, mainly use of heroin or illegal buprenorphine. The frequency of usage varied from single days to daily use of opioids during the last 30 days.

There was no association of time on polydrug use. However, a significant association between time and use of opioids was identified, where participants had a significant reduction in opioid use during the first 12 months. A significant relationship between age at substance use onset and polydrug use indicated that the older the age at onset, the lower polydrug use in OMT. No such association was found for age at opioid onset and opioid use.

Marital status was not associated with polydrug or opioid use. A significant relationship was identified between higher secondary education and opioid use: however, education level was overall not related to polydrug or opioid use. Participants in a treatment institution/prison had less polydrug use compared to participants with other housing situations.

Overall QOL during OMT was significantly related to opioid use, indicating that higher QOL was related to lower odds of opioid use. Polydrug use/opioid use and domain-specific QOL indicators such as housing, leisure, family and friends, health, work and financial situation were tested, but none of these specific domains of QOL were associated with opioid use or polydrug use. No significant Time by Total adverse experiences interaction, Time by Total resources interaction, or Time by age

at substance use onset interaction was found, indicating that these background factors did not moderate the slope of change in OMT.

5. DISCUSSION

The main findings in this thesis are that participants represent a heterogeneity. Nevertheless, participants had medium pressure of adverse experiences in their adolescents, and age at opioid onset was associated with both numbers and type of adverse experiences. Besides, patients' age of substance onset and polydrug use while in opioid maintenance treatment (OMT) correlated. Participants' overall quality of life (QOL) increases during the first 12 months, and the financial situation was significantly related to improved overall QOL. In addition, overall QOL during OMT was associated to opioid use, a higher QOL indicated lower odds of opioid use. In line with previous research, OMT protects against opioid use. Nevertheless, OMT does not have the same protection against polydrug use. We found a significant relationship between time in treatment and reduced opioid use.

The discussion is divided into two parts. In the first part, the main findings and possible implications are discussed. In the second part, methodological considerations is discussed.

5.1 Adverse experiences

Adverse experiences can occur in adulthood. Nevertheless, the focus in this study was on events participants experienced as adverse experiences (AE) that primarily occurred during their childhood or adolescence. Our main finding in Paper I was that participants experienced different types and numbers of adverse experiences, and these differences in exposure were systematically related to differences in age of opioid use onset. Some participants had few adverse experiences or none at all, while others had numerous adverse experiences.

Previous research found associations between numerous types of childhood trauma and SUD (Afifi, Henriksen, Asmundson, & Sareen, 2012; Anda et al., 2002; Dube, Anda, Felitti, Edwards, & Croft, 2002; Hamburger, Leeb, & Swahn, 2008). Furthermore, previous research also found that the *number* of risk factors individuals must cope with, is more important than the *type* of risks (Bry, McKeon, & Pandina,

1982; Newcombe & Felix-Ortiz, 1992). On average, the participants in our study had been exposed to eight risk factors, and the early-onset opioid users had been exposed to a higher number of potentially adverse experiences compared to the late-onset opioid users. An understanding of cumulative exposure may explain the high number of risk factors (Appleyard et al., 2005). The early-onset opioid users may live in low socio-economic neighbourhoods where they might be exposed to several risk factors, and they may lack resources to promote positive experiences (Lambe & Craig, 2017). Boardman and Saint Onge (2005) found that the neighbourhoods in which adolescents lived were often influential in substance use. The neighbourhoods are important social arenas in which adolescents spend a significant amount of time (Leventhal, Dupéré, & Brooks-Gunn, 2009) and seek companionship with like-minded peers. Therefore, the neighbourhood can provide an entrance into disadvantaged environments where other rules apply to the socially accepted norms, e.g. school dropout is considered an adequate norm. Associating with antisocial and substance-using peers is a strong predictor of adolescent substance use, independent of individual and family risk factors (Degenhardt & Hall, 2012). In addition, adolescents living in non-supportive homes may be more likely to engage in environments where they gain support from deviant peers (Hummel, Shelton, Heron, Moore, & van den Bree, 2013). Being young and “undergoing renovation” can cause adolescents to be more vulnerable to potential adverse experiences, as they do not have the right prerequisites or life experiences to deal with these experiences in an effective way.

Furthermore, the Adverse Childhood Experiences study (ACE) in the USA examined childhood abuse, neglect and household challenges. The ACE-study found a strong association between the number of adverse experiences and having poor health and well-being as an adult, the greater the number of adverse experiences the greater the risk for negative outcomes (Felitti et al., 1998). Adolescent behaviour outcomes have been predicted by multiple risks in early childhood (Appleyard et al., 2005). Thus, the child’s interaction with the environment is set. Evidence shows that the family atmosphere is a potential risk for substance use: people with SUD often

come from families where there is a lack of love and warmth and where family ties are weak (Jedrzejczak, 2005). Furthermore, adolescents' closeness to their parents had a direct effect on reducing adolescents' involvement in substance use and also influenced adolescents' choice of non-substance-using friends (Kandel & Andrews, 1987). Family-related factors are associated with the risk of substance misuse onset in adolescence (Hummel et al., 2013). In line with previous research, the present study showed that participants' families were a predictor of age at opioid onset and thereby an adverse experience. Living in a family with neglect, substance use, and lack of supportive parents can lead the adolescent to seek support elsewhere. Adolescents from such homes may seek a sense of belonging that they may find among deviant peers (Hummel et al., 2013). Previous findings suggest that once substance use has begun, the dominant influences come from peers (Kandel & Andrews, 1987). Results from the current study found that family-related adverse experiences had a strong influence on patient's age of opioid onset and may indicate that some participants came from non-supportive homes.

In addition, we found that age at substance use onset was significantly associated with polydrug use while in OMT. On this basis, OMT patients that are early-onset users might have been exposed to several AE's, as indicated in the current study, compared to late-onset users. They might therefore have a greater need for treatment of traumatic experiences as opposed to late-onset users. Moreover, research found that individuals' current QOL was impacted by their traumatic experiences (De Maeyer, Vanderplasschen, & Broekaert, 2009), and a lack of attention to adverse experience was associated with dropping out of treatment (Arellano, 1996).

Unlike Bry et al. (1982) our study found that *both* number and type of adverse experiences were important for the participants. Age at onset use is an essential adverse experience factor for alcohol and SUD (Behrendt et al., 2009; Cleveland, Feinberg, Bontempo, & Greenberg, 2008; King & Chassin, 2007; Moss, Chen, & Yi, 2014; Tanaree, Assanangkornchai, & Kittirattanapaiboon, 2017). Research often distinguishes between early onset and late onset, however there is no universal definition of these terms. Early onset use have been defined as use at age <18 years,

and late onset as age >18 (K. Bakken, Landheim, & Vaglum, 2004), or early onset as mean age 21 years and late onset as mean 27 years (De, Mattoo, & Basu, 2003). Participants in our study initiated substance use during adolescence, which is in line with previous research (Hanson, Medina, Padula, Tapert, & Brown, 2011) and, related to the definitions used, is defined as early onset. Participants initiated opioid use onset at mean age 22.6 years, which falls between early and late onset use compared to the aforementioned definitions. In contrast to this, Subramaniam and Stitzer (2009) found that among adolescents with opioid use disorder, the mean age of opioid use was 15.1 years for non-medical use of opioids prescription, while it was 15.5 years for adolescents using heroin. The study of Subramaniam and Stitzer (2009) shows a very early age for opioid onset use, compared to previous research showing that age at opioid onset use varies from the early to late twenties (Davstad, Stenbacka, Leifman, & Romelsjo, 2009; Naji et al., 2017; Weinstein et al., 2017). In this context, the mean age at opioid onset among participants in the current study is in line with other research. However, the result from the current study also shows a spread in age at opioid onset from 14 to 43 years, which illustrates the heterogeneity in the sample, which consists of both early onset and late opioid onset users. Nevertheless, observations that deviate from the mean, whether they have high or low values, have an effect on the variance, displaying a variation that is too large or too small from the actual ratio. By removing the extreme values, one can adjust for these effects. Moreover, age 43 is not considered an extreme value in our sample, and it was more important to keep all the observations in the analysis than to remove these values, to maintain the sample size.

The current study did not include exact information about the timing of adverse experiences. However, due to the diversity of examined adverse experiences and the strong association to family relationships, it is reasonable to assume that many have occurred in participants' childhood or adolescence, and thus before the age of opioid onset. Furthermore, these results highlight that participants carry different burdens into OMT, and these may have to be addressed on an individual basis. In addition, the results also implied that different burdens may indicate

different needs for care (De Maeyer et al., 2013; Laudet, Stanick, & Sands, 2009) and psychological support.

Patients' interpretations of risk factors are associated with their experiences of distress, which in addition may explain a variance in their substance use (Nordfjaern et al., 2010). Substance use and reduced psychological distress among patients with SUD may be buffered by positive life events (Nordfjaern et al., 2010). Potential positive life events were not included in Paper I. By including such events we could have given a broader picture of the total prediction in terms of age at opioid onset.

5.2 Quality of life as a term

QOL is an object of increased attention, and some investigators claim that people are familiar with the concept of QOL and thereby have an intuitive perception of the concept (Fayers & Machin, 2015). However, defining the term QOL is not without problems (Fayers & Machin, 2015; Laudet, Becker, et al., 2009; Moons et al., 2006).

Various disciplines and their different definitions of QOL cause a lack of consensus, resulting in varying notions of QOL being less comparable even though the label QOL is used universally. One does not necessarily examine the same phenomenon or the same reference groups (Black & Jenkinson, 2009; Rudolf & Watts, 2002). In addition, the concept of QOL lacks specificity. It deals with general phenomena (physical, mental, and social) that are almost endlessly divisible. Furthermore, QOL lacks a theoretical body that can elucidate variances in QOL irrespective of time and place (Carr & Higginson, 2001; Schuessler & Fisher, 1985). However, the lack of consensus and specificity may enrich and expand our perspective and scope of the multidimensional concept QOL, and thereby advance research on QOL.

There is a strong association between patients' QOL and their self-reported needs (Lasalvia et al., 2005), so that changes in individuals' needs may affect their perception of QOL. It may therefore be difficult to ascertain whether one is

investigating the “actual or real” QOL, or one is gaining insight into a person’s state of mind. On the other hand, the individual’s subjective view is a unique source of information. It represents information about social issues that is valuable for clinicians and also for society at large (Ferriss, 2004), and it provides insight into humanity and patients’ experience with the treatment system. Moreover, QOL is not a static trait (Moons et al., 2006). It is a dynamic process, so QOL will change over time. It is precisely this dynamic process - the changes - that are interesting, and this is what makes QOL a useful perspective.

Historically, the field of drug addiction, in Norway as elsewhere, has experienced a number of paradigm shifts. The use of opioids, as well as society’s understanding of the problem, has changed from not being considered a problem to being defined as a medical issue. By the 1920s, opioid use was deemed a social problem and was criminalised. The current paradigm once again considers opioid use as a medical issue (Conrad & Schneider, 1992). This is also made clear in the new proposals for drug policy reform in Norway. The drug policy reform proposes that issues involving personal use and possession of illicit substances shall be transferred from the justice sector to the health sector: people with SUD should receive health care rather than prison sentences (NOU 2019:26, 2019). These shifts of paradigm are important for the prevailing understanding of the issue, for the use of personnel (social workers, psychologist, prison officers or health professionals) and for treatment alternatives. Furthermore, the paradigm affects the prevailing perspective, and thus our understanding of QOL. Today, the field of drug addiction is in tension between a psychosocial and a medical understanding, with HRQOL predominating (Strada et al., 2019). The expansion of medical perspective entails a process of social pathogenesis where other aspects besides health-related problems, e.g. substance use, are defined as deviant actions and are subjected to a medical understanding (Illich, 1975). Despite the loose definition of HRQOL and its emphasis on mental, physical and social functioning (Fayers & Machin, 2015; Laudet, Becker, et al., 2009), it originates from the pathology and medical paradigm (Cummins, Lau, & Stokes, 2004; Laudet, Becker, et al., 2009). To consider opioid dependence as a chronic

disorder (McLellan et al., 2000) QOL is a particularly useful concept. QOL has a holistic approach capturing aspects that matter to the patients - dimensions in OMT patients' lives that are negatively impacted (Laudet & Stanick, 2010; Strada et al., 2019) as well as social aspects that are often ignored when measuring medical outcomes (De Maeyer et al., 2009; De Maeyer, Vanderplasschen, Camfield, et al., 2011; Zubaran et al., 2012). Besides, in order to provide new insights, QOL covers a wider scope than physical, mental and social functioning, including, for example, the opportunity for leisure and environmental safety (Laudet, Becker, et al., 2009). Furthermore, QOL highlights OMT patients' need for intervention and care (Strada et al., 2019).

5.3 Quality of life among study participants

The desire to change their life for the better is often people's main motivation for starting treatment (Laudet, Becker, et al., 2009; Rhodes, Ndimbii, Guise, Cullen, & Ayon, 2015). Some may apply for OMT only to reduce the stressful life they live, where the main motivation is to receive the urgently needed medication. However, the majority of OMT patients take an active choice and apply for OMT because they want to change their life and direct it in a better and more positive direction, i.e. towards enhanced QOL.

Time is an important factor in relation to QOL (Winklbaaur, Jagsch, Ebner, Thau, & Fischer, 2008). During the first months in OMT, newly admitted patients significantly enhance their overall QOL (De Maeyer, Vanderplasschen, Lammertyn, et al., 2011; Feelemyer et al., 2014; Giacomuzzi et al., 2003; Mitchell et al., 2015). Although an initial enhancement in QOL is shown, this tendency might not continue in the long term (Strada et al., 2019). Among voluntarily and compulsorily admitted patients with SUD, with seriously impaired QOL at baseline, 58% experienced a modest positive change in overall QOL six months post treatment (Pasareanu et al., 2015). Wang et al. (2012) found that a higher QOL at enrolment predicted a better QOL during the course of OMT. Furthermore, they found a significant improvement in QOL during the first three months and a slower development afterward. In

addition, a study among OMT patients found that HRQOL improved over the first six months and outperformed the change at six to 12 months (Karow et al., 2011). Our study is in line with previous studies: although OMT patients' QOL fluctuated, their overall QOL improved, and the effect was present, even twelve months after participants were enrolled in OMT (Paper II). Nonetheless, participants entered OMT with different levels of QOL; some experienced a stagnation in QOL, while others experienced a decline. For some patients, enrolment in OMT may lead to loneliness and isolation (Armstrong, 2015; Conner & Rosen, 2008). The ability to trust others may be affected negatively due to OMT patients' experiences of unexpected deaths of friends, harmful relationships or other adverse experiences. Therefore, they avoid establishing new relationships and isolate themselves, and OMT patients over the age of 50 are especially at risk of social isolation (M. L. Smith & Rosen, 2009).

In the current study, satisfaction with the financial situation was significantly related to QOL and time. The average level of satisfaction with financial QOL was low at baseline, yet it increased. Interestingly, and contrary to our findings, De Maeyer et al. (2013) showed that after OMT enrolment patients were dissatisfied with their financial QOL, even after five years. However, socially included OMT patients were more satisfied with their financial QOL compared to those living in marginal conditions and with those who were stabilized but socially excluded (De Maeyer et al., 2013). The dissatisfaction was explained by the high cost of subsidiary substance consumption habits and their large debts. Debt and living in economic chaos, spending all their money and not being able to pay rent or other bills are reported among OMT patients (Carlsen et al., 2019; Gaulen, Alpers, Carlsen, & Nesvåg, 2017). Likewise, a study among 1.015 OMT patients in Germany reported low material satisfaction after six month of treatment, which was explained by patient having limited financial resources (Karow et al., 2011). Loss of status and contact in the substance use environment can lead to loss of income from illegal activity and less access to income that they previously had. Moreover, for many, living on disability benefits means minimum level of existence, because many have not had

any taxable income. The social benefits therefore do not cover anything more than primary needs, i.e. basic household expenses and food (Carlsen et al., 2019).

Giacomuzzi et al. (2003) found a significant increase in OMT patients' satisfaction with financial QOL during the first six months in treatment. The aspect of material well-being (Schallock, 2004) often concerns satisfying basic needs, such as having enough money to buy food, pay the bills, rent, and pay off debts (De Maeyer et al., 2009; Malvini Redden, Tracy, & Shafer, 2013). There is a strong correlation between persistent opioid use between 35 to 67 years of age and receiving social benefits four years later (Svendsen et al., 2014). By availing themselves of public assistance from the Norwegian Labour and Welfare Administration (NAV) OMT patients can address their economic challenges. A fixed monthly income from social benefits or disability pension ensures them a certain financial security. This attained security can lead to an economic freedom they might never have experienced before (Malvini Redden et al., 2013; Nguyen et al., 2019). A person's financial situation may also have a positive relationship to external and internal resources such as self-esteem, optimism and a sense of personal control (Camfield & Skevington, 2008). This financial freedom enables participants to participate in public social venues, e.g. cinemas, restaurants, which had been inaccessible to them in the past. Both the economic freedom and increased social engagement can increase the possibility of social contacts with new environments. This can also create a sense of belonging, and an extension of the patient's social role that can have a positive ripple effect on overall QOL.

OMT patients with stable housing, vocational education and patients who were currently employed reported a significantly better HRQOL at study entry (Karow et al., 2011). By achieving financial security and basic comforts, OMT patients can achieve a stability in life that can enhance their QOL by giving structure to everyday life (De Maeyer et al., 2013; O' Sullivan, Boulter, & Black, 2013). Furthermore, the QOL can be improved by giving them social and practical support in their daily life (De Maeyer, Vanderplasschen, Camfield, et al., 2011). In addition, because many OMT patients have little affiliation to the labour market, leisure time becomes

important. Qualitative studies found that patients with substance use and mental disorders emphasise the importance of having a meaningful activity and being able to be part of society (Cruce, Öjehagen, & Nordström, 2012; De Ruyscher et al., 2017; Turton et al., 2011), and engagement in meaningful activities is associated with better QOL (Best et al., 2013). The current study shows a significant relationship between high QOL leisure and high overall QOL. Leisure can be seen as an important arena in which participants may have their social network, and an opportunity to explore the possibility of interacting socially and establishing friendships, which can thereby affect their overall QOL. In regard to leisure, a Norwegian study shows that over half the people with SUD are dissatisfied with the help they receive in terms of having a meaningful activity in everyday life, financial help, being physically active and establishing a social network (Stallvik, Flemmen, Salthammer, & Nordfjærn, 2019). It is important to have an activity, something that replaces the use of substances and fosters the feeling that one has a purpose and a meaningful everyday life (De Maeyer et al., 2009; De Maeyer, Vanderplasschen, Camfield, et al., 2011).

When actively using substances, opioid dependent individuals often prioritise access to substances over self-care, and they scarcely have any leisure time because most of their time is spent raising money to buy substances, find a dealer or find a safe place to inject opioids. However, once enrolled in OMT, time becomes more accessible and there is a greater opportunity to rebuild their identity, focus on themselves, their personal needs, desires and interests (De Maeyer et al., 2009; Järvinen, 2008).

More spare time can also be a disadvantage. As opposed to the active substance user, spending time on substance-related activities, the OMT patient have so much spare time that they do not know how to spend it. Too much leisure time can lead to loneliness and a feeling of worthlessness and boredom. The path back to the drug environment may then be short. On the other hand, re-integrating into society can also be difficult. The public stigma attached to OMT patients is often internalised by OMT patients, resulting in self-stigmatisation (Cheng et al., 2019; Matthews, Dwyer, & Snoek, 2017), which can be a barrier and make the establishment of a new,

abstinent network hard to achieve (De Maeyer et al., 2009; Lloyd, 2013). Thereby, it interferes with the individuals' QOL. Moreover, the possibility of becoming more socially active and having increased financial QOL potentially offers a positive secondary effect, i.e. that OMT patients feel more socially re-integrated and that they became equal members of society. Taking part in meaningful activities in society at large can be a powerful tool in combatting stigmatization (O' Sullivan et al., 2013).

Relationships to family and friends and the importance of social networks have been highlighted as predictors of QOL (De Maeyer et al., 2009; De Maeyer, Vanderplasschen, Camfield, et al., 2011; Muller et al., 2017). Among previously untreated alcoholics having a high baseline quality of friendship and family predicted a higher quality of friendship eight years later (Humphreys, Moos, & Cohen, 1997). In addition, the social QOL that included personal relationships, social support and sexual activity was enhanced more than the physical, psychological and environmental domain during six months follow-up in OMT (Mitchell et al., 2015). Muller et al. (2017) found that OMT patients who remained in treatment and achieved an abstinent social network increased their overall QOL from baseline to 12-month follow-up. The opposite was found for OMT patients who were socially isolated or maintained a substance-using network: their overall QOL declined.

In the present study, friends, partner and children as domain- specific QOL factors were not significant for overall QOL. A plausible explanation for the discrepancy between previous research and our study may be that participants were mainly single, and had no custody or contact with their children. Moreover, they reported having many acquaintances but no friends or few friends. Besides, participants experienced loss of social arenas and network. Participants' friends might primarily be substance-users, and as a step in the OMT patients' recovery process, they reduce their contact with substance-using friends after starting OMT (M. L. Smith & Rosen, 2009; Sun et al., 2015). This is in line with O' Sullivan et al. (2013) who showed that social integration was supposed to occur at the expense of old friendships. Cutting all ties to this network, when they begin OMT may be a functional strategy for some but not for all (De Maeyer et al., 2009). Those who

maintain contact with the substance-using environment and continue polydrug use may experience better QOL than those who cut the ties to the environment and experience loneliness. In the substance-using environment, they have a more or less functioning network and they have the skills required to socialise. Social support is important for recovery (Hser, Evans, Grella, Ling, & Anglin, 2015), but building a new, abstinent network can be a long process (Karow et al., 2011) and may take longer than the 12-month period we examined. This may result in participants being more or less socially isolated. Research has indicated that OMT patients often experience loneliness (Conner & Rosen, 2008; De Maeyer et al., 2009; Doukas, 2017), and loneliness may be a risk factor for reduced QOL (Epstein et al., 2009; Muller et al., 2017).

Furthermore, the results from the current study showed that overall QOL was significantly associated with opioid use, and higher QOL was associated with lower odds of opioid use during OMT (Paper III). This association may support the hypothesis that OMT has provided patients with the opportunity to change their life for the better (Stancliff, Elana Myers, Steiner, & Drucker, 2002), and that patients are making actual changes in their life. This is in line with von Greiff and Skogens (2012) who found that patients' process of change was initiated by the treatment and that the treatment was important for the changes. Moreover, one might interpret this as an indication that patients are generally satisfied with the overall treatment (Muller, Bjørnstad, & Clausen, 2018).

In addition, we found that specific QOL domains such as housing were associated with higher overall QOL. About 78% of OMT patients in Norway live in their own apartment (Waal et al., 2018). Having one's own home can contribute to a sense of increased independence and control over social relations, as one can decide who may or may not enter the apartment. However, having an apartment does not imply that patients are satisfied with their housing situation. OMT patients desire to live in a stable, safe and drug-free environment where they are treated as normal citizens (De Maeyer et al., 2009). However, many OMT patients live in socially

deprived areas characterised by crime, active substance use and low socioeconomic status (Carlsen et al., 2019; Vassenden et al., 2012).

The association between health and QOL is thoroughly documented (Karow et al., 2011; Mitchell et al., 2015; Nosyk et al., 2011; Padaiga et al., 2007; Teoh Bing Fei, Yee, Habil, & Danaee, 2016) and states that health improves after enrolment in OMT. In contrast, our study did not find health status to be significant, however, it was close to the significant level of 0.05. The mismatch between our results and existing research may be due to cultural differences. While the Norwegian welfare system ensures everyone equal treatment in the health care system regardless of the persons' social status, OMT patients' right to health care in other communities and cultures varies. Moreover, participants did not enter treatment in a very poor health condition, nor did they perceive their health as bad, and they did not report health as an important factor for their QOL whereas other variables were weighted more heavily. This is in line with previous research that showed that people with SUD primarily associated social inclusion and self-determination with QOL, and not health (Brekke, Vetlesen, Høiby, & Skeie, 2010; De Maeyer et al., 2009). In addition, participants may have underreported their physical and mental ailments due to disagreement with diagnoses assigned to them earlier in life, and chose therefore not to report these.

To grasp the social phenomena in the current study, a quantitative self-report approach was taken. However, a quantitative approach will provide restricted knowledge about participants' opinions, attitudes, wishes or views, because we only collect the assessments we request. There is often no room for additional explanations from the participants. To obtain this kind of in-depth knowledge, a qualitative approach is appropriate. By using qualitative methods, we may be able to obtain the participants' personal opinions and interpretations of the various social phenomena investigated, i.e. their understanding and experiences related to risk factors, or their deeper reflections pertaining to polydrug use. Distinct information about these issues is especially important because the study concerns people such as OMT patients, who are considered "hard-to-reach" (Abrams, 2010; Bonevski et al., 2014); it may be

more important to enhance our understanding of participants' actions and social conditions rather than try to find causal explanations for the social phenomena examined. Nevertheless, quantitative self-reported data can provide a wide range of responses, and it is important to investigate how they interrelate.

5.4 Concurrent use of legal and illegal substances while in OMT

A German study showed that OMT patients increased their use of alcohol, cannabis, and cocaine from baseline to 12 months, and at six-year follow-up (Soyka, Strehle, Rehm, Buhringer, & Wittchen, 2017). Furthermore, a Chinese study found that 75% of OMT patients used opioids more than once during the 12 months after treatment initiation, and concurrent use was associated with poor family relations, high doses of methadone and poor OMT attendance (Luo et al., 2016). Kornør and Waal (2004) found a strong correlation between methadone dose and heroin use over the previous 4 weeks, where OMT patients with low methadone dose (< 105 mg) and short treatment duration (≤ 19.8 months) were at higher risk for use of heroin and illegal opioids compared to those with methadone dosage > 105 mg. An interesting perspective was illustrated by Giacomuzzi et al. (2003): patients with buprenorphine treatment had significantly lower consumption of opioids compared to patients on methadone. Urine samples were positive for opioids in 20% among buprenorphine patients while positive for 65% among methadone patients. In addition, lack of psychosocial support, e.g. cognitive and behavioural approaches, for OMT patients resulted in twice as high odds for injecting illicit OMT medications (Launonen, Wallace, Kotovirta, Alho, & Simojoki, 2016). Moreover, a Finnish study found that opioids were rarely found as abused substances: however, opioid-positive urine samples were more often found among OMT patients with irregular attendance compared to those with regular attendance (Heikman et al., 2017). These studies are in contrast to the results from the present study. However, we found, in line with previous research (Dobler-Mikola et al., 2005; Mattick et al., 2009; Tran et al., 2012), that OMT was significantly associated with lower opioid use (Paper III). OMT aids the withdrawal symptoms and replaces the continuous hunt for the next fix for the

patients. Moreover, participants who are satisfied with the medical effect and dosage are no longer in need other opioids (Dole & Nyswander, 1968).

OMT seems to be less effective in preventing polydrug use. We found no significant reduction in polydrug use during the 12-month follow-up. Concurrent polydrug use while in OMT, especially in early OMT, can indicate a negative response to treatment (Heikman et al., 2017; Sees et al., 2000; W. L. White et al., 2014). Potential determinants for polydrug use can be type of medication (Launonen et al., 2016) or inadequate dosage (Heikman & Ojanperä, 2009; Launonen et al., 2016; Roux et al., 2008). Being under-medicated or experiencing side effects of OMT medications can lead OMT patients to prefer alternative medication, especially if this is not precluded by the OMT. Heikman et al. (2017) found that polydrug use was significantly more common among OMT patients with inadequate doses of methadone or buprenorphine compared to those who experienced adequate dosage. Substances that were abused were primarily BZD, amphetamines, cannabis, non-prescribed psychotropic medicines, new psychoactive substances and opioids. Although Finland and Norway both are Scandinavian countries and share some cultural features, there is a cultural difference regarding OMT patients' preferences when it comes to type of substances included in polydrug use. We did not examine the medical dose, type of medication, or whether OMT patients were satisfied with the dose/medicine they received in OMT. This may have been a deficiency in our study, and should be explored further in future studies.

Problems related to OMT medication and lack of treatment can cause patients to resort to well-known strategies, viz. polydrug use (Adams, Bloom, Capel, & Stewart, 1971). Mitchell et al. (2015) hypothesised that substance abuse while in OMT was negatively associated with overall QOL. However, this expectation received little support: results showed that OMT patients' self-reported opioid use was associated with psychological QOL domain only (Mitchell et al., 2015). Substance use while in OMT does not imply that patients are "non-treatable", only that they might need other interventions, or that they need to be taken seriously when they report inadequate dosage.

Abstinence has been the main objective for treatment of opioid dependence, as well as a measure for treatment success (Bolek, Yargic, & Ekinici, 2016; Kiluk et al., 2019). Previous research identified an association between young age and polydrug use (Behrendt et al., 2009; Betts et al., 2016). This association is complex. People who are young and unmarried are more likely to continue substance use than do older and married subjects (Brewer, Catalano, Haggerty, Gainey, & Fleming, 1998). The same tendency was found in a Swedish study by Davstad et al. (2007), where age was related to the proportion of discharged OMT patients. Patients at age ≤ 30 had a higher discharge rate than patients aged ≥ 41 years, and 45 % of involuntarily discharges were based on substance use often in relation to other discharge criteria. According to Mutasa (2001), failure to follow the course of OMT was associated with, among other things, being a young polydrug user. Our study had similar findings: younger age at substance use onset was significantly related with a higher polydrug use while in OMT. Adolescents are “temporarily under renovation” and they might be more vulnerable compared to more mature individuals. In addition, a feature of being young is to be curious and to have an urge to explore more, and this perhaps exposes younger persons to risks that they may not yet be prepared to deal with. Furthermore, peer pressure might be harder to resist when one is young and lacks self-confidence. However, we found no association between opioid use and age at opioid onset use while in OMT. This contradicts Soyka, Zingg, Koller, and Kuefner (2008) who stated that the younger the participant was at the beginning of regular opioid use, the more likely they were to drop out of OMT. Our study did not examine OMT participants’ dropout rate; nevertheless, research shows a close link between younger age and dropout (Marcovitz, McHugh, Volpe, Votaw, & Connery, 2016; Schuman-Olivier, Weiss, Hoepfner, Borodovsky, & Albanese, 2014; W. L. White et al., 2014).

No connection between participants’ social characteristics and their opioid or polydrug use were found in the current study. Demographic factors have been shown to have little or no associations with continued substance use (Brewer et al., 1998). Nevertheless, social exclusion, poor education, unemployment, poverty, and peer

association are found to influence OMT patients' continued polydrug use (Mutasa, 2001). The association found in the current study, between age at opioid use onset and adverse experiences and between age at substance use onset and the odds of polydrug use in OMT may indicate that some sociodemographic characteristics are significant for treatment and patients' QOL. Future research should examine this topic more thoroughly.

5.5 Heterogeneity

Society often maintain a stereotypical view of an opioid user being a young, homeless, unemployed, and criminally-motivated individual (Goulão & Stöver, 2012). The demographical profile of OMT patients in this thesis might challenge this stereotypical view. The results show that patients in OMT are heterogeneous in terms of their sociodemographic characteristics, age at onset, adverse experiences, current QOL and their use of opioids or polydrug use after OMT enrolment. The heterogeneity implies that when people enrol in OMT they come from diverse social strata with different experiences in life (De Maeyer et al., 2013). This heterogeneity can be important in a wider social context, especially in relation to the communities' stereotypical perception of opioid dependent individuals. Stereotypes are typifications, often prejudiced characterisations of a group or individuals, that say nothing about the individual (Matthews et al., 2017). Furthermore, OMT patients experience discrimination and stigmatisation from staff at social and health care facilities (Luoma et al., 2007; Nguyen et al., 2019; Sattler, Escande, Racine, & Goritz, 2017; van Boekel, Brouwers, van Weeghel, & Garretsen, 2013). Anstice, Strike, and Brands (2009) found that pharmacists and dispensing staff stigmatised OMT patients by serving other pharmacy customers first and making OMT patients wait for an unnecessarily long time before serving them. In addition, Shidlansik, Adelson, and Peles (2017) found that staff's education level, knowledge about OMT and years of professional experiences were significantly associated with stigma describing OMT patients. Lack of knowledge often leads to flawed beliefs and reinforcement of stereotypes. There is a correlation between an individual's view of

people with disorders and their response to them and social distance from them (Angermeyer, Matschinger, & Corrigan, 2004; Corrigan, 2006). Sattler et al. (2017) indicated that knowledge about addiction, personal experience and contact with people with SUD could have a positive impact on the reduction of stigmatisation. There is a discrepancy between society's perception of stereotyped OMT patients and OMT patients in reality. OMT patients are not a homogeneous group, although many would think so. Therefore, personnel in health and social care as well as the general population need to be continuously reminded and enlightened about the heterogeneity of OMT patients. By diffusing this knowledge, we can perhaps decrease the "us-them" perspective of people with SUD and thereby reduce stigmatisation.

5.6 Methodological considerations

In general, the methodological approach can increase the risk of bias. Bias refers to errors that can occur throughout the research process, from study design, execution, and interpretation (Althubaiti, 2016; Bjørndal & Hofoss, 2015; Valoir, 2001). Thereby systematic error is introduced into the results, such as false associations or failure to recognize true relationships (Althubaiti, 2016; Delgado-Rodriguez & Llorca, 2004; Fadnes, Taube, & Tylleskar, 2009). How participants' responses can introduce information bias, possible confounding factors and missing that may lead to misinterpretations will be discussed below.

5.6.1 Sample and selection bias

The relationship between sample sizes and sampling errors is inversely correlated. While small samples are more prone to sample errors, the errors are reduced in large samples (Ringdal, 2013). Participation of all individuals in a population is rarely achieved; however, a representative selection, via a randomised study sample, is sought in quantitative studies (Bjørndal & Hofoss, 2015). The sample in the current study consisted of a random sample, specific self-recruited participants in a predefined group and first-time enrolled OMT patients in a limited geographical area, so it is possible that sample error may occur (Althubaiti, 2016). At

study initiation, it was estimated that approximately 100 first-time patients would be enrolled annually in OMT in the catchment area of Haukeland University Hospital. At the end of the study participants numbered 47. Consequently, the current study was at risk of having a non-representative sample. Bias in the selection of participants continues throughout the entire research process (Bjørndal & Hofoss, 2015) and represents a violation of internal validity and diminishes the accuracy of the observation.

Differences between those who consent to participate in the study and those who do not may affect the study results (Bjørndal & Hofoss, 2015; Tooth, Ware, Bain, Purdie, & Dobson, 2005). A systematic review by Kho, Duffett, Willison, Cook, and Brouwers (2009) comparing participants and non-participants in observational studies found differences between all outcomes (age, sex, race, income, education, and health status). In our study, all potential participants shared some common characteristics: opioid dependence, first-time OMT patients, and they lived in the same catchment area. Aside from these characteristics, we had no information about those who declined study participation. Moreover, participants accepted the invitation to participate may have other characteristics than those who declined (Bjørndal & Hofoss, 2015). To illustrate, enrolment in OMT can cause social isolation and loneliness (Carlsen et al., 2019; Conner & Rosen, 2008; Y.-J. Yang et al., 2017), and loneliness may have been a contributing factor in consenting to participate in the study. The prospect of having someone to talk to on a regular basis, of gaining meaning in his or her everyday life and of contributing to something bigger than themselves may have been the motivation for participating. Furthermore, some potential OMT patients explained that their reasons for declining the invitation were based on a desire not to be identified as OMT patients, the study was considered too time-consuming (every 3 months), or they were not interested in answering the topics and/or questions that KVARUS addresses.

Bias caused by participants' failure to follow-up, study attrition, can also result in selection bias (Ringdal, 2013). Loss of participants in the sample because they cannot be located is a major factor in study attrition, especially for participants

primarily using heroin (Gerstein & Johnson, 2000). Rohrer, Vaughan, Cadoret, and Zwick (1999) found that participants with a higher risk of substance use were systematically missing from follow-ups, and antisocial and borderline personality disorders have been associated to early attrition. This systematic dropout was explained by the fact that participants experiencing poor outcomes after treatment are often reluctant to respond to surveys about their social functioning. Our study provided first-hand experience of the difficulty in retaining newly enrolled patients in the study. Our experience, which is consistent with that of Rohrer et al. (1999), is that participants actively using substances often tended to prioritise use of substances and were therefore difficult to contact. If contact was achieved, the agreements were often cancelled or not kept. Moreover, when study participation coincided in time with OMT enrolment, which it did for many participants, this may have affected the dropout. Participants, and potential participants, expressed that life was too chaotic and not compatible with attending interviews every third month for the next two years. They had “a full-time job” simply organising their own lives, attending meetings with various support services, and trying to keep control of their financial situation. It was not necessarily a lack of interest in the project, but a lack of sufficient resources that made some resigned, or declined participation.

The current study consisted of self-selected participants, and not all “types” of OMT patients were represented. Non-attending patients at the outpatient units having little contact with the SA’s or the OMT system, were probably less likely to participate in our study, compared to those with more frequently or daily contact. According to national status reports, an estimated 30% of all OMT patients in the catchment area of Haukeland University Hospital gets their medication from pharmacies (Waal, Bussesund, et al., 2019). These patients are assumed to have a higher level of functioning than patients at outpatient units, and they are underrepresented in our sample. Furthermore, participants were recruited from eight different outpatient units, while the proportion of newly enrolled OMT patients was not evenly distributed among these units. Besides, in the second recruitment period, several participants were recruited from the low-threshold unit, which had the

majority of newly enrolled OMT patients. We can only speculate as to whether patients enrolled in OMT via the low-threshold unit have a poorer functional level compared to patients referred to OMT through a general practitioner or the social service. The sample may be biased as participants may be of poorer, or better, functional ability than the total OMT population average.

Moreover, a sample consisting of participants with either very positive (overestimating) or negative experiences (under-estimating) may also cause a biased sample. To illustrate, if the sample selection was based on whether participants were motivated to give a positive or a negative presentation of their own OMT experiences after enrolment, this would have biased the sample. Although personality traits in some participants meant that they had a more positive or negative view of their surroundings and own lives, our impression is that the sample displays a variety of experiences that makes neither overestimation nor underestimation applicable to our study.

A study design where outcomes from our sample are compared against a control group consisting of people with opioid dependence and who are not in OMT would have improved the study and the validity of our results. This was not possible within the framework of our study.

5.6.2 Information bias

Information bias is an error in the approach to data collection (Althubaiti, 2016). Study participants may generally be more interested than others in talking about themselves (McDonald, 2008). It is therefore easier to obtain genuine data and boost participants' willingness to answer questions. The downside is that the information given may be biased. Information bias can be due to participants desire to obtain benefits through participating in the study, e.g. treatment benefits or extra services, or they want to conceal the truth if they are reporting certain behaviour perceived to have negative consequences (Darke, 1998). In our study, it was not possible for participants to acquire any treatment benefits, as the researcher was not

associated with the OMT. In addition, during the recruitment process and the study, clear information was given about the difference between participating in a study and participating in treatment, and what the nature of the researcher's role was. However, some participants might misinterpreted the researcher's role because the researcher was employed at the research department at AFR, and the participants did not necessarily distinguish between the OMT department and the research department. Besides, some participants may have placed emphasis on getting benefits from participation in the study, e.g. the lottery ticket at each data point or the gift certificates of 200 NOK each year.

Impression management is when a participant wants to fit the presentation of self into a situation, place or audience, or the participant intends to maintain a positive self-image (Althubaiti, 2016; Latkin, Edwards, Davey-Rothwell, & Tobin, 2017), and this may have occurred in the current study. The tendency to overreport more desirable attributes and underreport socially undesirable behaviours or attributes, viz. social desirability bias, can influence data authenticity. A study of drug use epidemiology in the USA found that social desirability concerns were related with underreporting substance use, while overreporting was mainly related to memory difficulties (Johnson & Fendrich, 2005). Another study in the general population showed that responses to questions on alcohol and drug consumption and harms were considerably affected by social desirability (Zemore, 2012). People inclined to present themselves in socially desirable ways were often reluctant to acknowledge serious SUD problem and the need for help (Zemore, 2012). The tendency to "fake good" may apply to our participants as well. The KVARUS contains questions that can be perceived as sensitive where participants may be reluctant to answer or want to "embellish the truth", e.g. use of legal/illegal substances while in treatment and thereby underreport the exact usage. In an interview setting such as that of the present study, the need to create an impression of oneself can be more intensified than in a postal survey. The impression management may be of the utmost importance to the participants, especially at baseline, which is the first meeting, where social desirability prevails. The need to

maintain impression management will probably subside during the course of the study as the participant and researcher become better acquainted with one another. Based on this assumption, data from participants with only baseline data may be more socially biased, compared to data from participants with multiple data points. However, when reporting their own well-being, deliberate deception is not found to be an important issue (Næss et al., 2011). This is in line with the impression in the present study that social bias was not particularly prominent.

Information bias is also related to the instrument used. To reduce biases, reliable and validated instruments are needed. Although findings on changes in marital status, housing, leisure or financial matters are relevant to QOL considerations, they are found to be relatively insensitive indicators of subjective QOL (Edgerton, 1996). Use of various QOL instruments precludes the opportunity to compare results across studies. The complexity of OMT patients' chronicity indicates a more adequate outcome measure than absence of symptoms, and the majority of instruments used are not suitable for opioid dependent individuals because they largely measure health-related aspects (Strada et al., 2019; Strada et al., 2017). KVARUS is specifically targeted for retrieving data from people with SUD for treatment purposes. KVARUS was being developed while the study was in progress, and in this process, clinicians and former and present SUD patients evaluated the questions as understandable and the response categories as comprehensible and comprehensive. This process, excluded unreliable questions. In addition, KVARUS incorporates questions and sets of questions, i.e. sociodemographic characteristics, substance use during the previous 30 days, and QOL, from validated instruments, e.g. WHO-BRIEF or SF-36. There is little indication that these validated questions/question sets should be less valid when used in KVARUS and the current study, compared to use in other studies. Furthermore, researcher's reading/explaining the questions and the answer options may influence the information provided by study participants. In this study, the researcher has completed the data points with all participants so that the possibility of bias is reduced.

Fatigue may occur in a repetitive study such as the present one, and this may be an information bias. Participants responded to the same questionnaire every three months for two years. This repetitive approach can be perceived as demotivating, which in turn can cause unreliable answers, especially if responses were given to complete the interview rather than providing accurate information (Drost, 2011). Moreover, given that the researcher met with the participants at all data points, the personal factor may have been important. Behaviour, ways of communicating, and personal chemistry may have been factors that influenced whether the participants gave accurate information, and whether they completed or withdrew from the study. We have little information about participants' reasons for study dropout; however, we cannot ignore the possibility that fatigue is a cause.

Furthermore, participants' current mood (Pavot & Diener, 2008) and limited memory (Rand, 2000) may influence the information given in a study. Substance use at a young age is linked with cognitive functioning later in life (Hanson et al., 2011), indicating a possible cognitive disadvantage e.g. memory decline and poorer executive functioning. KVARUS collects data on age of substance use, opioid onset use, and a limited set of health-related data, e.g. psychiatric diagnoses and whether participants are treated medically. Information of these potential effects on participants' cognitive functioning is not obtained. Moreover, a high degree of personality disorders and other psychiatric comorbidity has been documented among heroin users enrolled in treatment (Ross et al., 2005). Participants' mental health and potential comorbidity were not controlled for in the current study, and these are confounding factors that may influence our results.

5.6.3 Missing data and confounding factors

Confounding is when the effect being examined is confused with the effect of another unknown factor, leading to bias (van Stralen, Dekker, Zoccali, & Jager, 2010); it is a threat to the assessment of causal associations. A confounder does not need to be causal, but it needs to be a correlate of a causal effect (Valoir, 2001). Depending on the direction, a confounding effect can lead to overestimation or

underestimation, i.e. to creating an apparent connection between two conditions, and an existing connection does not emerge (Bjørndal & Hofoss, 2015). Through stratification or multivariate statistical analysis, the effect of confounding can be reduced (van Stralen et al., 2010).

In the present study stigma may have been a confounding factor. A stigma refers to an attribute that is extremely discrediting (Goffman, 1990). Society has stereotypical beliefs about people with SUD (De Maeyer et al., 2009; Matthews et al., 2017; Yang, Wong, Grivel, & Hasin, 2017), often viewing them as unreliable, dangerous, lacking self-control and belonging to a homogeneous group. Besides, opioid dependent individuals are often more severely stigmatised than individuals who use other illegal substances (Ahern, Stuber, & Galea, 2007) or suffer from other disorders (Corrigan, Kuwabara, & O'Shaughnessy, 2009), and the stigmatisation persists even after the substance use has been reduced or terminated (Ahern et al., 2007; Anstice et al., 2009). Stigmatisation is likely to affect participants' QOL, and is thereby likely to be a confounding factor.

In Paper I we focused on adverse experiences (AE), however, AE does not exist in a vacuum: protective factors are also often present. It is thus likely that the presence of potential protective factors is a confounding factor, i.e. the protective factors may have had a strong impact on the participant, resulting in non-actualised AE.

Health is closely intertwined with the social, economic, and environmental conditions of people, and as illustrated in this thesis, health is associated with both SUD and opioid dependence. In Paper II, participants' health-related quality of life was measured; however, the association with opioid dependence was not statistically significant. Moreover, various aspects of health may influence QOL, and therefore health can be a confounding factor in this study. The main focus of this thesis was on social aspects of QOL, and although health is a part of QOL, measuring health-related quality of life (HRQOL) does not imply a measurement of their QOL per se (Moons et al., 2006; WHO, 1996). Measuring the impact of a disease on an

individual's QOL takes into account only the patient's perceived health and ascertains the patient's functional limitations (Black & Jenkinson, 2009; Laudet, Becker, et al., 2009; Moons et al., 2006). Besides, patients perceive QOL and health status as two distinct constructs (K. W. Smith, Avis, & Assmann, 1999), and people with SUD primarily associate social inclusion and self-determination, with QOL (De Maeyer et al., 2009).

Implicit in the current study design is the challenge of incomplete or interrupted follow-up of participants due to time (Lin, Lu, & Tu, 2012), and incomplete data often occur as a result of attrition, when participants drop out (Fitzmaurice, Laird, & Rotnitzky, 1993). The result of missing data may be a biased comparison and reduced overall statistical power (Myers, 2000).

The literature distinguishes between three cases of missing data, with different implications for bias and reduced statistical power. When data are missing completely at random, analysis on the available data is unbiased, but the the statistical power is reduced. First, where there are no systematic differences between the missing and the observed values, data are missing completely at random (MCAR). Under MCAR, missing data can be ignored because they do not influence the outcome of the study and do not result in an inferential bias (Graham, 2009). A second, and more realistic situation occurs when the propensity of missing data can be explained by the observed data but not the unobserved data, data are missing at random (MAR). This situation is relevant when missing data is related to known characteristics of the sample. Under MAR the probability of missing data depends largely on other observed characteristics of the participant (Donders, van der Heijden, Stijnen, & Moons, 2006). Third, when the probability of missing data depends on information that is not observed, data are missing not at random (MNAR) (Donders et al., 2006; Graham, 2009; Lin et al., 2012; I. R. White & Carlin, 2010).

The highest likelihood of attrition can be expected to be found among participants with the highest frequency of substance use (Enders, 2011), and polydrug use is related to high risk for early treatment dropout (Martinez-Raga, Marshall,

Keaney, Ball, & Strang, 2002). Moreover, approximately 50% of OMT patient's drop out from treatment during the first month (Ball, Carroll, Canning-Ball, & Rounsaville, 2006). In the present study, the majority, nine participants, of those who dropped out did so during baseline and three months follow-up. Furthermore, missing data cannot be explained by participants being discharged from OMT, because no participant was discharged during the study period. We acquired important knowledge by measuring participants' lifecycles, and experienced that participants had sporadic absences when they were actively using illegal substances. Besides those who dropped out after baseline, absences were mainly due to lack of follow-up. Absences in these cases meant that the entire data point for the participant was lost. In other cases, single items were missing, e.g. domain-specific QOL such as friends. To illustrate, participants with no friends did not perceive these items as relevant and did not reply; therefore, this item was missed. Items missing and missed data point resulted in lack of observations and the analysis was based on a lesser number of different observations. The result is a weakened opportunity to present solid conclusions.

There are alternative strategies to handle missing data in the analytic phase, such as only including observations with complete case analysis or available case analysis, or use of single or multiple imputation methods (Bennett, 2001; Donders et al., 2006; Pedersen et al., 2017). Unless missing data is MCAR, a complete case analysis excludes participants from the analysis if data are incomplete. A complete case analysis usually produces biased results because participants with full datasets often are a biased sub-sample of the studied population (Bennett, 2001). In situations other than MCAR, the two main approaches are imputation methods and estimation.

An alternative approach would be to impute missing data. In a data imputation, available data from other participants are used to estimate the values of missing data in the source population and imputed in the data set (Bennett, 2001; Donders et al., 2006). An advantage with the single imputation approach is that the researcher will have a "complete" data set without missing values. However, the disadvantage is that the single imputation approach treats imputed values equal to the observed values and

thereby underestimates the variance in the data set (Bennett, 2001). In multiple imputation, the uncertainty of imputations is taken into account by including randomness in the computation of imputed values.

Estimating parameters based on the largest set of available cases is another approach. This is the approach taken in Papers II and III where we used linear mixed models, and the direct likelihood method, where all available information in the model is used. Conditional on the independent variables such estimation gives unbiased estimates under the MAR assumption.

By using the multiple imputation approaches we could possibly have gained a larger N for the analysis, but given MAR assumption a direct likelihood estimation and multiple imputation would not be expected to differ much (e.g. Enders, 2010). Imputation and estimation of missing values work well under MAR conditions, but not when missing data are due to unmeasured values (MNAR).

In the absence of a randomised control group, we cannot conclude exactly as to the extent to which unmeasured variables affected the results. However, as missing scores at one data point could be predicted from the scores at previous data points (Graham, 2009), there was no clear selection on drug use and dropout, and based on our knowledge of the participants, MAR is the most plausible explanation. Given our sample and the biases associated with it, we cannot be certain that our sample is representative of the OMT population. However, our sample consists of participants with a sociodemographic variation and a distribution broadly similar to the OMT population both locally and nationally (Waal, Bussesund, et al., 2019). One interpretation may be that bias exists in our sample; however, it is inconsequential in relation to the results presented in this study.

5.6.4 Validity and reliability

To reduce bias, reliable and validated instruments are needed. Reliability is consistency of measurement over time (Drost, 2011). Even if KVARUS was under development at the time of the study, it was particularly developed for retrieving data

specifically for people with SUD. The tools used to examine OMT patients' QOL have mainly had a HRQOL focus and have been developed for patients with other chronic diseases, and therefore some questions and topics do not fit for the OMT population (Strada et al., 2019; Strada et al., 2017). Furthermore, the instruments have often been generic, meaning that they are too superficial to be used on their own (Fayers & Machin, 2015) and do not capture the uniqueness of the OMT population (Strada et al., 2019).

QOL cannot be directly observed, which complicates it in terms of validity and reliability (Megari, 2013; Schuessler & Fisher, 1985). A direct comparison between the participants' responses is problematic because participants' utterances may be interpreted differently and may emphasise various dimensions of their evaluations of QOL. To remedy this, clinicians and SUD patients reviewed KVARUS in a process whereby they evaluated the questions as understandable and the response categories as comprehensible and comprehensive.

The term QOL may be interpreted differently depending on the interpreter's perspective. QOL is linked to how society is organised, including political organisation (Næss et al., 2011). We live a social life with cultures and sub-cultures, and in communities, where our judgement is affected by socially accepted values (Gasper, 2010). For this reason, QOL is culturally sensitive. Several OMT models exist around the world, and OMT patients face diverse challenges in different communities and nations. This might reduce the direct transferability of QOL instruments/measures or results from one culture to another. On the other hand, technological developments and globalisation have brought the world and people closer together, especially in the Western world, so that cultural differences might not be as large as they used to be.

Results in the current study present the statistical validity, the significance level, which indicates that the results did not occur by chance. However, the result being statistically significant is not equivalent to being clinically significant (Breagh, 2003; Musselman, 2007). Clinical significance depends on the perspective

being used, e.g. that of the patients, the clinicians or societies, and along with the context. Clinical significance can be achieved when an outcome measure has an impact upon the domain of interest, e.g. a patient's functioning or QOL, which would bring about a meaningful change in the patient's management (Jaeschke, Singer, & Guyatt, 1998). From this perspective, the current study is clinically significant as OMT participants have achieved improved QOL and reduced opioid use after OMT enrolment, which is an impact upon the domain of interest, albeit one that is not measured in the current study.

Attrition is a threat to the study's internal validity (Graham, 2009). The attrition analysis in Paper II showed no significant differences between non-completers and completers for level of education, marital status, and type of living situation for the first year. Furthermore, no differences were found with respect to domain-specific QOL between non-completers and completers. In Paper III, no significant association was found between attrition pattern and polydrug use from baseline to 12-month follow-up. Likewise, no significant association was found for opioid use, with the exception of participants who dropped out at 12 months, who had a higher polydrug use at baseline compared to non-dropouts. The attrition analysis indicates that there were no changes in the sample's sociodemographic characteristics caused by difference between non-completers and completers. Attrition does not affect the sample's sociodemographic characteristics or the domain-specific QOL outcomes. The interpretation may thus be that attrition in our study does not affect the study's validity.

External validity conveys the possibility of generalising observed results from one population to another (Delgado-Rodriguez & Llorca, 2004; Drost, 2011). Results are reliable if the study is repeatable with alternative instruments that measure the same thing (Drost, 2011).

Dropouts from a small sample poses a more precarious problem compared to a larger sample because it may entail the possibility of reduced significance of results, and data with less statistical power (Hoyle, 1999). The current study aimed to recruit

approximately 50 participants. With eight repetitive data points, and a follow-up rate of 40%, we would have had approximately 160 observations. The study managed to recruit 47 participants, and between 34 to 38 participants completed the 12-month follow-up. Low retention rate is a threat to a study's validity, both internal and external. It may also reduce the statistical power, which is frequently a problem in studies involving a small sample (Cottler et al., 1996; Hoyle, 1999; Stinchfield, Niforopulos, & Feder, 1994). Only if internal validity is satisfied can generalisability be considered (Tooth et al., 2005). KVARUS covers a large number of topics and variables. As expected, some analysis had missing data due to participants' no-show status or lack of answers because of non-relevant questions posed to the participants. Although the current study is based on few participants, the analysis is based on many observations. This resulted in a total of 1,026 observations for analysis in Paper I, 193 observations for analysis in Paper II, and between 193 and 146 observations for data analysis in Paper III. Besides, repeating data points for the same person will be more reliable than if we had based our analysis on a single observation, thereby our approach strengthens the studies reliability. This must be considered acceptable considering the objective. Furthermore, studies show that the validity and reliability of substance users' self-reports are generally accurate (Adair, Craddock, Miller, & Turner, 1996; Kopak et al., 2017; Reinert & Allen, 2007; Robinson, Sobell, Sobell, & Leo, 2014), and there is no indication that people with SUD are more likely than non-users to provide socially desirable replies (Latkin et al., 2017).

Regarding comparison with OMT patients nationwide, comparative studies focusing only on first-time enrolled OMT patients are scarce. However, Bukten et al. (2019) found that the mean age at first treatment initiation in OMT at a nation level was 37 years. In addition, participants' sociodemographic characteristics in the current study were similar to the Norwegian OMT population (Waal et al., 2018). Furthermore, although Norway is a small country, cultural differences may indicate that OMT patients are not equal regardless of where in Norway they are located. Despite any cultural differences, there are fewer cultural differences both locally and nationally than internationally, thus such generalisations must be made with caution.

However, the results from the current study must be interpreted with the proviso that KVARUS is not a validated instrument

5.7 Ethical considerations

Ethical guidelines were followed in this study, but some ethical aspects emerged as issues during the study, and these can be addressed.

One dilemma in research is the burden versus the benefit of participating. The KVARUS is comprehensive and it includes topics and questions that can trigger emotional distress (e.g. questions regarding adverse experiences, history of substance use, judgement of QOL related to friends and leisure). To adapt to the emotional distress, the researcher used different approaches: an introduction to difficult topics/questions, the possibility of taking breaks whenever the participants felt like it, and a broad time horizon so that participants could spend as much time as they found necessary. Moreover, the researcher ended each meeting highlighting positive aspects reported by the participant so that s/he left with a positive feeling. Some participants felt there were too many detailed and irrelevant questions. Others underscored that participation was beneficial because they had the chance to talk about topics highly relevant to them and they acquired a structured overview of their own life situation during the previous three months.

OMT patients, who are representatives for a marginalised and vulnerable group due to their being in challenging and vulnerable situations while in treatment, pose ethical dilemmas. Vulnerability is an individual, relational and contextual phenomenon (Helgeland, 2005; Hovland, 2009). Group affiliation as such does not determine vulnerability, but whether the individual has characteristics that diminish understanding or voluntary participation in the study (Hovland, 2009; Ruyter, 2008). In general, OMT patients must be considered fully competent in terms of mental capacity and functionality. Some participants were in vulnerable situations during the time period our study lasted. However, only one participant was excluded due to reduced comprehension and lack of cognitive competence. The lack of competence

was not noteworthy before the second meeting, at which time it was decided to exclude this participant.

In addition, some ethical considerations may be worth discussing in conjunction with the recruitment. In the first recruitment period, the special advisors (SA) were the main connection to potential participants. The SA had information about who the potential participants were, how to contact them and whether potential participants were informed about the research project. By doing this, the SAs became gatekeepers (Bonevski et al., 2014; Hammersley & Atkinson, 1996; McFadyen & Rankin, 2017) and possessed the power to determine which persons the researcher would have access to. It was important that the study information was given by the researcher and not the SA, because the patients had to be assured that s/he had the right to voluntarily consent and could not be obliged to do so or be pressured into participating by virtue of his/her relationship with the SA (Alver & Øyen, 1997).

Moreover, the time the information is given to potential participants can impact the recruitment process. The study information was mainly given at the end of the kick-off meeting with the SA. This meeting involves a lot of information, e.g. medication regimes, patients' obligations, treatment possibilities and so on. At the same time, some OMT patients are intoxicated, tired of the information flow and are incapable of absorbing all the information given to them. These organisational issues may have affected the recruitment process, and this was one reason why the recruitment approach was changed.

In the second recruitment period, the researcher took a more active approach and personally visited the OMT units for the purpose of recruiting participants. Moreover, the SAs introduced the researcher to potential participants. This approach was more successful. At one OMT unit the researcher stayed in the waiting room while trying to get in contact with newly enrolled patients. A positive effect of spending time in the waiting rooms was that, during the period spent waiting, some of the participants who were hesitant had time to think it through and then decided to

participate. We also benefited from a snowball effect, where some participants recruited other OMT patients.

Loneliness is a well-known issue among OMT patients (Carlsen et al., 2019; Conner & Rosen, 2008; De Maeyer et al., 2009; Muller et al., 2017), including the participants in our study. Participants' loneliness should not be exploited. Patients should not be coaxed into contributing to the project unwillingly, merely because they get some interaction on a regular basis over a given period of time. This was particularly important concerning participants in prison, with few or no visits, where participating in the study might have been considered a good pastime for an inmate. If one was in doubt as to whether the participant was comfortable contributing, the researcher repeated the information on voluntary participation and that this would not affect future treatment. Participants in prison completed the 12-months follow-up, but one half of them dropped out after changes in detention criteria, e.g. from closed prison to open sentence or release.

5.8 Strengths

There are several strengths of this study. Although fatigue is a relevant bias in the study, we believe that the most important strength is the chance to follow change over time by repetitive frequency of the measurements. With repetitive measurements it is possible to provide information on individual and group change, to control for differences within the person, and to monitor developments over time. Because recall deteriorates with time (Fadnes et al., 2009), the use of an intensive repetitive tool creates a better opportunity for the participants to recall important events that affect them (Caruana et al., 2015). Our data might therefore have a higher validity compared to data with longer recall periods. The repetitiveness in this study allowed us to study OMT patients' changes and development during treatment, and not just gain a brief glimpse into the course of the treatment.

Another strength is the use of patients-reported outcome measures and patient-reported experience measures. KVARUS's emphasis on patients' views can expand

our view of their condition by including aspects of social, economic, environmental, and subjective QOL, contrary as opposed to symptoms of mental or physical health. Besides, the testing and retesting of KVARUS by patients in treatment and user organisations is definitely a strength. This ensures the relevancy of the KVARUS for OMT patients. Furthermore, this thesis shows that social and psychological aspects are important aspects in increasing OMT patients' QOL, and QOL is an important piece in the puzzle to understand the whole picture of factors that can contribute to positive changes in OMT patients' lives.

Furthermore, a strength is the perspective of this study. Focus on social parameters related to OMT in the field of SUD research has received little attention, and this thesis is a supplement to this professional literature.

6. CONCLUDING REMARKS

To understand the real-life conditions and potential clinical needs of first-time enrolled OMT patients it is essential to have better insight into opioid dependent individuals' demographical data. Although, the OMT population in the current sample did not differ significantly from the OMT population locally or nationally regarding sociodemographic characteristics, we cannot be certain that results from the current study are influenced by bias such as selection bias, information bias, or confounding factors. Consequently, due to the small sample and bias, the results cannot be generalised for all first-time enrolled OMT patients locally, nationally or internationally. The findings nevertheless provide interesting insights into social mechanisms for the selected sample. If these social mechanisms are applicable for all first-time enrolled OMT patients, a wider study, including a larger and randomised sample, is required.

The main finding of this study is that participants were representatives for a heterogeneous group, with various sociodemographic characteristics, life experiences, levels of QOL, and potential polydrug use while in OMT. This is in line with previous research, which shows that OMT treatment recruits individuals from different social strata, and not only from the lower strata. Furthermore, exploring patients' heterogeneity on treatment entry can give clinicians the opportunity to explore the patients' adverse experiences, shown by previous research and this current study to be an important factor for this group of patients. Due to the heterogeneity, it might be important to distinguish between people enrolled in OMT who have few versus multiple adverse experiences. Patients need to be asked about potential adverse experiences because it is unlikely that they will mention them during treatment (Tucci, Kerr-Corrêa, & Souza-Formigoni, 2010). Focus on adverse experiences is important because lack of attention to adverse experiences is associated with dropouts from treatment and low QOL. Moreover, some OMT patients might need extra follow-up and psychological treatment for their traumas.

Research has emphasised the importance of the number and/or type of risk factors in individuals with SUD. The current study found a significant association between age at opioid onset and both type *and* number of adverse experiences. Some family-related AEs were both highly frequent and had a significant effect on participants' age of opioid use onset, indicating that family-related AEs can be important to include in the treatment of OMT. The early-onset opioid users tended to be exposed to a higher number of adverse experiences compared to the late onset opioid users. Besides, there was a significant relationship between early onset use and use of polydrug use while in OMT. The relationship between type and number of risk factors, and the significance of protective factors in the course of OMT should be investigated in a larger OMT population.

Study participants entered OMT with varying levels of overall QOL and for some participants, their overall QOL did not improve. However, in general for the group as a whole, their overall QOL increased significantly during the first year in OMT. Satisfaction with their personal financial situation was the main predictor of overall QOL. Furthermore, a relationship between overall QOL and opioid use was detected, indicating that higher QOL was related to lower odds of opioid use. The OMT medicine is effective against patients' use of opioids. However, it does not provide the same preventive effect against polydrug use. A significant association between overall QOL and reduced opioid use was detected, but no association between domain-specific QOL and opioid or polydrug use. These associations may emphasise the importance of addressing OMT patients' needs in other areas besides substance use (Laudet & Stanick, 2010). In addition, OMT patients might need other interventions, such as related social interventions, e.g. training social skills (e.g. small talk), learning how to behave in different social settings, achieving control over personal finances and performing everyday tasks such as shopping, cooking etc.(Carlsen et al., 2019) to improve their overall QOL. The factors that hinder an enhancement in quality of life, e.g. the drug environment as a social arena for OMT patients, have yet to be scrutinised; these factors offer an opportunity for further research.

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Appendix A

KVARUS (Beta version)

The example used in this illustration is based on a fictitious person.

KVALITETSREGISTER FOR RUSBEHANDLING - Beta 3.0

- Bruker og behandler fyller ut registeret sammen
- Medisinskfaglige spørsmål som diagnose, innholdet i behandling og utredning fylles ut av behandler
- De andre spørsmål baserer seg på brukers subjektive opplevelse av egne problemer og den behandlingsinnsatsen som gis
- Spørsmålene som evaluering av behandlingen gjøres av brukeren uten at behandleren ser på (de sidene er farget grønne)

Navn på behandlingsenhet

PASIENTOPPLYSNING

Pasient ID: Fødselsår: ÅÅÅÅ
 Kjønn: Mann Kvinne

Etnisk tilhørighet
 Mors fødeland:
 Fars fødeland:
 Eget fødeland:
 Årstall pasienten kom til Norge:

DIN ARBEIDSSITUASJON

	Har du vært i arbeid /elev siste 12 måneder	Antall måneder siste 12 måneder (opphøy til heltall)	I arbeid /elev nå
	Ja		Ja
I fullt arbeid (100%)	<input checked="" type="checkbox"/>	<input type="text" value="1"/>	<input type="checkbox"/>
I deltidarbeid	<input checked="" type="checkbox"/>	<input type="text" value="0"/>	<input checked="" type="checkbox"/>
I arbeidstiltak o.l. (inkl. salg av gatemagasiner)	<input checked="" type="checkbox"/>	<input type="text" value="2"/>	<input checked="" type="checkbox"/>
Er elev eller student	<input checked="" type="checkbox"/>	<input type="text" value="4"/>	<input type="checkbox"/>

UTEN ARBEID

Har du aktiviteter som gir mening eller betyr noe?

OPPSUMMERING (Outcome)

Antall dager brukt rus de siste 30 dager:

På en skala fra 1 til 5 i hvilken grad...

1 Svært lav 5 Svært høy

...opplever du din rusbruk som et problem?

1 Svært lav 4 5 Svært høy

...opplevde du rusbehandlingen du får som nyttig?

1 Svært lav 3 5 Svært høy

...alt i alt, hvor tilfreds er du med din livssituasjon?

VELG FUNKSJON

Inntaksoplysninger

Opplysninger før 1.inntak i registeret

Målepunkt

Pasientregisteret

Avslutt

KARTLEGGING AV FORHOLD FØR FØRSTE INNTAK I REGISTERET

Pasient ID 1001

Bruk av rusmidler

Rusbehandling

Viktige hendelser

Psykiske helse

Egen aktivitet

<=Meny Hjelp Avbryt Utskrift Inntak =>

KARTLEGGING AV FORHOLD FØR FØRSTE INNTAK I REGISTERET

Pasient ID 1001

Bruk av rusmidler

Rusbehandling

Viktige hendelser

Psykiske helse

Egen aktivitet

<=Meny Hjelp Avbryt Utskrift Inntak =>

DEBUT (første gang du opplevd å være full/ruset)

År 1992

Rusmiddel/rusmidler

Alkohol

Flasj

Amfetamin

Andre sentralstimulerende

GHB/GBL

Subutex/Subuxone

Metadon

Heroin

Andre opioider

Benzodiazepiner o.l.

Kokain

Hallusinogener

Løsemidler

Anabole steroider

Andre syntetiske rusmidler (Legal highs)

Uoversiktlig blanding

Annet

Den viktigste begrunnelse

Påvirkning fra andre

Nysgjerrighet, utprøving

Fga egne problemer

Tilfeldig, ikke planlagt

Annet

Vis eksempler

Injiserte? Ja Nei

<=Eorrige Avbryt Neste =>

RUSMIDDELBROK

RUSHISTORIE FØR FØRSTE INNTAK I REGISTERET

Frå alder 12 år 1992 til alder 14 år 1994

Rusfri Rusbruk Overdose

<=Eorrige Avbryt Neste=>

RUSMIDDELBROK FØR FØRSTE INNTAK I REGISTERET

Hvis flere rusmidler brukes samtidig må hvert rusmiddel føres opp separat

Rusmiddel	Den viktigste begrunnelse	Bruksfrekvens
Alkohol	Regulere følelser, brukt som medisin	Daglig
Hasj	Selve rusopplevelsen	5-6 g. pr uke
Amfetamin	Sosiale årsaker	2-4 g. pr uke
Andre sentralstimulerende	Tvangsmessig bruk	Ukentlig
CHB/CB	Annet	Periodevis
Subutex/Subuxone		Sjeldnere
Metadon		
Heroin		
Andre opioider		
Benzodiazepiner o.l.		
Kokain		
Hallusinogener		
Løsemidler		
Anabole steroider		
Andre syntetiske rusmidler (Legal highs)		
Uoverskiktig blanding		
Annet		

Injiserte? Ja Nei

1. Noenlunde under kontroll

Pasientens vurdering av alvorlighetsgrad på en skala 1 til 3

<=Eorrige Avbryt Neste=>

RUSMIDDELBROK FØR FØRSTE INNTAK I REGISTERET

Hvis flere rusmidler brukes samtidig må hvert rusmiddel føres opp separat

Rusmiddel	Den viktigste begrunnelse
Alkohol	Regulere følelser, brukt som medisin
Hasj	Selve rusopplevelsen
Amfetamin	Sosiale årsaker
Andre sentralstimulerende	Tvangsmessig bruk
CHB/CB	Annet
Subutex/Subuxone	
Metadon	
Heroin	
Andre opioider	
Benzodiazepiner o.l.	
Kokain	
Hallusinogener	
Løsemidler	
Anabole steroider	
Andre syntetiske rusmidler (Legal highs)	
Uoverskiktig blanding	
Annet	

Injiserte? Ja Nei

<=Eorrige Avbryt Neste=>

ANTALL OVERDOSER I PERIODEN

Antall overdoser i perioden 3

<=Eorrige Neste=>

UREGISTRERTE RUSBEHANDLINGER

Rusbehandlinger (utenom denne behandlingen) ved 2.linjetjenester før den første registrerte behandlingsskiven i kvalitetsregisteret

Antall tidligere rusbehandlingsskiver 3

Årstall oppstart første rusbehandlingsskiven 1995

Årstall oppstart siste rusbehandlingsskiven 1997

Antall fullførte (avsluttet ved gjensidig avtale) rusbehandlingsskiver 2

Antall tidligere rusbehandlingsskiver under formell tvang 1

Har noen av disse behandlinger hjulpet deg med å endre dine rusvaner? Ja Nei

Avbryt Neste=>

KONTAKT MED ANDRE

Hvem har du hatt kontakt med tidligere (mer enn 1 år tilbake) angående dine rusrelaterede problemer?

Oppfølging i bolig
Arbeidsgiverstøtte
NAV
Fastlege
Andre kommunale helse- og omsorgstjenester
Spesialist helsetjenester
Kriminalomsorg
Selvhjelpsgrupper
Andre

<=Eorrige Avbryt Neste=>

KARTLEGGING AV FORHOLD FØR FØRSTE INNTAK I REGISTERET

Pasient ID 1001

Bruk av rusmidler

Rusbehandling

Viktige hendelser

Psysiske helse

Egen aktivitet

<=Meny Hjelp Avbryt Utskrift Inntak =>

NEGATIVE FORHOLD SOM HAR PÅVIRKET DIN NÅVÆRENDE LIVSSITUASJON - 1

Fyller ut av pasienten

Blitt mobbet Påvirket mye

Blitt slått Påvirket noe

Blitt seksuelt krenket, fysisk eller psykisk Påvirket litt

Blitt forsømt av omsorgsgivere over tid Ikke påvirket

Samlivsbrudd mellom mine omsorgsgivere Ikke aktuelt

Vært under barnevernets omsorg Ønsker ikke å svare

Alvorlige økonomiske problemer hos mine omsorgsgivere Påvirket mye

<=Forrige Avbryt Neste =>

NEGATIVE FORHOLD SOM HAR PÅVIRKET DIN NÅVÆRENDE LIVSSITUASJON - 2

Fyller ut av pasienten

Negativt parforhold Påvirket noe

Samlivsbrudd Påvirket litt

Mistet omsorg for eget/egne barn Ikke påvirket

Rusproblemer i familien Ikke aktuelt

Familie medlemmer som er/har vært i fengsel Ønsker ikke å svare

Depresjon, angst eller andre psykiske problemer i familien Påvirket mye

Selv mord eller forsøk på selvmord i familien Påvirket noe

<=Forrige Avbryt Neste =>

NEGATIVE FORHOLD SOM HAR PÅVIRKET DIN NÅVÆRENDE LIVSSITUASJON - 3

Fylles ut av pasienten

Langvarig fysisk sykdom i familien	Påvirket litt
Tap av nær familie eller andre nære (dødsfall)	Ikke påvirket
Drop-out fra skolen	Ikke aktuelt
Ufrivillig oppsigelse av arbeid	Ønsker ikke å svare
Mistet bolig	Påvirket mye
Konflikt med politi/rettsvesen	Påvirket noe
Prostibusjon (salg)	Påvirket litt

<=Forrige Avbryt Neste => ? [] []

POSITIV FORHOLD OG ERFARINGER SOM DU KAN DRA NYTTE AV VIDERE I BEHANDLING - 4

Fylles ut av pasienten

Støtte fra personer i familien	Ja
Viktige personer utenfor familie	Nei
Kontakt med tidligere rusmisbrukere	Ikke aktuelt
Nære venner utenfor rusmiljøet	Ja
<input checked="" type="checkbox"/> Ivarettatt av hjelpeapparatet	Nei

<=Forrige Avbryt Neste => ? [] []

POSITIV FORHOLD OG ERFARINGER SOM DU KAN DRA NYTTE AV VIDERE I BEHANDLING - 5

Fylles ut av pasienten

Fått omsorg tilbake for eget/egne barn	Nei
Kontakt med egne barn	Ikke aktuelt
Kjæreste/partner	Ja
Å bli/være forelder	Nei
God bosituasjon	Ikke aktuelt
God helse	Ja

<=Forrige Avbryt Neste => ? [] []

POSITIVE FORHOLD OG ERFARINGER SOM DU KAN DRA NYTTE AV VIDERE I BEHANDLING - 6

Fylles ut av pasienten

Gatesmørt

God på skole

Langvarige arbeidsforhold

Idrett eller andre fritidsaktiviteter

Har noe å tro på

<=<Eorrigje Avbryt Neste=>

PSYKISKE PROBLEMER/DIAGNOSER - 1 av 2

PSYKISKE PROBLEMER/DIAGNOSER FØR FØRSTE INNTAK I REGISTERET

Føle alder år Har fremdeles Er blitt frisk

Problem/diagnoser (NBI utenom F10-F19 diagnoser)

Angstplager

Legg til Slett

<=<Eorrigje Avbryt Vis historie Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2
F0	F20.0 Schizofreni
F2	F20.9 Uspesifisert schizofreni
F3	F21 Skizotyp lidelse
F4	F22 Ikke-organiske psykoser
F5	F23 Akutte og forbigående psykoser
F6	F24 Indusert psykose (vrangforestillingslidelse)
F7	F25 Schizoaffectiv lidelse
F8	F28 Andre ikke-organiske psykoser
F9	F29 Uspesifisert ikke-organisk psykose
Andre problemer	

<=<Eorrigje Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2
F0	Angstplager
F2	Sosial usikkerhet
F3	Depresjon
F4	Tristhet
F5	Søvnproblemer
F6	Spiseproblemer
F7	Kommer ofte i konflikt med andre
F8	Uro
F9	Tankekjør
Andre problemer	Vansker med å kontrollere eget sinn Avhengighet ikke knyttet til stoff (f.eks. spill, shopping, sex) Kognitive vansker Annet

<=<Eorrigje Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2	Eksempler på Kognitive vansker
F0	Angstplager	Konsentrasjonsproblemer
F2	Sosial usikkerhet	Sliter med å huske ting
F3	Depresjon	Sliter med å planlegge
F4	Tristhet	Sliter med å komme i gang med ting
F5	Søvnproblemer	Sliter med å fullføre ting
F6	Spiseproblemer	Sliter med å ha overblikk over en situasjon, se helheten
F7	Kommer ofte i konflikt med andre	Sier ofte ting som ikke passer
F8	Uro	Avbryter andre
F9	Tankegjær	Er for impulsiv
Andre problemer	Vansker med å kontrollere eget sinne	Sliter med å skifte fokus, er lite fleksibel
	Avhengighet ikke knyttet til stoff (f.eks. spill, shopping, sex)	Blir fort sint
	Kognitive vansker	Er rastløs, har uro i kroppen
	Annet	Lett for å kjede meg

<=<Eierrige Avbryt Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE FØR FØRSTE INNTAK I REGISTERET

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

I hvilken grad på en skala 1-5 opplevde du bedring? 1 Svært lite 5 Svært mye

<=<Eierrige Avbryt Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE FØR FØRSTE INNTAK I REGISTERET

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

<=<Eierrige Avbryt Neste=>

Egen aktivitet i forhold til rusproblemer før første inntak i registeret

Fyller ut av pasienten. Sett x på aktuelle aktiviteter og anså nytten på en skala fra 1 til 5

	Ja	Liten nytte	Stor nytte
Prøvd å slutte	<input checked="" type="checkbox"/>	<input type="text" value="1"/>	<input type="text" value="5"/>
Gjort flere forsøk på å slutte	<input checked="" type="checkbox"/>	<input type="text" value="2"/>	<input type="text" value="5"/>
Prøvd å ruse meg mindre	<input type="checkbox"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
Skiftet rusmidler for å få kontroll	<input checked="" type="checkbox"/>	<input type="text" value="3"/>	<input type="text" value="5"/>
Hatt rusfrie perioder	<input checked="" type="checkbox"/>	<input type="text" value="3"/>	<input type="text" value="5"/>
Brukt antabus (mot alkohol) i perioder	<input checked="" type="checkbox"/>	<input type="text" value="1"/>	<input type="text" value="5"/>
Søkt kontakt med behandlingstiltak (eks. lege, poliklinikk, ruskonsulent)	<input checked="" type="checkbox"/>	<input type="text" value="2"/>	<input type="text" value="5"/>
Mott til, eller har vært i behandling (eks. institusjon, poliklinikk, LAR)	<input checked="" type="checkbox"/>	<input type="text" value="3"/>	<input type="text" value="5"/>
Endret vaner, gjort nye ting	<input checked="" type="checkbox"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
Annet (bruk notatkon)	<input checked="" type="checkbox"/>	<input type="text" value="1"/>	<input type="text" value="5"/>

<=<Eierrige Avbryt Neste=>

INNTAKSOPPLYSNINGER

Oppstartdato for denne behandlingssekvensen 19 / 7 / 2013

Type behandling

- Poliklinisk behandling
- Dagbehandling
- Døgnbehandling
- Ambulant

Fagperson som registrerer
Barclay

Status på behandling: Avbrutt

<= Forrige Avbryt Neste =>

RUSMIDDELBRUK SISTE 30 DAGER

RUSMIDDELBRUK FØR OPPSTART AV DENNE BEHANDLINGSEKVENSENS

Rusfri Rusbruk Overdose

<= Forrige Avbryt Neste =>

RUSMIDDELBRUK SISTE 30 DAGER

Hvis flere rusmidler brukes samtidig må hvert rusmiddel føres opp separat

Rusmiddel

- Alkohol
- Hasj
- Amfetamin
- Andre sentralstimulerende
- GHB/GBL
- Subutex/Subuxone
- Metadon
- Heroin
- Andre opioider
- Benzodiazepiner o.l.
- Kokain
- Hallusinogener
- Løsemidler
- Anabole steroider
- Andre syntetiske rusmidler (Legal highs)
- Uoversiktlig blanding
- Annet

Den viktigste begrunnelse

- Regulere følelser, brukt som medisin
- Selve rusopplevelsen
- Sosiale årsaker
- Tvangsmessig bruk
- Annet

[Vis eksempler](#)

Antall dager brukt rus de siste 30 dager 12

Injiserte? Ja Nei

Pasientens vurdering av alvorlighetsgrad på en skala 1 til 3

2. Omfattende, men innen grenser

<= Forrige Avbryt Neste =>

DIN SIVILSTAND

Velg et alternativ

- Ensig
- Gift/samboer/partner
- Kjæreste/særboer

<= Forrige Avbryt Neste =>

ER DU GRAVID?

Velg et alternativ

- Ja
- Nei

<= Forrige Avbryt Neste =>

DIN BOSITUASJON

Velg et alternativ

Egen bolig (leiet eller eid) Bor fast hos familie Midlertidig bolig Uten fast bolig	Bor midlertidig hos venner eller familie Hospits eller lignende Sover ute eller på tilfeldige steder
---	--

<=Eorrige Avbryt Neste=>

EGNE BARN

Dersom du har barn, velg de aktuelle

Har omsorg for minst et barn under 18 år Har formelt samvær med minst et barn under 18 år Har barn under 18 år (ikke omsorg eller formelt samvær) Har voksne barn
--

<=Eorrige Avbryt Neste=>

HAR DIN PARTNER EGNE BARN UNDER 18 ÅR?

Velg et alternativ

Ja
Nei

<=Eorrige Avbryt Neste=>

DIN HØYEST FULLFØRT UTDANNING

Velg et alternativ

Ingen fullført utdanning Grunnskole VGS Fagbrev Høyere utdanning

<=Eorrige Avbryt Neste=>

HAR DU UAVKLARTE SAKER HOS POLITIET?

Velg et alternativ

Ja
Nei

<=Eorrige Avbryt Neste=>

VENTER DU PÅ SONING?

Velg et alternativ

Ja
Nei
Ikke avklart

<=Eorrige Avbryt Neste=>

TILFREDSHET MED LIVSSITUASJONEN

FYLLES UT AV PASIENTEN. På en skala fra 1 til 5, i hvilken grad er du tilfreds med...

	I svært liten grad	4	I svært stor grad	Ikke aktuelt
... din bosituasjon?	◀			▶
... ditt partnerforhold?	◀			▶
... ditt forholdet til egne/partners barn?	◀			▶
... din arbeidssituasjon?	◀			▶
... fritid?	◀			▶
... venner?	◀			▶
... din helse?	◀			▶
... din økonomi?	◀			▶

<=Eorrige Avbryt Neste=>

FYSISK LIDELSE VED OPPSTART AV DENNE BEHANDLINGSSEKVEN...

Velg fysisk sykdom som du antar kan ha betydning for behandlingen
 Luftveislidelser, f.eks. kols, astma

Lidelsen knyttet til bruk av rusmidler Ja Nei Usikker

Mottatt behandling Ja Nei

Type lidelse Akutt Langvarig (kronisk)

1. Svært lav 5 5. Svært høy

I hvilken grad på en skala fra 1-5 synes du at du mestrer denne fysiske sykdommen?

<=Forrige Avbryt Neste=>

FYSISK LIDELSE VED OPPSTART AV DENNE BEHANDLINGSSEKVEN...

Velg fysisk sykdom som du antar kan ha betydning for behandlingen
 Luftveislidelser, f.eks. kols, astma

Lidelsen knyttet til bruk av rusmidler Ja Nei Usikker

Mottatt behandling Ja Nei

Type lidelse Akutt Langvarig (kronisk)

<=Forrige Avbryt Neste=>

PSYKISKE PROBLEMER/DIAGNOSER- 1 av 2

PSYKISKE PROBLEMER/DIAGNOSER VED OPPSTART AV DENNE BEHANDLINGSSEKVENSEN

Problem/diagnoser (NBI utetom F10-F19 diagnoser) ?

F23 Paranoide psykoser
 Depresjon

Legg til Slett

<=Forrige Avbryt Vis historie Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2
F0	F20.0 Schizofreni
F23	F20.9 Uspesifisert schizofreni
F3	F21 Søsthyplidelse
F4	F23 Paranoide psykoser
F5	F23 Akutte og forbigående psykoser
F6	F24 Indusert psykose (vrangforestillingslidelse)
F7	F25 Schizoaffective lidelse
F8	F28 Andre ikke-organiske psykoser
F9	F29 Uspesifisert ikke-organisk psykose
Andre problemer	

<= Forrige Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2
F0	Angstbølger
F2	Sosial usikkerhet
F3	Depresjon
F4	Tristhet
F5	Søvnproblemer
F6	Spiseproblemer
F7	Kommer ofte i konflikt med andre
F8	Uro
F9	Tankegjør
Andre problemer	Vansker med å kontrollere eget sinn
	Avhengighet ikke knyttet til stoff (f.eks. spill, shopping, sex)
	Kognitive vansker
	Annet

<= Forrige Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2	Eksempler på Kognitive vansker
F0	Angstplager	Konsentrasjonsproblemer
F2	Sosial usikkerhet	Sliter med å huske ting
F3	Depresjon	Sliter med å planlegge
F4	Tristhet	Sliter med å komme i gang med ting
F5	Søvnproblemer	Sliter med å fullføre ting
F6	Spiseproblemer	Sliter med å ha overblikk over en situasjon, se helheten
F7	Kommer ofte i konflikt med andre	Sier ofte ting som ikke passer
F8	Uro	Avbryter andre
F9	Tankekjør	Er for impulsiv
Andre problemer	Vansker med å kontrollere eget sinn	Sliter med å skifte fokus, er lite fleksibel
	Avhengighet ikke knyttet til stoff (f.eks. spill, shopping, sex)	Blir fort sint
	Kognitivt elevenniser	Er rastløs, har uro i kroppen
	Annet	Letting for å kjede meg

<=>Eorrige Avbryt Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE VED OPPSTART AV DENNE BEHANDLINGSSEKVENSEN

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

I hvilken grad på en skala 1-5 opplever du bedring? 1 Svært lite 5 Svært mye

I hvilken grad på en skala 1-5 synes du at du mestrer psykisk problem/diagnose? 1 Svært lav 5 Svært høy

<=>Eorrige Avbryt Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE VED OPPSTART AV DENNE BEHANDLINGSSEKVENSEN

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

I hvilken grad på en skala 1-5 synes du at du mestrer psykisk problem/diagnose? 1 Svært lav 5 Svært høy

<=>Eorrige Avbryt Neste=>

Egen aktivitet i forhold til rusproblemer før denne behandlingssekvensen

Fyller ut av pasienten. Sett x på aktuelle aktiviteter og anslå nytten på en skala fra 1 til 5

	Ja	Liten nytte	Stor nytte
Prøvd å slutte	<input type="checkbox"/>		
Gjort flere forsøk på å slutte	<input checked="" type="checkbox"/>	5	
Prøvd å ruse meg mindre	<input type="checkbox"/>		
Skiftet rusmidler for å få kontroll	<input checked="" type="checkbox"/>	4	
Hatt rusfrie perioder	<input type="checkbox"/>		
Brukt antabus (mot alkohol) i perioder	<input checked="" type="checkbox"/>	3	
Søkt kontakt med behandlingstiltak (eks. lege, poliklinikk, ruskonsulent)	<input type="checkbox"/>		
Møtt til, eller har vært i behandling (eks. institusjon, poliklinikk, LAR)	<input checked="" type="checkbox"/>	2	
Endret vaner, gjort nye ting	<input type="checkbox"/>		
Annet (bruk notatikon)	<input type="checkbox"/>		

<=>Eorrige Avbryt Neste=>

HAR DU ØNSKE OM Å ENDRE RUSVANENE DINE?

Ja
 Usikker
 Nei. Jeg trenger en pause
 Nei, men jeg trenger noen å snakke med
 Nei. Jeg mestrer problemet
 Nei. Jeg er rusfri
 Nei, men andre mener jeg trenger rusbehandling

EGENAKTIVITET VED DENNE BEHANDLINGSSEKVENSEN

Ikke viktig Svært viktig
 På en skala fra 1 til 5, hvor viktig er det for deg å endre dine rusvaner?

Måter du vil endre dine rusvaner på Hvor stor tro har du på at du klarer dette tiltaket
 Komme i aktivitet 5

Når vil du begynne å endre dine rusvaner?
 Ikke klar Usikker Umiddelbart Har begynt

EN MÅTE Å ENDRE RUSVANER PÅ

En måte å endre rusvaner på
 Komme i aktivitet

Hvor stor tro har du på at du klarer dette tiltaket på en skala fra 1 til 5
 Lite tro 1 5 Stor tro

IKKE ØNSKE OM Å ENDRE RUSVANER

Men andre mener jeg trenger rusbehandling:

NAV
 Barnevern
 Arbeidsgiver, leder
 Familien/venner
 Partner
 Fastlege

KONTAKT SISTE ÅRET

Hvem har du hatt kontakt med det siste året for denne behandlingssekvensens angående dine rusrelaterte problemer?

Oppfølging i bolig
 Arbeidsgiverstøtte
 NAV
 Fastlege
 Andre kommunale helse- og omsorgstjenester
 Spesialist helsetjenester
 Kriminalomsorg
 Selvhjelpsgrupper
 Andre

OPPFØLGING FRA SAMARBEIDENDE INSTANSER

Oppfølging i bolig Ukentlig Hver 2.-3.uke Sjeldnere Ikke i det hele tatt

DIN ARBEIDSSITUASJON

	Har du vært i arbeid /elev siste 12 måneder	Antall måneder siste 12 måneder (opphøy til heltall)	I arbeid /elev nå
	Ja		Ja
I fullt arbeid (100%)	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>
I deltidarbeid	<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>
I arbeidstiltak o.l. (inkl. salg av gatemagasiner)	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>
Er elev eller student	<input checked="" type="checkbox"/>	4	<input type="checkbox"/>

<=Forrige Avbryt Neste =>

UTEN ARBEID

Har du aktiviteter som gir mening eller betyr noe?

Ja
Nei

<=Forrige Avbryt Neste =>

OPPSUMMERING (Outcome)

Antall dager brukt rus de siste 30 dager ?

På en skala fra 1 til 5 i hvilken grad...

...opplever du din rusbruk som et problem? 1 Svært lav 4 5 Svært høy

...opplevde du rusbehandlingen du får som nyttig? 1 Svært lav 3 5 Svært høy

...alt i alt, hvor tilfreds er du med din livssituasjon? 1 Svært lav 2 5 Svært høy

<=Forrige Avbryt Neste =>

Målepunkt

MÅLEPUNKT UNDER BEHANDLING

Pasient ID

Behandlingssekvens

Liste av målepunkt i denne behandlingssekvensen

Dato	Behandling	Instans	Fagperson
22.07.2013	Poliklinisk	PUT	Barday
23.07.2013	Dagbehandling	PUT	Harry

Legg til nytt Rediger Slett Utskrift

<= Forrige Meny Avbryt Hjelp Neste =>

MÅLEPUNKT

Målepunkt dato / /

Behandelnde instans

Den siste perioden har vært

Poliklinisk behandling

Dagbehandling

Døgnbehandling

Ambulant ?

Fagperson som registrerer

<= Forrige Avbryt Neste =>

REGISTRERING AV ULIKE FORHOLD

Pasient ID: 1001
Behandlingssekvens: 19.07.2013
Målepunkt: 22.07.2013

Ved dette målepunkt

Bruk av rusmidler	Data er registrert
Rusbehandling	Data er registrert
Sosiale forhold	Data er registrert
Fysisk helse	Ingenting registrert
Psykisk helse	Data er registrert
Egen aktivitet	Ingenting registrert
Status	Data er registrert

<=> Eorrige Hjelp Utskrift Avslutt

RUSMIDDELBRUK SISTE 30 DAGER

RUSMIDDELBRUK VED MÅLEPUNKTET 22.07.2013

Rusfri Rusbruk Overdose

<=> Eorrige Avbryt Neste =>

RUSMIDDELBRUK VED DETTE MÅLEPUNKTET

Hvis flere rusmidler brukes samtidig må hvert rusmiddel føres opp separat

Rusmiddel	Den viktigste begrunnelse
Alkohol	Regulere følelser, brukt som medisin
Hasj	Selve rusopplevelsen
Amfetamin	Sosiale årsaker
Andre sentralstimulerende	Uviktigmessig bruk
GHB/GBL	Annet
Subutex/Subuxone	
Metadon	
Heroin	
Andre opioider	
Benzodiazepiner o.l.	
Kokain	
Hallusino gener	
Løsemidler	
Anabole steroider	
Andre syntetiske rusmidler (Legal highs)	
Uoversiktig blanding	
Annet	

Antall dager brukt rus de siste 30 dager: 3

Injiserte? Ja Nei

Pasientens vurdering av alvorlighetsgrad på en skala 1 til 3: 3. Svært omfattende, uten grenser

<=> Eorrige Avbryt Neste =>

ANTALL BEHANDLINGSKONTAKTER

Antall behandlingsrelaterte kontakter siden forrige målepunkt (inkludert telefon, SMS, e-post, o.l.): 3

<=> Eorrige Avbryt Neste =>

EVALUERING AV BEHANDLING - 1 av 2

FYLLES UT AV PASIENTEN. På en skala fra 1 til 5, i hvilken grad...

	I svært liten grad		I svært stor grad	Ikke aktuelt
... har henviser(e) samarbeidet med behandlingstilbudet du får nå?	◀	1	▶	<input type="checkbox"/>
... opplever du å bli forstått?	◀	2	▶	<input type="checkbox"/>
... blir du inspirert?	◀	3	▶	<input type="checkbox"/>
... får du god informasjon om behandlingen?	◀	4	▶	<input type="checkbox"/>
... er behandler/institusjon gode til å tenne håp?	◀	5	▶	<input type="checkbox"/>
... har behandler/institusjon tro på deg?	◀	1	▶	<input type="checkbox"/>
... bryr behandler/institusjon seg?	◀	2	▶	<input type="checkbox"/>
... blir det stilt krav til deg?	◀	3	▶	<input type="checkbox"/>

<=Forrige Avbryt Neste =>

EVALUERING AV BEHANDLING - 2 av 2

FYLLES UT AV PASIENTEN. På en skala fra 1 til 5, i hvilken grad...

	I svært liten grad		I svært stor grad	Ikke aktuelt
... opplever du å ha medvirkning og innflytelse på behandlingen?	◀	4	▶	<input type="checkbox"/>
... har du selv bidratt i behandlingen?	◀	5	▶	<input type="checkbox"/>
... er behandlingen tilpasset dine forventninger?	◀	1	▶	<input type="checkbox"/>
... er enheten/behandler opptatt av dine ressurser?	◀	2	▶	<input type="checkbox"/>
... er enheten/behandler opptatt av dine erfaringer?	◀	3	▶	<input type="checkbox"/>
... tar behandlingen hensyn til din kulturelle bakgrunn?	◀	4	▶	<input type="checkbox"/>
... får du hjelp for dine rusproblemer?	◀	5	▶	<input type="checkbox"/>
... samarbeider enheten/behandler med andre tjenesteytere som NAV, fastlege osv.?	◀	1	▶	<input type="checkbox"/>
... planlegger enheten/behandler oppfølging etter at behandlingen avsluttes?	◀	2	▶	<input type="checkbox"/>

<=Forrige Avbryt Neste =>

SAMARBEID MED ANDRE

Samarbeid siden forrige målepunkt
23.07.2013

Oppfølging i bolig

Arbeidsgiverstøtte

NAV

Fastlege

Andre kommunale helse- og omsorgstjenester

Spesialist helsetjenester

Kriminalomsorg

Pårørende

Andre

<=<Førige Neste =>

Samarbeid med andre: Kriminalomsorg

Kriminalomsorg (KOP)

Mestringsenhet o.l. i fengsel

Politi

OK

TYPE SAMARBEID MED OPPFØLGING I BOLIG

Fylles ut av behandleren. Flere alternativer kan avmerkes

Veid behov

- Gjennom veiledning
- Gjennom ansvarsgrupper
- Gjennom systematisk samarbeid utover ansvarsgruppe
- Gjennom samhandlingsteam
- Annet

<=<Førige Avbryt Neste =>

KRISE OG INDIVIDUELL PLAN

Er det utarbeidet kriseplan? Ja Nei

Er det utarbeidet individuell plan? Ja Nei

<=<Førige Avbryt Neste =>

KRISE OG INDIVIDUELL PLAN

Er det utarbeidet kriseplan? Ja Nei

Er det utarbeidet individuell plan? Ja Nei

Ønsket pasienten individuell plan? Ja Nei

<=<Førige Avbryt Neste =>

BEHANDLERENS KARTLEGGING/UTREDNING

Fylles ut av behandleren

Siden forrige målepunkt 05.08.2013 er pasienten kartlagt for:

	Ja, internt	Ja, eksternt	Nei/Tikke aktuelt
Rus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Psykiske lidelser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sosiale forhold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nettverk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input checked="" type="checkbox"/> Mestringsferdigheter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nevrokognitiv fungering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Somatiske helseproblemer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<=<Førige Avbryt Neste =>

TEMA/INNHOET I BEHANDLINGEN SOM GIS - 1 av 3

Fylles ut av behandleren
Kryss av aktuelle tema og måter

Tema/innhold	Gitt individ	Gitt i gruppe	Gitt av andre	Tilbudt men takket nei
Relasjonsbygging	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Førstehjelp, overdosefare	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Økonomi/gjeld	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Oppfølging i bolig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Arbeidsstøtte (eks. IPS, arbeid med resept)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fysisk trening	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Kosthold og næring	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Praktisk hjelp ute (tannbeh, somatisk beh, medisnbruk)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<=<Forrige Hjelp Avbryt Neste =>

TEMA/INNHOET I BEHANDLINGEN SOM GIS - 2 av 3

Fylles ut av behandleren
Kryss av aktuelle tema og måter siden forrige målepunkt 05.08.2013

Tema/innhold	Gitt individ	Gitt i gruppe	Gitt av andre	Tilbudt men takket nei
Fritidsaktiviteter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kriminalitet, oppfølging i fengsel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivasjon for begrensning /rusfrihet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avhengighetsbehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Angst og depresjonsbehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traumebehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psykoosebehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<=<Forrige Hjelp Avbryt Neste =>

TEMA/INNHOET I BEHANDLINGEN SOM GIS - 3 av 3

Fylles ut av behandleren
Kryss av aktuelle tema og måter siden forrige målepunkt 05.08.2013

Tema/innhold	Gitt individ	Gitt i gruppe	Gitt av andre	Tilbudt men takket nei
Behandling av andre psykiske problemer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Behandling for kognitive vansker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeid med sosiale ferdigheter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeid med sosiale nettverk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeid med familie/par	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeid med foreldrekompetanse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Somatiske helseproblemer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<=<Forrige Hjelp Avbryt Neste =>

The image displays six separate windows from a medical software application, each with a title bar and a close button (X). Each window contains a list of options and navigation buttons at the bottom.

- MEDIKAMENTELL BEHANDLING**: Title bar has a close button. Content: "Velg de aktuelle siden forrige målepunkt 05.08.2013". List: Substitusjonsbehandling (LAR), Aversjonsbehandling (Antabus), Abstinensbehandling, Annen. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- ANNEN PSYKOFAMAKOLOGISK BEHANDLING**: Title bar has a close button. Content: "Annen behandling på enheten og hos andre f.eks. fastlege siden forrige målepunkt 05.08.2013". List: Antipsykotika, Stemningsstabiliserende, Antidepressiver, Anxiolytika, hypnotika og sedativa, Ritalin eller lignende, Annen. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- SELVHJELPSGRUPPER**: Title bar has a close button. Content: "Velg aktuelle siden forrige målepunkt 05.08.2013". List: AA, NA, Andre. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- BEHANDLINGSSTATUS**: Title bar has a close button. Content: "Velg et alternativ". List: Aktiv, Overført annen enhet, Avbrutt, Fullført. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- DIN SIVILSTAND**: Title bar has a close button. Content: "Velg et alternativ". List: Enslig, Gift/samboer /partner, Kjæreste/særboer. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- ER DU GRAVID?**: Title bar has a close button. Content: "Velg et alternativ". List: Ja, Nei. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- DIN BOSITUASJON** (top left): Title bar has a close button. Content: "Velg et alternativ". List: Egen bolig (leiet eller eid), Bor fast hos familie, Midlertidig bolig, Uten fast bolig. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- DIN BOSITUASJON** (top right): Title bar has a close button. Content: "Velg et alternativ". List: Egen bolig (leiet eller eid), Bor fast hos familie, Midlertidig bolig, Uten fast bolig. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.
- DIN BOSITUASJON** (bottom): Title bar has a close button. Content: "Velg et alternativ". List: Egen bolig (leiet eller eid), Bor fast hos familie, Midlertidig bolig, Uten fast bolig. Right column: Botiltak, ettervernsbolig, rehab.bolig, Behandlingsinstitusjon, Fængsel. Buttons: <=Forrige, Avbryt, Neste=>, and icons for help, list, and mail.

DIN BOSITUASJON

Velg et alternativ

Egen bolig (leiet eller eid) Bor fast hos familie Midlertidig bolig Uten fast bolig	Bor midlertidig hos venner eller familie Hospits eller lignende Sover ute eller på tilfeldige steder
--	--

<=<Forrige Avbryt Neste=>

EGNE BARN

Velg kun de aktuelle

Har omsorg for minst et barn Har samvær med minst et barn Har voksne barn

<=<Forrige Avbryt Neste=>

HAR DIN PARTNER EGNE BARN UNDER 18 ÅR?

Velg et alternativ

Ja Nei

<=<Forrige Avbryt Neste=>

DIN HØYEST FULLFØRT UTDANNING

Velg et alternativ

Ingen fullført utdanning Grunnskole VGS Fagbrev Høyere utdanning
--

<=<Forrige Avbryt Neste=>

HAR DU UAVKLARTE SAKER HOS POLITIET?

Velg et alternativ

Ja Nei

<=<Forrige Avbryt Neste=>

VENTER DU PÅ SONING?

Velg et alternativ

Ja Nei Ikke avklart

<=<Forrige Avbryt Neste=>

TILFREDSHET MED LIVSSITUASJONEN

FYLLES UT AV PASIENTEN, På en skala fra 1 til 5, i hvilken grad er du tilfreds med...

	I svært liten grad	1	2	3	4	5	I svært stor grad	Ikke aktuelt
... din bosituasjon?	◀	◀	◀	▶	▶	▶	▶	<input type="checkbox"/>
... ditt partnerforhold?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... ditt forholdet til egne/partners barn?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... din arbeidssituasjon?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... fritid?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... venner?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... din helse?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>
... din økonomi?	◀	◀	▶	▶	▶	▶	▶	<input type="checkbox"/>

<=<Forrige Avbryt Neste=>

FYSISK SYKDOMMER VED MÅLEPUNKTET 22.07.2013

Velg fysisk sykdom som du antar kan ha betydning for behandlingen

Hjerte/kar-lidelser

Lidelsen knyttet til bruk av rusmidler Ja Nei Usikker

Mottar behandling Ja Nei

Type lidelse Akutt Langvarig (kronisk)

I hvilken grad på en skala fra 1-5 synes du at du mestrer denne fysiske sykdommen?

1.Svært lav 3 5.Svært høy

<=Eorige Avbryt Neste=>

FYSISK SYKDOMMER VED MÅLEPUNKTET 22.07.2013

Velg fysisk sykdom som du antar kan ha betydning for behandlingen

Hjerte/kar-lidelser

Lidelsen knyttet til bruk av rusmidler Ja Nei Usikker

Mottar behandling Ja Nei

Type lidelse Akutt Langvarig (kronisk)

<=Eorige Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2
F0	F20.0 Schizofreni
F2	F20.9 Uspesifisert schizofreni
F3	F21 Schizotyp lidelse
F4	F22 Akutte og forbigående psykoser
F5	F23 Akutte og forbigående psykoser
F6	F24 Indusert psykose (vrangforestillingslidelse)
F7	F25 Schizoaftaktiv lidelse
F8	F28 Andre ikke-organiske psykoser
F9	F29 Uspesifisert ikke organisk psykose
Andre problemer	

<=Eorige Avbryt Neste=>

PROBLEM/DIAGNOSEKODE

Velg fra nivå 1 listen og deretter fra nivå 2 listen

Nivå 1	Nivå 2	Eksempler på Kognitive vansker
F0	Angstplager	Konsentrasjonsproblemer
F2	Sosial usikkerhet	Sliter med å huske ting
F3	Depresjon	Sliter med å planlegge
F4	Tristhet	Sliter med å komme i gang med ting
F5	Søvnproblemer	Sliter med å fullføre ting
F6	Spiseproblemer	Sliter med å ha overblikk over en situasjon, se helheten
F7	Kommer ofte i konflikt med andre	Sier ofte ting som ikke passer
F8	Uro	Avbryter andre
F9	Tankekjør	Er for impulsiv
Andre problemer	Vansker med å kontrollere eget sinne	Sliter med å skifte fokus, er lite fleksibel
	Avhengighet ikke knyttet til stoff (f.eks. spill, shopping, sex)	Blir fort sint
	Kognitive vansker	Er rastløs, har uro i kroppen
	Annet	Lett for å kjede meg

<=Eorige Avbryt Neste=>

PSYKISKE PROBLEMER/DIAGNOSER - 1 av 2

PSYKISKE PROBLEMER/DIAGNOSER VED MÅLEPUNKTET 23.07.2013

Problem/diagnoser (NB! utenom F10-F19 diagnoser) ?

F30.2 Mani med psykotiske symptomer

Legg til Slett

<=<Eorigge Avbryt Vis historie Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE VED MÅLEPUNKTET 23.07.2013

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

I hvilken grad på en skala 1-5 synes du at du mestrer psykisk

1 Svært lav 3 5 Svært høy

<=<Eorigge Avbryt Neste=>

PSYKISK PROBLEM/DIAGNOSE - 2 av 2

PSYKISK PROBLEM/DIAGNOSE VED MÅLEPUNKTET 23.07.2013

Mottatt behandling for psykiske problem/diagnose (ikke rusproblem) Gjelder også behandling fra fastlege Ja Nei

I hvilken grad på en skala 1-5 opplever du bedring?

1 Svært lite 2 5 Svært mye

I hvilken grad på en skala 1-5 synes du at du mestrer psykisk

1 Svært lav 4 5 Svært høy

<=<Eorigge Avbryt Neste=>

Egen aktivitet i forhold til rusproblemer siden inntak

Fylles ut av pasienten. Sett x på aktuelle aktiviteter og anså nytten på en skala fra 1 til 5

	Ja	Liten nytte	5	Stor nytte
Prøvd å slutte	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gjort flere forsøk på å slutte	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prøvd å ruse meg mindre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skiftet rusmidler for å få kontroll	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hatt rusfrie perioder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brukt antabus (mot alkohol) i perioder	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Søkt kontakt med behandlingstiltak (eks. lege, poliklinikk, ruskonsulent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Møtt til, eller har vært i behandling (eks. institusjon, poliklinikk, LAR)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Endret vaner, gjort nye ting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet (bruk notatikon)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<=<Eorigge Avbryt Neste=>

HAR DU ØNSKE OM Å ENDRERUSVANENE DINE?

Ja

Usikker

Nei. Jeg trenger en pause

Nei, men jeg trenger noen å snakke med

Nei. Jeg mestrer problemet

Nei, men andre mener jeg trenger rusbehandling

<=<Eorigge Avbryt Neste=>

EGENAKTIVITET VED DETTE MÅLEPUNKTET

I en skala fra 1 til 5, hvor viktig er det for deg å endre dine rusvaner? Ikke viktig 3 Svært viktig

Måter du vil endre dine rusvaner på Hvor stor tro har du på at du klarer dette tiltaket

Ta mot behandling 3

Legg til ny Rediger Slett

Når vil du begynne å endre dine rusvaner?

Ikke klar Usikker Umiddelbart Har begynt

<=<Eorigge Avbryt Neste=>

EN MÅTE Å ENDRE RUSVANER PÅ

En måte å endre rusvaner på

Trene

Hvor stor tro har du på at du klarer dette tiltaket på en skala fra 1 til 5

Lite tro 1 3 5 Stor tro

<=<=Forrige Avbryt Neste=>

IKKE ØNSKE OM Å ENDRE RUSVANER

Men andre mener jeg trenger rusbehandling:

Domstol/fylkesnemnd (Eks. §10.2, 10.3)

NAV

Barnevern

Arbeidsgiver, leder

Familien/venner

Partner

Fastlege

<=<=Forrige Avbryt Neste=>

DIN ARBEIDSSITUASJON

	Har du vært i arbeid /elev siste 12 måneder	Antall måneder siste 12 måneder (opphøy til heiltall)	I arbeid /elev nå
I fullt arbeid (100%)	<input checked="" type="checkbox"/>	10	<input checked="" type="checkbox"/>
I deltidarbeid	<input checked="" type="checkbox"/>	9	<input type="checkbox"/>
I arbeidstiltak o.l. (inkl. salg av gatemagasiner)	<input checked="" type="checkbox"/>	8	<input type="checkbox"/>
Er elev eller student	<input checked="" type="checkbox"/>	7	<input checked="" type="checkbox"/>

<=<=Forrige Avbryt Neste=>

UTEN ARBEID

Har du aktiviteter som gir mening eller betyr noe?

Ja

Nei

<=<=Forrige Avbryt Neste=>

OPPSUMMERING (Outcome)

Antall dager brukt rus de siste 30 dager 2

På en skala fra 1 til 5 i hvilken grad...

...opplever du din rusbruk som et problem? 1 Svært lav 3 5 Svært høy

...opplever du rusbehandlingen du får som nyttig? 1 Svært lav 4 5 Svært høy

...alt i alt, hvor tilfreds er du med din livssituasjon? 1 Svært lav 5 5 Svært høy

<=<=Forrige Avbryt Neste=>

Paper I



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

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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 (≤ 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 ^a	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 ^b	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. ^aMissing data for three participants. ^bTemporary 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

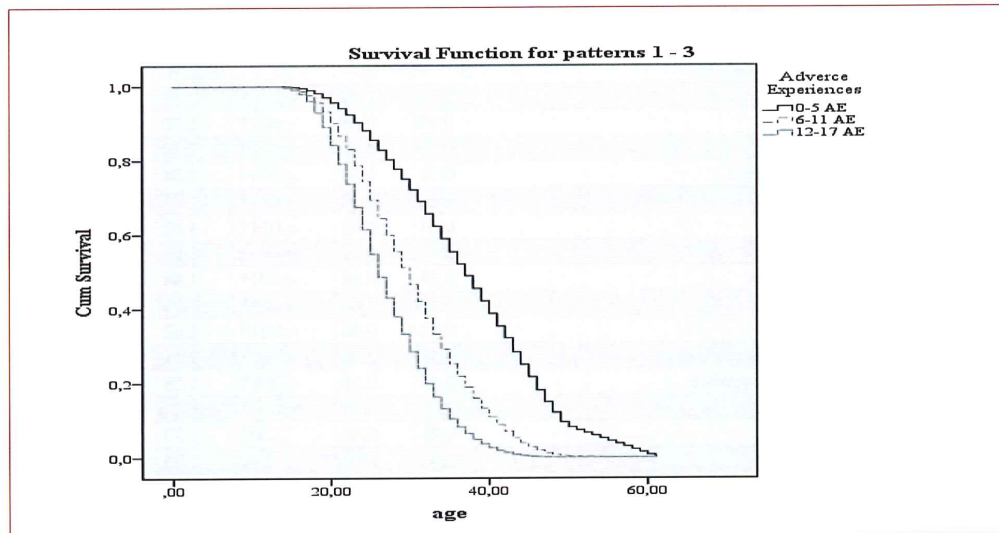


Figure 1 Age of opioid onset and number of adverse experiences

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.

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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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Paper II

II



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CLINICAL PSYCHOLOGY & NEUROPSYCHOLOGY | RESEARCH ARTICLE

Predictors of quality of life of patients in opioid maintenance treatment in the first year in treatment

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Abstract: Background: Although research has examined patients' perception of quality of life while in opioid maintenance treatment, the focus has mainly been on health-related quality of life. Objectives: This study aimed to investigate opioid maintenance treatment patients' subjective overall quality of life and the potential association between quality of life and factors, such as housing, the relationship with their partner, children and friends, leisure, work, financial situation and health during the first year in treatment. Methods: Self-recruited first-time enrolled patients met for a structured registration through face-to-face interviews every third month for 12 months. Sociodemographic factors and nine indicators of quality of life from the National Quality Register for Substance Abuse Treatment were utilized. Results: Participants (N = 38), reported a significant improvement in overall quality of life in the first year $F(1, 40.4880) = 7.532, p = .009$, with a positive effect on .19 per time unit. In particular, the domain financial situation predicted improved quality of life, $F(1, 37.774) = 14.212, p = .001$. Moreover, there was no significant change for subjective factors such as leisure, relationship with children, housing, health, and relationship with a partner across time. Specific domains of quality of life such as housing, leisure and financial situation were positively associated with overall quality of life. Conclusions: These results suggest that to address factors as a part of patients' treatment can be instrumental in improving quality of life. Further

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PUBLIC INTEREST STATEMENT

There is a positive change in quality of life for people addicted to opioids when they enroll in opioid maintenance. This change relates mainly to improvements in health, such as fewer infections and drug related diseases. But, what are patient's own views on their quality of life? What association is there between the overall quality of life and their housing situation, the relationship with their children and friends, leisure and financial situation in the first year in treatment? Based on answers from face-to-face interviews every third month, the article answers these questions. It was found that the overall quality of life improved during the first year, and the financial situation, in particular, predicted improved quality of life. Housing, leisure and financial situation were positively associated with overall quality of life. Exploration of these issues in treatment can help patients improve their quality of life.

research is needed to explore these findings in a larger opioid maintenance treatment population.

Subjects: Social Sciences; Behavioral Sciences; Health and Social Care

Keywords: quality of life; opioid maintenance treatment; patient reported outcome measures; patient reported experience measures; factors; financial situation; follow-up

Individuals with substance use disorders (SUD) experience harmful impacts and long-term impairments in their lives such as mental and physical problems, issues related to social relationships, housing and personal economy (McLellan, Lewis, O'Brien, & Kleber, 2000; Muller, Skurtveit, & Clausen, 2017; Shion, Sambamoorthy, Ying, & Aznal, 2014; Tiffany, Friedman, Greenfield, Hasin, & Jackson, 2012). SUD treatment emphasizes reduction in drug use, deemed successful when patients test negative for drugs (Mitchell et al., 2015; Strada et al., 2017; Tiffany et al., 2012). However, with a comprehensive perspective on SUD, abstinence is no longer the only goal (Bolek, Yargic, & Ekinci, 2016; De Maeyer, Vanderplasschen, & Broekaert, 2010; Mitchell et al., 2015). Although the increasing emphasis on patients' empowerment and the interest in patients' viewpoint may present important insights into treatment and life in general, few studies utilize substance (ab)users' perspectives as an important source of information (De Maeyer, van Nieuwenhuizen, Bongers, Broekaert, & Vanderplasschen, 2013; Strada et al., 2017). Thus, the concept of quality of life (QOL) is becoming increasingly important in the field of addiction research (Mitchell et al., 2015; Rudolf & Watts, 2002; Strada et al., 2017).

The concept of QOL has been used inconsistently in different research fields (Gill & Feinstein, 1994; Laudet, Becker, & White, 2009; Zubaran & Foresti, 2009). Terms like life satisfaction, subjective well-being and health-related quality of life (HRQOL) are sometimes used synonymously with QOL (Camfield & Skevington, 2008; De Maeyer et al., 2010). Although there is no consensus on the content of the term QOL, researchers agree that QOL is subjective and multidimensional (De Maeyer et al., 2010; Laudet et al., 2009; WHO, 1995b). A widely used definition of QOL is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHO, 1995b, p. 1405).

A widely applied standard in addiction research has been the focus on how a disease affects a person's functioning. In this context the absence of disease is essential (De Maeyer et al., 2010; Moons, 2004; Zubaran & Foresti, 2009). Today, a more comprehensive approach acknowledges QOL as a reflection of how people perceive and react to different aspects of a person's life (Gill & Feinstein, 1994). Domain satisfaction is a judgement of a specific aspect of an individual's life, and life satisfaction and domain satisfaction are generally correlated (Pavot & Diener, 2008). To better understand patients' satisfaction with life overall, and to give attention to social aspects, it has been suggested that the best patient reported outcome measure to use is QOL (De Maeyer et al., 2010; Muller, 2017).

In relation to the SUD population, research has primarily been concerned with socially desirable outcomes such as abstinence, reduced criminality and prostitution and health-related issues. Research on opioid maintenance treatment (OMT) with a focus on QOL has primarily had a health-related perspective (De Maeyer, Vanderplasschen, & Broekaert, 2009; De Maeyer et al., 2010; Laudet, 2011; Muller, Skurtveit, & Clausen, 2016b). Research has also focused on the correlation between addiction severity and QOL, has compared groups with and without dual diagnosis, and has analysed the impact of methadone or buprenorphine on patients' QOL (Zubaran & Foresti, 2009). Concerning health-related quality of life (HRQOL), research has documented significant improvements in physical and psychological health components of QOL (Karow et al., 2011; Mitchell et al., 2015; Nosyk et al., 2011; Padaiga, Subata, & Vanagas, 2007; Torrens et al., 1997;

Tran et al., 2016). At a 12-month follow-up, improvements were reported in the realm of pain/discomfort and anxiety/depression (Nosyk et al., 2011). On the other hand, symptoms of sleep problems, pain and depression influence OMT patients' quality of life and the ability to function (Peles, Schreiber, & Adelson, 2006; Pud, Zlotnick, & Lawental, 2012). A recent study demonstrates a significant negative correlation between high methadone dosage (> 90 mg/day) and QOL in several domains, including the physical and psychological domains (Pedrero-Perez, 2017).

In comparison to the general population and patients with other chronic diseases, patients in OMT report significantly poorer QOL (Best et al., 2013; De Maeyer et al., 2010; De Maeyer, Vanderplasschen, Lammertyn et al., 2011; Laudet et al., 2009; Rudolf & Watts, 2002). A study of 549 Norwegian patients, including inpatients and outpatients in both opioid maintenance treatment and medication-free treatment, found that about three-fourths reported their overall QOL to be poor or very poor. Furthermore, the results showed that those who stated methadone/buprenorphine as their preferred substance were more likely to report neutral, good or very good QOL rather than very poor QOL (Muller, Skurtveit, & Clausen, 2016a). Research shows that QOL improves after starting OMT, especially during the first months of treatment (De Maeyer, Vanderplasschen, Lammertyn et al., 2011; Feelemyer, Jarlais, Arasteh, Phillips, & Hagan, 2014). The positive effect of QOL is often explained by improvements in health (Nosyk et al., 2011).

Social support is an important predictor of success in OMT (Chou et al., 2013; Khuong, Vu, Huynh, & Thai, 2018; Laudet, Morgen, & White, 2006; Lin, Wu, & Detels, 2011). Ponizovsky et al. (2010) found that the best predictor of QOL was social support from friends and significant others. A study of 159 patients enrolled in methadone treatment for about a decade identified social relationships and support, psychological well-being, employment, independence and a meaningful life as important components of a good QOL (De Maeyer, Vanderplasschen, Camfield et al., 2011). Other factors linked to improved QOL are a life less controlled by the addiction, fewer social issues and a better relationship with family and friends. Health was rarely mentioned in this context (Brekke, Vetlesen, Høiby, & Skeie, 2010). Muller (2017) found that 12 months after initiation of treatment changes in general QOL were related to development in patients' social network. Those who expanded or maintained an abstinent network reported a greater increase in QOL. Merely patients who remained in OMT one year after enrolment reported improved social quality of life.

One of the goals of OMT is to improve the QOL of opioid-dependent individuals (Norwegian Directorate of Health, 2010). The way in which opioid-dependent individuals experience their daily life is not well researched (De Maeyer et al., 2009; Pasareanu, Opsal, Vederhus, Kristensen, & Clausen, 2015). It is important to utilize user-driven approaches to gain insights into aspects that determine OMT individuals' self-perceived QOL (De Maeyer, Vanderplasschen, Camfield et al., 2011). Instruments for measuring QOL in opioid-dependent patients tend to focus on health-related aspects (Strada et al., 2017). Health is important for OMT patients' QOL. However, the broader impact of opioid dependence calls for instruments that also incorporate how social and material living conditions add to the understanding of QOL. Patients' social and material living conditions have an impact on their overall QOL. On this background, our study addresses the following aims:

- (a) to examine patients' overall QOL during the first year after enrolment in OMT, and
- (b) to investigate potential correlations with overall QOL to domain-specific QOL indicators in housing, relationship with children and friends, work, leisure, health and financial situation.

1. Material and methods

1.1. Sample

Participants for this study were recruited from eight OMT outpatient units in the catchment area of Haukeland University Hospital, Bergen, Norway. The geographic catchment area includes

approximately 350 000 inhabitants from Bergen municipality and surrounding municipalities. There are about 1000 OMT patients in the catchment area of Haukeland University Hospital, including patients who have been in OMT from 1998 to newly enrolled patients.

The National Quality Register for Substance Abuse Treatment (NQR-SAT) applies to individuals with substance use disorders enrolled in treatment. NQR-SAT originates from western Norway and is awaiting approval as a national registry. The initially established registry was used in the present study.

Data used in this paper were collected from 47 self-recruited patients in OMT. They were recruited during two periods: January to December 2013, and September 2015 to June 2016. Inclusion criteria were opioid dependence according to ICD-10 or DSM-IV, age > 18 years, first time admittances to OMT, living in Haukeland University Hospitals' catchment area, and commencement of OMT medication (Buprenorphine or Methadone) before the first registration. Lack of competence to consent was the only exclusion criterion.

Patients received either buprenorphine or methadone as medical treatment with a variation in dosage from 4 mg to 20 mg buprenorphine and 80 to 100 mg methadone. Two participants received extended-release injections with naltrexone which blocks the effects of opioids. The majority of patients came to their local outpatient unit for daily medication and a short conversation with the employee at the outpatient unit, while those in prison received medicine on a daily basis from health employees in prison or prison staff. The two patients who received naltrexone got a muscle injection once a month.

During the first year, five participants dropped out, three withdrew from the study due to lack of interest, and one was excluded due to cognitive impairment and inability to provide consent. Data from these participants were included in the analysis up to the time they completed the research participation. The total sample included 47 opioid-dependent individuals', 11 females and 36 males. For sociodemographic characteristics see (Carlsen & Torsheim, 2019).

1.2. Data collection

Participants met for structured registrations through face-to-face interviews every third month for a period of two years. The current study utilizes data from baseline (T0) and every third month through the first 12-month follow-up from T1 to T4. In total, 291 observations of a total of 47 individuals were analysed and distributed as follows: 47 participants at T0, 38 participants at T1 and T2, 34 participants at T3 and 36 at T4. Of the 47 included participants, 29 participants completed all registrations, eight completed four, one completed three, four completed two, and five participants completed only baseline registrations.

The principal investigator was responsible for data management. Participants provided written informed consent to participate in the study, and the study was approved by the Regional Committee for Medical and Health Research Ethics (2013/429/REK South-East C).

1.3. Measures

NQR-SAT collects Patient Reported Outcome Measures (PROM- data) and Patient Reported Experience Measure (PREM-data). PROMs capture a patient's perception of their health (self-reported health status, symptoms, QOL, etc.) (Black, 2013; Neale et al., 2016; SKDE, 2017), whereas PREMs capture a patient's perception of their experience with health care or treatment (involvement, communication, service access, etc. (SKDE, 2017). In other words, data in NQR-SAT are patients' subjective perceptions on given topics.

Questions from validated tools are incorporated in NQR-SAT, and nine indicators of QOL were utilized in this study. One indicator measured the overall QOL, and eight indicators measured QOL in specific social domains. To measure the overall QOL, we used the question "How would you rate

your quality of life as a whole?”, which is used in several instruments on QOL, including WHOQOL-Brief and WHOQOL (WHO, 1995a, 1996) and Personal Wellbeing Index (Cummins, Eckersley, Pallant, van Vugt, & Misajon, 2003). The eight specific indicators reflect on various social life domains, where some of them are strongly related to global life satisfaction (Tomy, Tyszkiewicz, & Cummins, 2011). The specific domain questions were: “How satisfied are you with: 1) your personal relationship with partner, 2) your relationship with children, 3) your relationship with friends (International Wellbeing Group, 2013; Tomy et al., 2011; WHO, 1996) 4) housing (WHO, 1995a, 1996) 5) your health (International Wellbeing Group, 2013; WHO, 1996) 6) work (WHO, 1995a) 7) leisure (WHO, 1995a), and 8) financial situation (WHO, 1995a). Equally to the WHO-BRIEF (WHO, 1996) the participants reported, their QOL on a five-point Likert-type response scale, ranging from 1 = “very dissatisfied” to 5 = “very satisfied” at each measurement point.

To measure participants drug use the NQR-SAT uses the question “How many days have you used alcohol or drugs during the last 30 days?” which is the same question as in EuroASI (Blacken et al., 1994).

1.4. Data analysis

Descriptive statistics with frequency analysis were used to examine the participants’ demographic characteristics at baseline.

Linear mixed models for repeated measures were used to estimate level and change in general and specific domains of QOL from baseline to 12-month follow up. Main and interactive effects were tested with Satterthwaite’s corrected F-test. A significance level of $p < 0.05$ was considered statistically significant in all the analyses. SPSS version 24 was used for the analysis.

The linear mixed analysis was conducted in two stages. The objective of the first stage was to establish a proper model of change, regressing the dependent variable on time and relevant group factors. In the random part of the model, we compared a random intercept only model with a random intercept and random slope of time model. In the random intercept model, individuals differed with respect to their intercept at time 0, but shared the effect of time. In the random intercept and slope model, individuals differed in their intercept on time and in their slope of change. Model fits were compared using likelihood ratio tests for nested models.

In the second stage of analysis, time invariant baseline factors were included to test differences in intercept and change. Significance was assessed by omnibus F-tests per factor term. In addition, we tested whether the effect of time interacted with baseline characteristics such as level of education (no education/primary/secondary school/high school/higher education), marital status (single/married), and type of living situation (own apartment/permanently with parents/temporary housing/homeless). Time is coded as four time points, one for every three months data were collected.

2. Results

2.1. Attrition

There was attrition from baseline to follow-up. In the first year, eight participants missed one data point, one participant missed two data points, four participants missed three data points, and five participants missed four data points and had only baseline registration. Twenty-nine participants had no missing values.

An independent sample t-test showed no significant differences for the first year between non-completers and completers for level of education, marital status, and type of living situation. There were no statistically significant differences at baseline between completers and non-completers

with respect to quality of life in the domains of relationship with a partner, children and friends, housing, health, work, leisure, and financial situation.

2.2. Demographic characteristics at T0

At baseline, the mean age of the 47 participants was 37.8 years, 76.6 % were men, and 93.6 % were of Norwegian ethnicity. Among women who participated at baseline 73 % participated in the follow-ups, while the average was 79 % among men. Approximately 50 % ($n = 24$) lived in their own apartment, while 29.8 % ($n = 14$) had temporary housing such as rehabilitation homes, treatment institutions or prison facilities. Seventy-six point six percent ($n = 36$) were single. Primary/secondary school were reported as the participants' highest level of education during the entire 12-month follow-up. Fifty-eight percent ($n = 22$) had a meaningful activity at baseline, yet none of the participants had work. Twenty-five participants had children, and 80 % ($n = 20$) of them had visitation rights or custody of their own children under the age of 18 years, while 16 % ($n = 4$) had no custody/visitation rights, and 28 % ($n = 7$) had adult children. At baseline, 63.8 % ($n = 30$) had no unresolved issues with the police or justice system.

2.3. Change in QOL

Table 1 shows that the results form a series of linear mixed models regressing QOL on time. The overall QOL increased significantly during the 12 months in OMT, $F(1, 40.880) = 7.532, p = .009$. The positive effect of the overall QOL was $b = .19$ per time unit, corresponding to a moderate effect size of 0.62 SD change during the 12 months. The random intercept and slope components were statistically significant, indicating that patients differed in their level at baseline, as well as in their rate of change. To exemplify, according to the effect of time, patients with a change rate at 2 SD below the mean change rate would have a decline in QOL, whereas patients with a change rate at 2 SD above the mean would increase their overall QOL across time.

The rate of change for the first 12 months was positive for all specific QOL domains, except for leisure, see Figure 1. Statistical significance of change per time unit was only achieved for financial QOL $F(1, 37.774) = 14.212, p = .001$. At baseline, the average patients were dissatisfied with their financial QOL and the increase per time unit was $b = .18$. A significant variation between patients was also identified.

Based on few observations for QOL in relation to partner, relationship with children and work, these domains were excluded from this analysis. There was no significant rate of change for friends $F(1, 38.542) = 1.488, p = .230$, housing $F(1, 38.847) = 7.33, p = .385$ and health $F(1, 37.014) = 3.140, p = .085$. Participants did vary on the abovementioned domain-specific QOL and spread across the entire scale. However, this variation was not significant.

In the last sequence of models, overall QOL was regressed on QOL in specific domains, using specific QOL as time-varying covariates, see Table 2. QOL domains such as financial situation, housing and leisure were associated with higher overall QOL. Leisure was the strongest contributor $b = .32, p = .001$, followed by housing $b = .22, p = .001$ and financial situation $b = .15, p = .03$.

We also tested for interaction effect for level of education, marital status and type of housing. None of these had any significant prediction on overall QOL, $F(4, 43.822) = 1.103, p = .367$, $F(2, 104.367) = .413, p = .662$, $F(3, 94.529) = 1.670, p = .179$, respectively.

3. Discussion

Patients are generally dissatisfied with their overall QOL before enrolling into OMT (De Maeyer, Vanderplasschen, Lammertyn et al., 2011). Our main finding was that, although OMT patients QOL fluctuated, on average their overall QOL improved after starting OMT, corresponding to a moderate effect size. This result is congruent with previous research. The continuous positive improvement in overall QOL can indicate that the gap between what patients expect and what they receive from OMT is little.

Table 1. Estimates of Covariance Parameters and Fixed Effects Estimates for social measures of QOL

	Total QOL	Housing	Sig.	Leisure	Sig.	Friends	Sig.	Health	Sig.	Financial	Sig.
Intercept (b_0)	2.60	3.22	*	3.01	*	3.18	*	3.06	*	2.14	*
Time (b_{time})	0.19	0.05	NS	0.00	NS	0.07	NS	0.08	NS	0.18	*
RI (U_b)	0.75	0.91	*	0.62	*	0.60	**	0.63	*	0.74	*
RS (U_j)	0.11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Residual (e)	0.74	1.05	*	0.93	*	1.04	*	0.85	*	0.72	*

RI = Random Intercept component, RS = Random Slope of time component * $p < .001$ ** $p < .05$

Figure 1. Measures of QOL during the 12-month follow-up period (T1-T4)

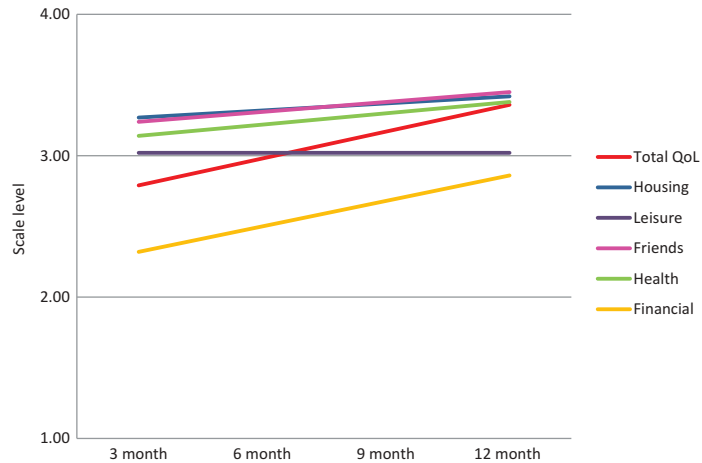


Table 2. Overall QOL regressed on specific QOL social domains

Parameter	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	0.37	0.35	109.799	1.045	0.298	-0.33	1.07
Time	0.16	0.05	139.787	3.065	0.003	0.05	0.27
Housing	0.22	0.06	126.255	3.369	0.001	0.09	0.35
Leisure	0.32	0.08	143.819	4.013	0.001	0.16	0.48
Friends	0.00	0.06	137.011	0.000	1.000	-0.13	0.13
Health	0.07	0.07	120.643	1.025	0.307	-0.06	0.21
Financial	0.15	0.07	94.529	2.105	0.038	0.00	0.30

Different aspects can influence patients' QOL. Giacomuzzi et al. (2003) found a significant increase of QOL score for finances at six months follow-up. In the current study, participant's satisfaction with their financial situation was a significant predictor for positive overall QOL. Norwegian OMT patients experience an immediate effect of the enrolment; they do not pay for their OMT medication as this is covered by the welfare state. This releases capital that previously was linked to purchase of opioids and other substances (Redden, Tracy, & Shafer, 2013). When starting in OMT, patients are given an opportunity to address the economic challenges and utilize official help from the Norwegian Labour and Welfare Administration (NAV). NAV assists patients with several issues, e.g. ensuring that bills are paid, setting up a budget for debt repayment, and applying for social benefits or disability pension. Many OMT patients have little regular work experience and do not have a regular income. By applying for social benefits or disability pension, those who meet the requirements will receive a fixed monthly income from the welfare state. By achieving control over their financial situation, patients can achieve a security that they have not previously experienced, which can result in economic freedom: they might have the opportunity to save money and/or buy things they earlier could not afford (Redden et al., 2013).

About 68.6 % of the patients with five to ten years in outpatient methadone treatment reported low QOL scores for financial situation (De Maeyer, Vanderplasschen, Lammertyn et al., 2011). In our study, we also found that the average level of satisfaction with financial QOL was low at baseline, yet it increased during the first 12 months. Some patients are heavily in debt and live in an economic chaos, spending all their money and not being able to pay rent for housing or other bills (Carlsen, Gaulen, Alpers, & Fjaereide, 2018; Gaulen, Alpers, Carlsen, & Nesvåg, 2017). Losing contact and status in the drug environment can lead to a worse economic situation, e.g. possible loss of income from illegal activity and less access to income. Many patients emphasized the importance of having basic comforts such as affordable housing, money for personal transportation, food and an income (De Maeyer et al., 2009) nevertheless, living on disability benefits, for many, means that they must live on an existence minimum.

By achieving financial security, housing, family, and basic comforts, OMT patients achieve a stability in life and thereby a meaningful life (De Maeyer, Vanderplasschen, Camfield et al., 2011). To improve QOL it is important to support OMT patients in their daily life with practical, social and environmental support (De Maeyer, Vanderplasschen, Camfield et al., 2011). In this context, leisure time is important. Engagement in meaningful activity has been associated with better QOL (Best et al., 2012), and our findings show an association between high QOL leisure and high overall QOL. Having something to do, an activity or interest, gives life meaning and purpose and may reduce the loneliness many OMT patients' experience and remove it as a prominently negative factor.

Social network and relationship to family and friends have been highlighted as important predictors for QOL (De Maeyer et al., 2009; De Maeyer, Vanderplasschen, Camfield et al., 2011; Muller et al., 2017). Sun et al. (2015) found that family relations among patients, and the quality of such relations, improved after starting OMT. Others have demonstrated that gaining an abstinent social network improved the global QOL (Best et al., 2012; Muller et al., 2017). In our study, no domains such as friends, partner or children were significant predictors for overall QOL. A possible explanation for the discrepancy between previous research and our study may be that participants experience loss of network and a social arena. Starting in OMT may be a new beginning for many patients, a possibility to break with drug-using friends and the drug users' network. Sun et al. (2015) found that OMT patients reduced daily contact with drug-using friends after starting in OMT. However, establishing a new drug-free network, or reconnecting with family members or old friends, may take longer or occur later than during the first 12 months (Karow et al., 2011). Other explanations can be that participants in our study were satisfied or dissatisfied with their friends both before and after enrolling in OMT; the friends were still the same, and enrollment in OMT did not change the friendship. Or, participants experienced themselves unable to establish a drug-free network, or they wanted to wait to reconnect with drug-free friends until they were back on their feet. Participants also reported that they had few or no friends in the drug environment, but many acquaintances. Lack of social network support, few friends and little or no contact with family members are also factors demonstrated to be common in older patients in OMT (Carlsen et al., 2018).

There is a significant time effect in the domains of general well-being (Winklbaaur, Jagsch, Ebner, Thau, & Fischer, 2008). Research has documented an increase in satisfaction with life for patients during the first months in OMT (Maremmanni, Pani, Pacini, & Perugi, 2007; Xiao, Wu, Luo, & Wei, 2010), or during the first half-year (Karow et al., 2011; Padaiga et al., 2007). Our study is in line with previous research regarding the effect of time on overall QOL. Moreover, we found the effect to be present even twelve months after participants were enrolled in OMT. Muller et al. (2017) showed that for those still in OMT, social QOL increased during 12-month follow-up, and the increase was a function of treatment retention, not a function of time.

The present study did not incorporate the perspective of health on QOL. There is vast evidence about the relationship between QOL and health (Fei, Yee, Habil, & Danaee, 2016; Karow et al., 2010; Mitchell et al., 2015), and more research on the association between social and material living conditions and QOL is needed. Besides, our study showed that health was not significant, even though it was close to the significance level of .05. This finding is not in line with the literature which states that health improves upon OMT entry. There may be several reasons why health was not significant. One explanation may be that the Norwegian welfare system ensures everyone equal treatment in the health care system regardless of the status as OMT patient or not. Another possibility is that participants have underreported both physical and mental ailments. Some participants did not agree with diagnoses given them earlier in life, and chose therefore not to report these. Others did not enter treatment in a very poor health condition, nor did they consider health as an important factor for their QOL whereas other variables were weighted more heavily. According to De Maeyer et al. (2009) substance (ab)users primarily associate social inclusion and self-determination with QOL, and not health.

4. Strengths and limitations

When interpreting the results, some limitations must be taken into account. This study consists of self-selected participants, and the sample may therefore not be representative of OMT patients in general. However, substance abusers' self-reports are regarded as generally accurate (Kopak, Proctor, & Hoffmann, 2017; Reinert & Allen, 2007; Robinson, Sobell, Sobell, & Leo, 2014).

There are several potential explanations for the small sample size in this study. One explanation is that life was too chaotic and not compatible with participation in this research project. OMT patients rather needed time to arrange for a place to stay, to settle the economy, attend meetings with their doctor, social services and other official helping services. This was "a full time job" and they did not have the surplus at that time that was needed to participate in this research project. Another explanation is the way patients were recruited. The first year, participants were mainly recruited by the means of OMT advisors working at the OMT units who informed newly enrolled patients about the study. Besides, an information leaflet and an invitation to participate were sent to all first time enrolled patients. This proved to be ineffective. Hence, more proactive strategy was chosen in the second recruitment stage, with a better outcome.

Participants assessment of QOL may be influenced by their current mood (Pavot & Diener, 2008), but the effects produced in a study are small compared to the stable variance in the measure settings. Occasion-specific mood effects were not inherently important in ecological measurement (Eid & Diener, 2004).

To grasp the full scope of change in OMT patients' QOL, a follow-up period of 12 months may be too short. According to clinical experience patients are going through many changes in life during the first 12 months in treatment, such as getting a structured meaningful everyday life, regain control over mental, social, economic and environmental issues that emerges after years of substance abuse. QOL changes over time, and in a 12 month period we might just capture temporary changes in QOL. With patients staying in OMT for years or even forever, research needs to focus on QOL in long-term conditions. Thereby we might identify important predictors of lasting improved QOL.

The uniqueness of our study is the frequency of the follow-up, every third month. A time interval of three months enables participants to recall important events that affect them, in contrast to studies with annual or longer recall periods, because recall deteriorates with time (Fadnes, Taube, & Tylleskar, 2009).

5. Implications of the study

The main objective of this study was to take a social perspective on factors that affect the quality of life of OMT patients. Although the QOL perspective provides a more comprehensive understanding of patients' experiences with OMT, QOL used to be neglected in SUD studies. An important implication of this study is that social aspects can improve QOL in OMT patients. These aspects need to be addressed in clinical practice in a larger OMT population. By integrating QOL in clinical practices, additional information, aside from the diagnostic information, can be provided for a total picture of the patient, and the concept of QOL can go beyond the boundaries of the research field (De Maeyer et al., 2010). It appears that the treatment system would benefit if more attention were given to QOL factors rather than merely health issues. Improved QOL of OMT patients may have positive effects on other issues in life.

6. Conclusion

Participants QOL vary, in terms of both overall QOL and domain-specific QOL, at enrolment in OMT and throughout the 12-month follow-up period. Nevertheless, patients in this study experienced a small increase of overall QOL, and a specific significant improvement was found for financial QOL during the first 12 months in treatment. Level of education, marital status and type of housing did not predict overall quality of life, however, higher quality of life for leisure; housing and financial situation was associated with higher overall QOL. It is essential to enhance aspects of life that matter to patients in OMT, as this has important implication for better treatment outcomes. The clinical practice currently lacks this focus, which can and should be elaborated to a greater extent than today.

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Paper III

Opioid and Polydrug Use Among Patients in Opioid Maintenance Treatment

This article was published in the following Dove Press journal:
Substance Abuse and Rehabilitation

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Purpose: Opioid maintenance treatment reduces a person's use of heroin. However, frequent substance use in treatment is a problem.

Aim: To examine the association between opioid maintenance treatment and opioid/polydrug use, and whether social factors, adverse experiences, social resources, and quality of life are associated with opioid/polydrug use during the first 12 months in treatment.

Patients and Methods: Forty-seven participants from treatment units in Bergen, Norway participated in five waves of data collection. Every third month, a structured face-to-face interview collected self-reported data on sociodemographic characteristics, opioid/polydrug use, participants' social resources or adverse experiences, and quality of life. Data were collected as part of KVARUS, the National Quality Register for Substance Abuse Treatment. A multilevel binary logistic regression analysis was conducted to examine the association of opioid/polydrug use on time-invariant baseline adverse experiences and social resources, and time-varying reports of quality of life.

Results: There was a significant negative association between time in treatment and use of opioids, $b = -0.89$, $SE = 0.19$, $p = < 0.01$. Furthermore, a negative association of age at substance use on polydrug use was found, $b = -0.40$, $SE = 0.19$, $p = 0.03$. A higher overall quality of life was significantly associated with lower odds of opioid use during opioid maintenance treatment, $b = -0.62$, $SE = 0.23$, $p = < 0.01$. Social dimensions, participants' adverse experiences, and social resources were not associated with polydrug or opioid use.

Conclusion: Opioid maintenance treatment is associated with lowered opioid use, but to a lesser degree with polydrug use. Our findings add quality of life as an important factor that should be given particular attention because it can offer insight to aspects that can affect the patients' opioid use.

Keywords: opioid maintenance treatment, polydrug use, opioid use, patient reported outcome measures, quality of life

Introduction

Opioid Maintenance Treatment (OMT) reduces use of heroin,¹⁻³ retains patients in treatment,^{3,4} and decreases criminal activity^{4,5} and mortality.^{2,6} Today, OMT is the most common and effective treatment for opioid dependence.^{3,7-10} To illustrate the effectiveness of OMT, Tran, Ohinmaa, Mills, et al¹¹ found that the proportion of self-reported opioid use among patients in OMT with continued opioid use decreased from 99.7% from baseline to 14.6% at 9-month follow-up.

The positive effect of OMT on heroin reduction might not generalize to reduced use and misuse of other legal and illegal substances. Several sources reported misuse of alcohol, benzodiazepines (BZD), amphetamines, cannabis, cocaine, and OMT

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medications.^{7,10,12–14} Synthetical opioids such as methadone, buprenorphine, and fentanyl are increasingly misused.¹⁰ Frequent substance use and polydrug use in OMT is a problem,^{8,9,15} and such use is associated with dropout from OMT.^{16,17} Drug use in early OMT is indicative of problematic or negative response to treatment. White, Campbell, Spencer, Hoffman, Crissman, DuPont¹⁸ found that OMT patients with positive test for polydrug use had quadrupled the attrition rate, with the highest attrition rate among patients who used opiates or non-prescribed BZD, 46% and 42%, respectively. In contrast, those without positive drug tests had a 10% attrition rate.

The magnitude of polydrug use among OMT patients has received little research attention.⁷ A study showed that among OMT patients in Canada, 93.3% had used illicit substance, and 85% tested positive for polydrug use indicated by ≥ 2 illicit drug classes in the same test.¹⁷ Soyka, et al² found that OMT patients in Germany increased use of alcohol, cannabis, and cocaine from baseline to 12 months, and at six-year follow-up. The study also showed that patients underreported the use of BZD, and urine tests identified 20% used BZD while in OMT.² Specka, et al¹² found that 25% of all OMT patients had a constantly high BZD-positivity rate, and usually in combination with additional substances. A recent study among 434 patients in opioid agonist treatment in Ukraine showed that 23% injected drugs the previous 30 days, primarily opioids, and of these 40% had polydrug use with opioids, stimulants, and alcohol.¹⁹ A Chinese study showed that 74.6% of OMT patients used opioids more than once during the 12 months after treatment initiation.²⁰ Wagner, et al⁷ found that 51% of patients with minimum 1 week in OMT had positive tests for at least one non-prescribed substance, and 32% tested positive for substances that were not part of the routine drug screening, such as Pregabalin.

There are multiple determinants for substance use, e.g. polydrug and/or opioid use, among OMT patients. Substance use refers to the use of one substance, either illegal or legal, while polydrug use refers to the use of multiple substances consumed sequentially or at the same time.²¹ Having a history of polydrug use, history of injecting²² and a desire to get intoxicated predict continued polydrug use during OMT. However, Moratti, Kashanpour, Lombardelli, Maisto²³ suggest that experience of euphoria or pleasure is seldom the main reason for substance and polydrug use. Other potential factors are self-treatment of opioid dependence where the person tries to reduce withdrawal symptoms and cravings,²⁴ the type of OMT medication,²² and inadequate dosage.^{15,22,23,25,26} Side

effects of OMT medications can lead patients to prefer alternative to OMT medication.²⁷ Tran, et al¹¹ found that ongoing substance abuse was significantly predicted by peer pressure, cravings, having health concerns and receiving treatment for tuberculosis.

In addition to these individual factors, social conditions might be contributing factors in polydrug use during OMT as well. Poorer social conditions, such as no work and income, and ongoing substance use have been associated with injected buprenorphine among OMT patients.²⁸ According to Kopak, Proctor, Hoffmann²⁹, patients age (younger than 25 years), low income (earning less than a high-school diploma), marital status (never been married), and employment status (unemployed) were important indicators in relation to post-treatment substance use. Lack of psychosocial support during treatment is also associated with injecting use of intoxicating substances.²² Maintaining contact with active drug users and participating in a drug-use lifestyle are negative effects of polydrug use which can reduce the probability of successful outcome from OMT.³⁰ Besides, a childhood with only one or no parents, not living in a stable relationship and being dissatisfied with treatment are significantly associated with sniffing of buprenorphine among OMT patients.³¹

Social and environmental influences can be a part of multiple causes for ongoing substance abuse among patients in OMT. As concurrent substance use might lower retention rate in OMT,^{16,18} it is important to understand and examine the determinants of concurrent use. Knowledge about these factors is a prerequisite for improving interventions, retention and outcomes of OMT. On this background, our study addresses the following research objectives:

- (a) to examine the association between OMT and subsequent substance/polydrug use and,
- (b) to examine whether social factors such as social background, adverse experiences, social resources, and quality of life (QOL) are associated with substance and polydrug use during the first 12 months after enrolment in OMT.

Materials and Methods

Sample

Eligible participants were first-time OMT patients in the catchment area of Haukeland University Hospital, Bergen, Norway. In 2018 there were 1080 OMT-patients in this catchment area. Approximately 100 new patients were enrolled on a yearly basis. OMT patients were recruited

from eight outpatient OMT units, during two periods: January to December 2013, and September 2015 to June 2016. The majority of participants were outpatients, but some participants were imprisoned. At the outpatient unit, patients picked up their daily medicine and had a short conversation with one of the OMT staff, while participants in prison got their medication from health professionals or prison staff. Participants received either buprenorphine (4 to 20 mg/day) or methadone (80 to 100 mg/day). Two participants got a muscle injection of extended-release naltrexone once a month.

Inclusion criteria were first time admittances to OMT, opioid dependence according to ICD-10 or DSM-IV, age > 18 years, commencement of OMT medication (buprenorphine or methadone) before the first registration. Lack of competence to consent was the only exclusion criterion. One hundred and 39 OMT patients were contacted and invited to participate in our study. All of these 139 fulfilled the inclusion criteria. Of these, 15 declined to participate, while 77 OMT patients did not respond to the invitation. Forty-seven self-recruited opioid-dependent individuals in OMT were enrolled in the study. Data from these 47 participants were included in the analysis up to the time participants completed the research participation. Participants received a lottery ticket for every fulfilled data point. At the 12-month data point, participants received a gift card valued for 200 NOK (approximately 22 USD or 22 EUR) in addition to the lottery ticket.

During the first year of data collection, 10 participants dropped out. Five participants dropped out without reason, three withdrew due to lack of interest, one was excluded due to cognitive impairment and inability to provide consent, and one participant was impossible to get in touch with. For complete information see Carlsen, Lunde, Torsheim.³²

Data Collection

Structured face-to-face interviews were completed by using the KVARUS questionnaire (National Quality Register for Substance Abuse Treatment). The KVARUS applies to individuals with a substance use disorder enrolled in treatment, and data in KVARUS are patients' subjective perceptions on given topics. The KVARUS is described in detail elsewhere, see Carlsen, Lunde, Torsheim.³²

We utilized data from a three-monthly interval from baseline (T0) through the first 12-month follow-up (T1–T4, where T1 is after 3 months, T2 is after 6 months, T3 is after 9 months, and T4 after 12 months). Between 169 and 193 observations were collected from a total of 47 participants. These data were

analysed and distributed as follows: 47 participants at T0, 38 participants at T1 and T2, 34 participants at T3 and 36 participants at T4.

Participants provided written informed consent. The principal investigator had the main responsibility for data management. The study was approved by the Regional Committee for Medical and Health Research Ethics (2013/429/REK South-East C).

Measures

In the current study, information on sociodemographic characteristics, substance use, social resources, adverse experiences, and QOL was collected.

Measured sociodemographic characteristics were level of education (no education/primary-secondary school/high school, higher education), marital status (single/cohabitant/boy-girlfriend), and living situation (own apartment/permanently with family/temporary living arrangement/homeless).

Substance use over the last 30 days was measured by the participants' self-reported 1) opioid use such as heroin, non-prescribed opioids, like methadone, buprenorphine-naloxone (Suboxone[®]), buprenorphine, morphine, other opioids, or overuse or misuse of prescribed opioids, and 2) use of substances such as alcohol, cannabis, BZD, GHB/GBL, hallucinogens, amphetamine, cocaine, and other stimulants. Participants' use of OMT medication (methadone, buprenorphine-naloxone (Suboxone[®]) or buprenorphine) as prescribed was not considered as opioid use. However, participants' self-reported misuse or overuse of opioids were categorised as opioid use, and use of other substances were categorised as polydrug use.

Significant life events can be experienced as social resources or adverse experiences. Adverse experiences are traumas or life events that the participants consider as having a negative impact on their current life. Dropout from school, addictions in participants' close family, neglect and being under care are indicators of adverse experiences found in KVARUS. Examples of social resources measured in KVARUS are support from family members, having drug-free friends, a safe and good housing situation and being in a stable relationship. These indicators were measured by "yes" or "no" responds. The yes responds to the various indicators of social resources were grouped into one variable, measuring the total social resources the participants accessed. In addition, the yes responds for the adverse experience indicators were grouped into one variable measuring the total adverse experience participants had been exposed to.

The current study used general and domain-specific measures of QOL. Overall QOL was measured by the item: How would you rate your QOL as a whole?³³ The questions to measure the domain-specific QOL were: How satisfied are you with: 1) your relationship with friends,^{33–35} 2) housing,^{33,36} 3) your health,^{33,34} 4) leisure,³⁶ and 5) financial situation.³⁶ Responses were given on a 5-point Likert-type response scale, ranging from 1 = “very dissatisfied” to 5 = “very satisfied” at each measurement point.

Data Analysis

To predict dichotomized outcomes from categorical and continuous predictors we used multilevel binary logistic regression analysis, as implemented in the Stata *melogit* program. The analysis process was conducted in two stages: in the first stage, the objective was to examine the association of use of opioids or other substances and time in treatment. We conducted a two-level binary logistic regression with polydrug use/opioid use as the dependent variable. The independent variables were time (cumulative from T0 to T4), overall QOL, level of education, marital status, and living situation.

The second stage of the main analysis included regressions of polydrug use/opioid use on time-invariant baseline, adverse experiences and social resource, and time-varying reports of QOL and social factors such as marital status, housing, and education. We also tested for associations between polydrug use/opioid use and participants self-reported social resources and adverse experiences. Various social life domains can be reflected in specific QOL indicators that are strongly related to global life satisfaction.³⁵ We therefore tested for specific QOL domains such as participants' relationships with friends, their health, leisure, housing, and financial situation.

The *n* varies in the different analyses due to non-response on some of the time-varying covariates included. For this reason, the current study used between 193 and 146 observations in the data analysis. To test whether there was a difference at baseline between participants who dropped out and participants who completed the study, we conducted a Fisher's exact test. A confidence interval of 95% was set, and a *p*-value of <0.05 was considered statistically significant in all the analyses.

Results

Attrition

There was attrition from baseline to 12-month follow-up. Five participants only completed baseline registration.

Four participants missed three data points, one participant missed two data points, and eight participants missed one data point. Twenty-nine participants completed all data points from T0 to T4.

There was no statistically significant association between attrition pattern and polydrug use from T0 to T4 (baseline to 12-month follow-up) by Fisher's exact test, baseline *p* = 0.60, 3 months *p* = 1.000, 6 months *p* = 1.000, 9 months *p* = 1.000, and 12 months *p* = 0.42, respectively. Likewise, no significant difference was found from T0 to T3 (baseline to 9 months follow-up) between attrition pattern and illegal opioid use, *p* = 0.53, *p* = 0.42, *p* = 0.20, *p* = 1.000, respectively. However, patients that dropped out at T4 had a higher polydrug use at T0, compared to non-dropouts, *p* = 0.02.

Sociodemographic Characteristics

Participants were mainly Norwegian men, 76.6%, with a mean age of 37.8 years (*SD* = 8.58) at baseline. The mean age at substance use onset was 14.3 years (*SD* = 4.87), while age at opioid onset was 22.6 years (*SD* = 6.80). At baseline, 78.7% of participants were not in a relationship. About half of the participants, 51.1%, lived in their own apartment, while 29.8% had a temporary-living situation, e.g. prisons, rehabilitation homes or treatment institutions, and 14.9% lived with their family. With regard to the education level, 45% of the participants had primary/secondary school while 27.7% had high school as their highest education. Approximately half of the participants had children, 53.2%; however, only 8.5% had custody for children under 18 years of age. About one-third, 29.7%, had visitation rights. Other sociodemographic characteristics were reported in Carlsen, Torsheim.³⁷ For sociodemographic distribution on study variables, see Table 1.

Illegal Substance and Opioid Use

At baseline, 70.2% of participants who reported substance use within the last 30 days stated opioids as the used substance. In this context, the use of opioids mainly consisted of heroin or illegal use of buprenorphine. The frequency of usage varied from single days to daily use of opioids during the last 30 days. In addition to opioid use, participants reported polydrug use that usually consisted of cannabis, BZD, amphetamine, and alcohol. Use of these illegal substances was also reported at the follow-up periods. Benzodiazepines and cannabis were often used in combination with other substances. Figure 1 shows the results from opioid and polydrug use on time.

Table 1 Baseline Characteristics for First Time Enrollees in Opioid Maintenance Treatment

	Mean/%	SD
Age	37.8	8.58
Marital Status		
Single	78.7%	
Cohabitant/married	21.3%	
Education Level		
No education	8.5%	
Primary/secondary school	44.7%	
High school	27.7%	
Higher education	19.1%	
Substance Use		
Age at substance use onset	14.3	4.87
Age at opioid onset use	22.6	6.80
Opioid use	70.2%	
Polydrug use	66.0%	
Significant Live Events		
Social resources	8.61	4.82
Adverse experiences	9.82	4.47
Quality of Life		
Overall Quality of Life	2.27	1.41
Domain-specific Quality of Life		
Housing	3.14	1.48
Leisure	3.02	1.23
Friends	3.15	1.25
Health	2.97	1.27
Financial situation	2.14	1.10

Note: Sample size domain-specific QOL vary between 44 and 47 participants, missing data from 1 to 3 participants.

There was no association of time, $b = -0.01$, $SE = 0.16$, $CI [-0.33, 0.30]$, $p = 0.93$, on polydrug use. However, a significant relationship between time and use of opioids was identified, $b = -0.89$, $SE = 0.19$, $CI [-1.28, -0.50]$, $p = <0.01$. Participants had a significant reduction in opioid use during the first 12 months; especially within the first 3 months see [Figure 1](#).

The result showed a significant relationship between age at substance use onset and polydrug use, $b = -0.40$, $SE = 0.19$, $CI [-0.77, -0.02]$, $p = 0.03$, indicating that the older the age at onset the lower the polydrug use in OMT. However, no such association was found between age at opioid onset and opioid use.

Social Background

Multilevel binary logistic regression showed that marital status was not associated with polydrug use or opioid use.

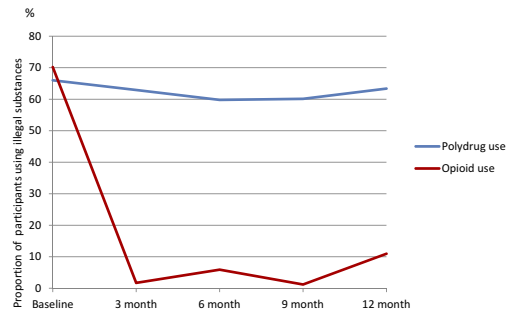


Figure 1 Polydrug use and opioid use regressed on time (follow-up time T1–T4). **Note:** Sample size baseline 47.

Education level was overall not related to polydrug use or opioid use. Compared to other housing situations, we found that living in a treatment institution or in prison were significantly related to having less polydrug use, $b = -2.53$, $SE = 0.81$, $CI [-4.13, -0.93]$, $p = 0.002$.

In the last sequence, a multilevel logistic regression tested the associations between the dependent variable and participants' social resources, their adverse experiences, age at substance onset, age at opioid onset, follow-up time, and QOL.

For opioid use, pre-baseline history of adverse experiences and social resources were not significantly associated with opioid use during OMT. Overall QOL during OMT was significantly associated with opioid use, indicating that higher QOL was related to lower odds of opioid use during OMT $b = -0.62$, $SE = 0.23$, 95% $CI [-0.16, -0.22]$, $p = <0.007$.

Adverse experiences and social resources were not significantly related to polydrug use during treatment. However, age at substance use onset was significantly associated with polydrug use, see [Table 2](#). No interrelations between the other independent indicators and polydrug use were identified.

Interaction effect analysis revealed no significant Time by Total adverse experiences interaction, Time by Total resources interaction, or Time by Age at substance use onset interaction (not shown in tables), indicating that these background factors did not moderate the slope of change in OMT.

In follow-up analysis we tested polydrug use/opioid use and domain-specific QOL indicators, such as housing, leisure, family and friends, health, and financial situation, but none of these specific domains of QOL were associated with opioid use or polydrug use.

Table 2 Indicators for Opioid Use and Polydrug Use for Participants in OMT

	Opioid Use ^a						Polydrug Use ^b					
	B	SE	p	z	95% CI		B	SE	p	z	95% CI	
					LL	UL					LL	UL
Intercept	4.08	1.82	0.025	2.24	0.50	7.66	5.75	2.09	0.006	2.74	1.64	9.86
Time ^c	-0.89	0.19	0.001	-4.5	-1.28	-0.50	-0.01	0.16	0.938	-0.01	-0.33	0.30
QOL	-0.62	0.23	0.007	-2.68	-1.07	-0.16	-0.22	0.21	0.288	-1.06	-0.65	0.19
Substance use onset							-0.40	0.19	0.035	-2.11	-0.77	-0.02
Age of opioid onset	-0.07	0.04	0.088	-1.71	-0.15	0.01						
Adverse experiences total	-0.10	0.06	0.139	-1.48	-0.23	0.03	-0.12	0.10	0.256	-1.14	-0.33	0.08
Resources total	0.05	0.06	0.333	0.97	-0.05	0.17	-0.12	0.10	0.229	-1.2	-0.31	0.07

Notes: ^aOpioid use = use of substances such as heroin, morphine, non-prescribed opioids like methadone, buprenorphine-naloxone (Suboxone[®]), buprenorphine, other opioids, or overuse/misuse of prescribed opioids. Sample size 43 participants with 169 observations, number of missing data 4. ^bPolydrug use = multiple consumption of substances such as: alcohol, cannabis, BZD, GHB/GLB, hallucinogens, amphetamine, cocaine, and other stimulants. Sample size 46 participants with 180 observations, number of missing data 1. ^cTime = change per 3-month period.

Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

Discussion

Our main finding is that OMT is significantly related to opioid use among opioid-dependent individuals¹, especially during the first year. This is also in line with previous studies.^{1,2,38} OMT aids the withdrawal symptoms and the continuous hunt for the next fix for the patients. The fact that some OMT patients have a concurrent opioid and/or polydrug use is a discussion of whether OMT patients' make use of the treatment or not, and this is of clinical, social, and political interest. Lack of psychosocial support has been associated with the use of legal and illegal substance use in OMT.²² Some participants in our study highlighted the treatment system in itself as a reason for polydrug use. They experienced "being a part of a machinery", where the treatment consisted of daily distribution of medicine and a brief conversation with the staff at the outpatient unit. Participants expressed a need for psychological treatment, more medical follow-up with a more flexible tapering of illegal use, such as BZD, and help with social challenges, e.g. related to daily activities as well as assistance with their housing situation. On the basis of lack of psychosocial treatment and inadequate help in OMT, many OMT patients used their well-known coping strategies, namely polydrug use. One solution to reduce patients' opioid use and/or polydrug use can perhaps be found in the actual treatment system, i.e. what type of treatment, the treatment content and treatment alternative patients are offered as well as addressing other burdens they bring along into treatment. Norway has a Cooperation reform (Samhandlingsreform) that was implemented to develop a better public health, prevention

and a better health and care services.³⁹ This Cooperation reform provides guidelines for interaction across municipal and national institutions, but these strategies might not be very effective when it comes to OMT patients. In addition, Lions, Carrieri, Michel, et al⁴⁰ found that a good relation to their physician could help OMT patients to abstain from none-prescribed opioid during treatment.

Abstinence has been the main objective for treatment of opioid addiction as well as a measure and outcome of treatment success.^{41,42} Nevertheless, addictions are often intertwined with social, economic, health and mental issues, and a more holistic and patient-oriented perspective has recently been emphasized. According to Van den Brink, Haasen⁴³ only motivated patients with sufficient social support and stable living situations would benefit from abstinence-oriented interventions. Considering this, the treatment system and clinicians might have to accept that not all patients want to, or are motivated to stop using substances and that abstinence, for many, is a utopia. From a harm reduction perspective, perhaps the treatments system should, to a greater extent than today, help OMT patients to gain a controlled polydrug use, and if tapering of OMT medication and abstinence was desired it should be seen as a treatment bonus. The definition of a successful treatment may vary from the patients' perspective to the clinicians' perspective. Outcome measures that take the perspective of the patient's into account will be beneficial, and QOL is such a measure. To improve the QOL for opioid-dependent individuals is one of the goals for OMT in Norway.⁴⁴ Our research found that overall QOL has a specific relation to opioid use, and overall QOL seems to be an important

indicator across time in OMT. This adds to the range of research that emphasizes the importance of QOL as an outcome measure.^{45,46}

Mutasa⁴⁷ found several factors for OMT patient's concurrent substance use: peer association, social exclusion, unemployment, poor education, poverty, personality trait (such as low self-esteem and anxiety), and lack of structure in everyday life. Brewer, Catalano, Haggerty, Gainey, Fleming⁴⁸ found that employment problems/unemployment and relationship with substance using peers did predict longitudinally continued substance use. We found that participants' social characteristics were associated with neither opioid nor polydrug use during the first 12 months of OMT. Our results are in line with Brewer, et al⁴⁸ who showed that most of the demographic variables had weak or non-existing associations with continued substance use. There is evidence for an association between traumatic experiences from childhood and substance abuse,^{49–51} and age at first injection drug use.⁵² In a previous publication,³⁷ we found that OMT participants differed in their exposure to adverse events, and this exposure was systematically related to age at opioid use onset. However, we did not find any associations between participants' adverse experiences or social resources, and their polydrug or opioid use during the 12-month follow-up.

Previous research identified an association between young age and polydrug use.^{53,54} This association is complex and potential factors can be: being young and "undergoing renovation" you might be more vulnerable compared to when one is older. Besides, a feature of being young is to be a bit more exploratory and maybe being more exposed to adverse experiences that one might not have the right prerequisites or life experiences to deal with in a good way. Another important factor is the peer-pressure that might be harder to resist when one is young and not that self-confident. Brewer, et al⁴⁸ emphasized that younger and unmarried subjects were more likely to continue substance use compared to older and married subjects. The same tendency was found in a Swedish study by Davstad, Stenbacka, Leifman, Beck, Korkmaz, Romelsjo,⁵⁵ where age was related to the proportion of discharged OMT patients. Patients at age ≤ 30 had a higher discharge rate than patient aged ≥ 41 years, and 45% of involuntarily discharges were based on substance use often in relation to other discharge criteria. A similar association was found in our study: younger age at substance use onset was significantly related with a higher polydrug use while in OMT. However, we did

not find an association between age at opioid onset use and opioid use while in OMT. This is in contrast to Soyka, Zingg, Koller, Kuefner⁵⁶ which stated that age at commencement of continuous opioid use was significantly related to treatment dropout: the younger the participant was at the beginning of regular opioid use the more likely they were to drop out of OMT. We did not examine OMT participants' dropout rate; nonetheless, research shows a close link between younger age and dropout.^{18,57,58}

Strengths and Limitations

When interpreting these results, some limitations must be taken into account. The current study was based on a relatively small sample, which reduces the power to detect weaker findings. We were still able to detect individual change and correlates of change. Besides, this study consists of self-selected participants in a limited geographical area. Thus, we cannot claim our results to be representative for the Norwegian OMT population. Nevertheless, there were significant similarities between participants' sociodemographic characteristics and the Norwegian OMT population.

The validity of self-reported drug use has been questioned: Magura, Kang⁵⁹ found that self-reported substance use often was underreported by individuals in a drug use population. Several studies uses urine tests to validate participants' self-reported data.^{60–63} The lack of such tests is a limitation in our study; it could have improved the validity of our results. Even if research shows that substance abusers' self-reports vary depending on the type of the used substance, research also shows that self-reports are consistent with urine tests, and therefore can be a reliable data source.^{63–65} Additionally, self-selected participants may be more committed to the study, and the short-recall periods in our study can lead to a more accurate reporting.

Other studies have detected effects of domain-specific QOL indicators such as social QOL^{66,67} and environmental QOL,^{67–69} while our study did not find such relationships. Several methodological factors might have contributed to our study not detecting any domain-specific associations: the sample size was not big enough to detect any impact, other domains besides those we examined may have affected the overall QOL, or the QOL-questions in KVARUS were too general and did not make explicit causal relations among issues and substance use.⁴²

OMT participants' natural treatment progression is rarely examined,⁶⁶ but the current study examines participants' adverse experiences, resources, polydrug use, and their potential change in treatment progression. This is one of the uniqueness of this study. In addition, the frequency of the follow-up, every third month, is a strength due to reduced recall bias. Participants are to a greater extent enabled to recall events that happened within a three months' time, in contrast to events that had a longer recall period.⁷⁰

Conclusion

The main objective was to examine the association between OMT and subsequent polydrug use/opioid use, and whether social factors and QOL were associated with such use during the first 12 months in OMT. Our results show that OMT is significantly related to patients' opioid use, but seems to be less important when it comes to polydrug use. This is also in line with previous research. Our findings add QOL as an important factor in relation to opioid use during OMT. Clinicians should therefore give a particular attention to their participants' overall QOL in OMT, because a simple measure of overall QOL can predict whether they are at risk of using opioids. Clinicians can also gain insight to other aspects that can affect the patients' opioid use. This knowledge can be used actively in treatment to improve patient QOL and thereby may help reducing, and potentially prevent, patients from using opioids. With such knowledge, we have a greater opportunity to intervene and reduce dropout from OMT. Besides, the lack of significant results in relation to social dimensions may imply that, apart from age, participants' life story is of minor importance in reducing polydrug use. Rather, it is the participants' current situation that is important.

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Disclosure

The authors report no conflicts of interest in this work.

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	Myrseth, Helga	Pathological Gambling - Treatment and Personality Factors

	Schanche, Elisabeth	From self-criticism to self-compassion. An empirical investigation of hypothesized change processes in the Affect Phobia Treatment Model of short-term dynamic psychotherapy for patients with Cluster C personality disorders.
	Våpenstad, Eystein Victor, dr.philos.	Det tempererte nærvær. En teoretisk undersøkelse av psykoterapeutens subjektivitet i psykoanalyse og psykoanalytisk psykoterapi.
	Haukebø, Kristin	Cognitive, behavioral and neural correlates of dental and intra-oral injection phobia. Results from one treatment and one fMRI study of randomized, controlled design.
	Harris, Anette	Adaptation and health in extreme and isolated environments. From 78°N to 75°S.
	Bjørknes, Ragnhild	Parent Management Training-Oregon Model: intervention effects on maternal practice and child behavior in ethnic minority families
	Mamen, Asgeir	Aspects of using physical training in patients with substance dependence and additional mental distress
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	Tolo, Astrid	Hvordan blir lærerkompetanse konstruert? En kvalitativ studie av PPU-studenters kunnskapsutvikling.
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	Nordgreen, Tine	Internet-based self-help for social anxiety disorder and panic disorder. Factors associated with effect and use of self-help.
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	Christiansen, Øivin	Når barn plasseres utenfor hjemmet: beslutninger, forløp og relasjoner. Under barnevernets (ved)tak.

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	Hystad, Sigurd William	Measuring Psychological Resiliency: Validation of an Adapted Norwegian Hardiness Scale
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	Jenssen, Eirik Sørnes	Tilpasset opplæring i norsk skole: politikeres, skolelederes og læreres handlingsvalg
	Saksvik-Lehouillier, Ingvild	Shift work tolerance and adaptation to shift work among offshore workers and nurses
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2013	Mentzoni, Rune Aune	Structural Characteristics in Gambling
V	Knudsen, Ann Kristin	Long-term sickness absence and disability pension award as consequences of common mental disorders. Epidemiological studies using a population-based health survey and official ill health benefit registries.
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	Mortensen, Øystein	The transition to parenthood – Couple relationships put to the test
	Årdal, Guro	Major Depressive Disorder – a Ten Year Follow-up Study. Inhibition, Information Processing and Health Related Quality of Life

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2014	Nordmo, Ivar	Gjennom nåløyet – studenters læringserfaringer i psykologutdanningen
V	Dovran, Anders	Childhood Trauma and Mental Health Problems in Adult Life
	Hegelstad, Wenche ten Velden	Early Detection and Intervention in Psychosis: A Long-Term Perspective
	Urheim, Ragnar	Forståelse av pasientaggresjon og forklaringer på nedgang i voldsrate ved Regional sikkerhetsavdeling, Sandviken sykehus
	Kinn, Liv Grethe	Round-Trips to Work. Qualitative studies of how persons with severe mental illness experience work integration.
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H	Skotheim, Siv	Maternal emotional distress and early mother-infant interaction: Psychological, social and nutritional contributions
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	Halvorsen, Kirsti Vindal	Partnerskap i lærerutdanning, sett fra et økologisk perspektiv
	Solbue, Vibeke	Dialogen som visker ut kategorier. En studie av hvilke erfaringer innvandererdommer og norskfødte med innvanderforeldre har med videregående skole. Hva forteller ungdommenes erfaringer om videregående skoles håndtering av etniske ulikheter?

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	Sandal, Ann Karin	Ungdom og utdanningsval. Om elever sine opplevingar av val og overgangsprossessar.
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2015	Hauken, May Aasebø	« <i>The cancer treatment was only half the work!</i> » A Mixed-Method Study of Rehabilitation among Young Adult Cancer Survivors
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	Rønsen, Anne Kristin	Vurdering som profesjonskompetanse. Refleksjonsbasert utvikling av læreres kompetanse i formativ vurdering
	Hoff, Helge Andreas	Thinking about Symptoms of Psychopathy in Norway: Content Validation of the Comprehensive Assessment of Psychopathic Personality (CAPP) Model in a Norwegian Setting
	Schmid, Marit Therese	Executive Functioning in recurrent- and first episode Major Depressive Disorder. Longitudinal studies
	Sand, Liv	Body Image Distortion and Eating Disturbances in Children and Adolescents
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	Jakobsen, Hilde	The good beating: Social norms supporting men's partner violence in Tanzania
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	Thun, Eirunn	Shift work: negative consequences and protective factors
	Hilt, Line Torbjørnsen	The borderlands of educational inclusion. Analyses of inclusion and exclusion processes for minority language students
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Reknes, Iselin	Exposure to workplace bullying among nurses: Health outcomes and individual coping
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Ness, Ingunn Johanne	The Room of Opportunity. Understanding how knowledge and ideas are constructed in multidisciplinary groups working with developing innovative ideas.
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2017 V	
Katsi, Masego	The power of context in health partnerships: Exploring synergy and antagonism between external and internal ideologies in implementing Safe Male Circumcision (SMC) for HIV prevention in Botswana
Jamaludin, Nor Lelawati Binti	The “why” and “how” of International Students' Ambassadorship Roles in International Education
Berthelsen, Mona	Effects of shift work and psychological and social work factors on mental distress. Studies of onshore/offshore workers and nurses in Norway.
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Søvik, Margaret Ljosnes	Evaluating the implementation of the Empowering Coaching™ program in Norway
Tonheim, Milfrid	A troublesome transition: Social reintegration of girl soldiers returning 'home'

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	Kronstad, Morten	Frå skulebenk til deadlines. Korleis nettjournalistar og journaliststudentar lærer, og korleis dei utviklar journalistfagleg kunnskap
	Vedaa, Øystein	Shift work: The importance of sufficient time for rest between shifts.
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	Adólfssdóttir, Steinunn	Subcomponents of executive functions: Effects of age and brain maturations

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	Selvik, Sabreen	A childhood at refuges. Children with multiple relocations at refuges for abused women.
2018	Leino, Tony Mathias	Structural game characteristics, game features, financial outcomes and gambling behaviour
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	Krossbakken, Elfrid	Personal and Contextual Factors Influencing Gaming Behaviour. Risk Factors and Prevention of Video Game Addiction.
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	Baldomir, Andrea Margarita	Children at Risk and Mothering Networks in Buenos Aires, Argentina: Analyses of Socialization and Law-Abiding Practices in Public Early Childhood Intervention.
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