

**Inpatient treatment for patients with substance use disorders:
outcomes at 6 months follow-up for both voluntarily and
compulsorily admitted patients**

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Preface

The background of my interest in research in the addiction field began almost one year after I had undergone my psychiatric training at the detoxification ward of the Addiction Unit, Sørlandet Hospital in Kristiansand. During that period I was supervised by Øistein Kristensen, senior psychiatrist and researcher. I was unfamiliar with the field of drug dependence let alone the patients' ambiguity to treatment despite facing life-threatening consequences. My explanation for this was that I was having preconceived negative attitudes towards dependent individuals.

I was having a difficult time as my language skills were still modest preventing me from fully engaging in motivational techniques. Dr. Kristensen's continuing support and enthusiasm has been invaluable and it was a great privilege to learn from him. He challenged me to routinely employ research in my clinic work. "Without research, there is no development of the profession and no betterment of clinical practice can be expected" has always been his slogan. In 2009 we published a report about the self-reported substance use in the Tidsskrift for den Norske legeforening before I joined the Psychiatric Unit to fulfil the rest of my psychiatric training. I met there more patients with substance use disorders with complex pathology both voluntary and compulsory admitted pursuant the Mental Health Care Act.

My interest in this research topic started when dr. Kristensen introduced me to the topic of compulsorily admission to treatment pursuant to the Social Services Act. At that time there had been started a research project with the goal to investigate factors related to the compulsory admission of patients with substance use disorders to addiction wards pursuant to the Social Services Act and dr. Kristensen was a fellow member of the research committee. Anne Opsal was employed at the Research Unit of the Addiction Unit, Department of Psychiatry, Sørlandet Hospital and was a PhD-candidate at Seraf-the National Centre for Addiction Research with the aim to evaluate treatment outcomes at 6-month follow-up in a longitudinal study. Due to logistical issues and other aspects related to the uniqueness of this type of research in Norway, data collection for the present study was completed in April 2012, including follow-up data. However, only data from the baseline data collection were included in Opsal's thesis from 2013.

Upon completing my training as psychiatrist I was offered the position of consultant psychiatrist at the Addiction Unit, Department of Psychiatry, Sørlandet Hospital and I joined this research project in August 2014, after the data collection was completed and thus took over data collected before I became a PhD candidate. The goal was to fulfil the original project plan, i.e. investigating a range of clinically relevant outcomes in patients with substance use disorders, which underwent either voluntary or compulsory admission for treatment at 6 months follow-up. In parallel, I worked clinically and achieved a new speciality in addiction medicine in 2016.

This is the first Norwegian thesis in addiction medicine and psychiatry investigating the outcomes and prognosis of the compulsory admitted patients with substance use disorders to addiction wards pursuant to the Social Act. During the late stage of this thesis, the Norwegian Health Authority published its latest recommendation for treatment of patients with substance use disorders compulsorily admitted to treatment.

Acknowledgements

The scientific work underlying this PhD thesis was conducted between 2014 and 2017 during my concomitant employment as a PhD fellow and consultant psychiatrist at the Addiction Unit, Department of Psychiatry, Sørlandet Hospital in Kristiansand.

I have great appreciation for my main supervisor, Professor Thomas Clausen from SERAF (Norwegian Centre for Addiction Research), University of Oslo (UiO). Thank you for sharing your vision, for inspiring and challenging me scientifically and for an excellent support and supervision.

I would also like to express my sincere gratitude to my two other supervisors, Anne Opsal, Ph.D. and John-Kåre Vederhus Ph.D. Anne Opsal, along with a number of clinicians from addiction treatment centers located in Kristiansand, Tønsberg and Oslo, recruited participants and completed interviews for both baseline and data collection at follow-up. Your persistence is admirable. Thank you to John-Kåre Vederhus for teaching me everything I know about data, statistic, and endlessly giving me clear and concise advice as we worked along. Øistein Kristensen, senior psychiatrist and researcher at Addiction Unit, Kristiansand deserves a special mention; he planned, initiated, led this project together with Professor Clausen, and gave me the opportunity to be a part of the project. His continuing support and enthusiasm has been invaluable during the past three years.

I thank the leadership of the Addiction Unit and the Department of Psychiatry, Sørlandet Hospital in Kristiansand for their help and support in making this project possible. I am grateful to all the clinicians from the three addictions centers within the South-Eastern Health Trust for making this project possible. Thank you to all the participants for taking their time to complete the interviews both at baseline and follow-up. Thank you to my good colleagues from the Research Unit at Addiction Unit Kristiansand.

Last but not least, I am forever grateful to Stine. Thank you for being my everyday support and inspiration, and your unwavering acceptance of my long working hours. Without your optimism and support, completing my PhD would have been almost impossible.

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Summary

Background

Many patients seeking inpatient treatment for substance use disorders (SUDs) have high levels of SUD severity and often have comorbid mental illness which can complicate the course of treatment. With increasing recognition that complete symptom remission may be beyond the reach for the majority of patients with SUD, up-to-date treatment approaches include the aim of reducing the symptom burden and avoiding further deterioration. Subsequently, treatment services need to incorporate multi-dimensional and patient-oriented measures of disease burden, such as quality of life and psychological wellbeing measures. Although complete abstinence is still considered to be an important predictor of level of functioning in patients with SUD, it should no longer be viewed as the only index of positive outcomes. A wider approach to treatment outcomes in the field of SUDs would fit well with the framework of chronic medical disorders currently employed by the addiction field. Obtaining information on a patient's degree of well-being and satisfaction with life during the course of treatment, would give therapists and patients a shared foundation for tailoring treatment and ultimately enhancing likelihood of recovery. Additionally, treatment should be experienced meaningful and relevant by the patients and should be provided as part of a continuum of care in order to support the long term recovery of as many patients as possible.

This thesis investigated the outcomes at 6 months follow-up in a cohort of adult patients with SUDs who received inpatient treatment within specialist treatment service for addictive disorders (TSB). The patient population included both voluntarily admitted (VA) as well as compulsorily admitted (CA) patients, pursuant to the Norwegian Municipal Health Care Act (NHMCA). Whereas there is a rich research literature investigating the outcomes of SUD treatment in general, research on clinical outcomes for compulsorily admitted patients pursuant to social law is still sparse. No studies investigating the clinical effectiveness of such treatment have been undertaken before in Norway despite over 20 years of practice under a "Compulsory Treatment Act". Although, the study was not regarded as a formal comparative study

findings of the compulsory admitted group were highlighted by comparing to those of voluntary admitted group.

Study aims

The overall aim of this thesis was to investigate outcomes at 6 months follow-up for both VA and CA patients. More specific aims were to examine changes and duration of changes in substance use related outcomes, level of mental distress and quality of life outcomes at 6 months after discharge and to investigate factors associated with these changes.

Material and methods

This thesis has been based on a prospective cohort study that followed hospitalized patients who underwent either voluntary or compulsory admission for treatment and were recruited consecutively from January 1, 2009 to May 31, 2011. The baseline cohort consisted of 202 patients, 137 CA and 65 VA. A cohort of 123 patients (51 CA and 72 VA) was prospectively investigated at a 6 months follow-up. The European Addiction Severity Index (EuropASI) was used at baseline and at follow-up to assess demographics and severity of substance use variables. Levels of mental distress were assessed with Symptom Checklist-90-R (SCL-90-R). A generic quality of life (QoL) questionnaire (QoL-5) was used to assess QoL domains. All patients were subject to a clinical psychiatric examination supported by the Mini-International Neuropsychiatric Interview (M.I.N.I), version 2002. The International Statistical Classification of Disease and Related Health Problems, 10th Revision (ICD-10) was used for coding mental and behavioural disorders.

Results

The majority of patients with SUD entering inpatient treatment were men with mean age of 30 years. There were significantly more female patients in the CA group than in the VA group (48% vs. 27%, respectively). Moreover, 71% of CA patients and 47% of VA reported injection use in the last 6 months before admission, which along with an average duration of substance use of 11 years for VA group and 10 years for CA group indicated severe SUD.

The 6 months follow-up outcomes for CA group showed that 31 (61%) patients reported injection use which represented a reduction of 10% compared with the pre admission rates. Furthermore, 11 patients (22%) reported at least one overdose in the last 6 months. Complete abstinence during the previous 30 days before interview was reported by 24%. Moreover, 37% reported reduction in the frequency of the preferred substance. The mental distress in the CA group improved during inpatient treatment, but deteriorated to a level similar to that observed before treatment at 6 months follow-up.

The VA patients showed similar reduction in injection use i.e. 16% compared with the pre admission rates as 22 (31%) patients still reported injection use. Only 1 patient reported at least one overdose in the last 6 months. A twice as high proportion of the VA patients (50 %) reported complete abstinence in the last 30 days prior interview at follow-up. Almost twice as many of VA patients (61%) reported reduction in the frequency of the preferred substance. Regarding mental distress, the VA patients improved in similar fashion as with the CA patients during inpatient treatment. However, contrary to the CA, they retained the improvement achieved during treatment throughout the follow-up.

Discussion and conclusion

The results showed modest improvements in QoL and substance-use related outcomes at 6 months following inpatient treatment for both groups of patients. Furthermore, we found that inpatient treatment reduced mental distress for both CA and VA. However, CA patients` level of mental distress which at baseline was lower compared to VA patients changed back to levels similar to pre-treatment at 6 months follow-up whereas VA patients maintained their improvement. Relapse to drug use following discharge from treatment may explain the set-back in mental distress observed in this group at 6 months follow-up. Abstinence may be more the exception than the rule among patients with severe SUDs and this seemed particularly true among the CA group. Additionally, abstinence at follow-up was not a predictor for large improvements in quality of life measures suggesting that rehabilitation should be seen as a more complex process than simply an altered pattern of substance use. If treatment is viewed from a chronic care perspective, particularly for patients with severe SUDs such as compulsorily admitted patients who often require many cycles

of inpatient treatment, it becomes important that aftercare services are seen as an integral part of the specialized SUD inpatient treatment. This raises issues about the importance of more formal aftercare provision following discharge from specialized services. Additionally, ongoing and repeated monitoring of outcomes such as quality of life and mental distress can be applied in repeated evaluations of SUD treatment to guide and target treatment interventions, and thus, facilitating entry into a corresponding level of care in the treatment system. Stand-alone interventions should not be considered adequate treatment for individuals with severe SUDs, particularly if treatment was compulsory. Thus, in this perspective even a modest improvement or even a steady level of symptom burden may be considered a beneficial outcome of treatment compared with the grave alternatives expected from no treatment.

Overall, the thesis` findings suggest that specialized SUD treatment provided improvements, although modest in a range of outcomes at 6 months follow-up for patients with SUDs who underwent either compulsory or voluntary treatment. The continued use of compulsory treatment for patients with SUD should rely on a model of care that is evidence based and which provides benefits in terms of outcomes. Far from minimizing the multitude of negative consequences associated with the use of coercion, the thesis` findings suggest that improvements although modest are achievable. Whether or not these practices should be intensified depends on further improvement of the quality and effectiveness of this type of treatment.

Sammendrag (Norwegian summary)

Bakgrunn

Mange pasienter som får sykehusbehandling for ruslidelse, har en alvorlig ruslidelse og ofte komorbid psykisk lidelse noe som kan gjøre behandlingen vanskeligere. Ettersom total rusfrihet og fullstendig fravær av psykiske symptomer kan være vanskelig å oppnå for de fleste pasienter med ruslidelse, tilstreber moderne behandling av ruslidelse å redusere symptombyrden og videre forverring av lidelsen. Behandlingstjenester bør da bruke flerdimensjonale og pasientorienterte mål på sykdomsbyrde, slik som livskvalitet og psykisk velvære. Selv om total avholdenhet fortsatt anses for å være en viktig predikter for forbedret resultat og funksjonsnivå hos pasienter med ruslidelse, burde det ikke lenger betraktes som det eneste tegnet på bedring. En bredere tilnærming til behandlingsresultater ville passe inn i det samme rammeverket for kroniske sykdommer som nå brukes på avhengighetsfeltet. Ved å framskaffe informasjon om pasientenes grad av velvære og tilfredshet med livet under behandlingen ville en slik tilnærming gi terapeuter og pasienter en praktisk felles plattform for å skreddersy behandlingen og til syvende og siste legge til rette for raskere bedring. I tillegg, burde behandlingen oppleves som meningsfull og relevant av pasientene og gis som del av en kontinuerlig behandling, slik at den fremmer langsiktig bedring for så mange pasienter som mulig.

Denne avhandlingen undersøkte utfallet ved seks måneders oppfølging for en kohort av voksne pasienter med ruslidelse etter utskrivelse fra døgnopphold i spesialisert tverrfaglig rusbehandling (TSB). Pasientpopulasjonen omfattet både frivillige (VA) og tvangsinnlagte (CA) etter Helse og omsorgstjenestelovens § 10.2.

Forskningslitteratur tar for seg resultatene av behandling av ruslidelse generelt, men det er fortsatt lite forskning når det gjelder tvangsinnlagte pasienter etter helse- og sosiallovgivning. I Norge er det ingen tidligere studier som tar for seg den kliniske effektiviteten av slik behandling til tross for over 20 år praksis i felten. Selv om studien ikke ble betraktet som en formell sammenlignings studie ble funn fra CA-gruppen fremhevet ved å sammenligne med VA-gruppens utfall.

Mål med studien

Det overordnede målet med denne avhandling var å undersøke relevante utfall ved seks måneders oppfølging for både frivillige og tvangsinnlagte pasienter. Andre, mere spesifikke mål var å undersøke endringer og varighet av endringer i stoffbruk, nivå av psykisk symptombelastning og livskvalitet seks måneder etter utskrivning og å undersøke faktorer knyttet til disse forandringene.

Materiale og metode

Denne studien var basert på en prospektiv kohortstudie som fulgte pasienter som var enten frivillig innlagt eller tvangsinnlagt for behandling og ble rekruttert fortløpende fra 1. januar 2009 til 31. mai 2011. Baseline kohorten besto av 202 pasienter: 137 VA og 65 CA. En kohort av 123 pasienter (51 CA og 72 VA) ble prospektivt undersøkt ved oppfølging etter seks måneder. Den europeiske versjonen av Addiction Severity Index (EuropASI) ble benyttet ved behandlingsstart og ved oppfølging for å vurdere sosiodemografiske variabler og gradering av rusmiddelbruk. Psykisk symptombelastning ble målt med Symptom Checklist-90-R (SCL-90-R). Et generisk livskvalitetsspørreskjema (QoL) med fem spørsmål ble brukt for å vurdere livskvalitetsfeltet. Alle pasientene gjennomgikk en klinisk psykiatrisk undersøkelse der Mini internasjonalt nevropsykiatrisk intervju (M.I.N.I.), versjon 2002, ble brukt. Verdens helseorganisasjons internasjonale statistiske klassifikasjonen av sykdommer og beslektede helseproblemer (ICD-10) ble anvendt for å kode psykiske og atferdsmessige lidelser.

Resultater

De fleste av innlagte pasienter var menn med en gjennomsnittsalder på 30 år som hadde en alvorlig ruslidelse og mange års erfaring med stoffmisbruk. Det var betydelig flere kvinnelige pasienter i CA-gruppen enn i VA-gruppen (48% mot 27%). 71% av CA-pasientene og 47% av VA rapporterte injeksjonsbruk de siste seks månedene før innleggelse, som sammen med en gjennomsnittlig varighet av stoffbruk på 11 år for VA-gruppen og 10 år for CA-gruppen indikerte en alvorlig ruslidelse.

Resultatene ved seks måneders oppfølging for CA-gruppen viste at 31 (61%) pasienter rapporterte injeksjonsbruk som representerte en reduksjon på 10% sammenlignet med ratene før innleggelse. Videre rapporterte 11 pasienter (22%) minst en overdose i løpet av de siste seks månedene. Total avholdenhet i løpet av de siste 30 dagene før intervju ble rapportert av 24%. Dessuten rapporterte 37% reduksjon i hyppigheten av det foretrukne stoffet. Psykisk symptombelastning i CA-gruppen ble forbedret under opphold, men forverret ved oppfølging etter seks måneder til et nivå tilsvarende det som ble målt før behandling.

VA-pasientene viste en tilsvarende reduksjon i injeksjonsbruk 16% sammenlignet med sammenlignet med ratene før innleggelse i.e. 22 (31%) pasienter rapporterte fortsatt injeksjonsbruk. Bare en pasient rapporterte minst én overdose i løpet av de siste seks månedene. En dobbelt så stor andel av VA-pasientene (50%) rapporterte total avholdenhet i de siste 30 dagene før intervjuet. Nesten dobbelt så mange av VA-pasienter (61%) rapporterte reduksjon i hyppigheten av det foretrukne stoffet. Når det gjelder psykisk symptombelastning, forbedret VA-pasientene på samme måte som hos CA-pasientene under behandling. Imidlertid beholdt de, i motsetning til CA, forbedringen som ble oppnådd under behandlingen gjennom oppfølgingen.

Diskusjon og konklusjon

Funnene presenterte i denne avhandling viste beskjedne forbedringer i QoL og stoffrelaterte utfall etter 6 måneder etter behandling i begge pasientgrupper. Videre har vi funnet ut at pasientbehandling (inneliggende døgntilrettelagt behandling) reduserer psykisk lidelse for både CA og VA. CA-pasientenes nivå av psykisk lidelse som var lavere sammenlignet med VA-pasienter ved baseline, var tilbake til nivået før behandling ved seks måneders oppfølging, mens VA-pasienter opprettholdt forbedringen. Tilbakefall til rusbruk etter avsluttet behandling kan være med å forklare tilbakeslaget av psykisk symptomtrykk observert i CA gruppen ved seks måneders oppfølging. Total avholdenhet er nok mer unntak enn regelen blant pasienter med alvorlige ruslidelser, og dette virket særlig å gjelde CA-gruppen. Videre var totalavhold ved oppfølging ikke en prediktor for store forbedringer i livskvalitetstiltak noe som tyder på at rehabilitering bør sees som en mer kompleks prosess enn bare et endret mønster av rusmiddelbruk. Behandlingstiltak bør ses i lys av ruslidelser som en kronisk sykdom, spesielt for pasienter med alvorlige ruslidelse,

slik som for CA pasienter. Denne pasientgruppen krever ofte mange sykluser med døgnopphold, og ettervern bør derfor sees på som en integrert del av TSB. Dette setter fokus på viktigheten av mer formelt ettervern etter utskrivelse fra sykehus for pasienter som blir tvangsinnlagt. I tillegg kan kontinuerlige og gjentatte målinger av livskvalitet og psykiske symptombelastning brukes klinisk som markører for alvorlighetsgrad og endring av symptombyrde for å veilede og skreddersy behandlingsintervensjoner, og dermed legge til rette for et tilsvarende nivå av omsorg i behandlingssystemet. Enkeltintervensjoner burde ikke anses som tilstrekkelig behandling for personer med alvorlig ruslidelse, særlig hvis behandlingen var tvungen. Selv en beskjeden forbedring eller til og med et stabilt nivå av symptombyrde kan betraktes som et gunstig resultat av behandlingen sammenlignet med den gradvise forverringen man kan forvente ved fravær av behandling.

Til sammen tyder avhandlingens funn på at spesialisert -rusbehandling ga forbedringer, selv om det var beskjeden forbedringer i en rekke utfall ved seks måneders oppfølging for pasienter både frivillig og tvangsinnlagte. Dersom tvangsbehandling av pasienter med ruslidelse fortsatt skal brukes, burde det anvendes en behandlingsmodell som er kunnskapsbasert og som gir forbedringer når det gjelder resultater. Langt fra å bagatellisere det potensielle mangfoldet av mulige negative konsekvenser forbundet med bruk av tvang og hevde at en slik behandling 'virker', viser avhandlingens funn at forbedringer, selv om det er beskjedne, er oppnåelige for en svært utsatt pasientgruppe. Om denne praksisen skal intensiveres, avhenger av ytterligere forbedring av kvaliteten og effektiviteten til denne typen behandling.

Abbreviations

ASI:	Addiction Severity Index (1)
CA:	Compulsory admitted
CI:	Confidence intervals
DSM-IV:	Diagnostic and Statistical Manual of Mental Disorders, 4 th Revision (2)
GSI:	Global Severity Index
ICD-10:	The International Statistical Classification of Disease and Related Health Problems, 10 th Revision (3)
LVM:	Law on Compulsory Care for Substance Abusers [Lag om vård av missbrukare i visa fall]
M.I.N.I:	Mini-international neuropsychiatric interview
NMHCA:	Norwegian Municipal Health Care Act
NSD:	Norwegian Center for Research Data [Norsk Senter for Forskningsdata]
OMT:	Opioid maintenance treatment
OR:	Odds ratio
QoL:	Quality of Life
RCT:	Randomized controlled trials
REK:	Regional Committee for Medical and Health Research Ethics Regionale [Komiteer for Medisinsk og Helsefaglig Forskningsetikk]
SUD:	Substance use disorder
SCL-90-R:	Symptom Checklist-90-R
TSB:	Multidisciplinary specialist treatment service for addictive disorders [Tverrfaglig spesialisert rusbehandling]
UiO:	University of Oslo
OMT:	Opioid Maintenance Treatment
VA:	Voluntary admitted

List of papers

- Paper I** Pasareanu AR, Vederhus JK, Opsal A, Kristensen Ø, Clausen T. Improved drug-use patterns at 6 months post-discharge from inpatient substance use disorder treatment: results from compulsorily and voluntarily admitted patients. *BMC Health Services Research* 2016; 16(1): 291.
- Paper II** Pasareanu AR, Vederhus JK, Opsal A, Kristensen Ø, Clausen T. Mental distress following inpatient substance use treatment, modified by substance use; comparing voluntary and compulsory admissions. *BMC Health Services Research* 2017; 17(1): 5.
- Paper III** Pasareanu AR, Opsal A, Vederhus JK, Kristensen Ø, Clausen T. Quality of life improved following in-patient substance use disorder treatment. *Health and quality of life outcomes* 2015; 13(1): 35.

1.0 Introduction

In this thesis, patients with substance use disorders (SUDs) who underwent either voluntary (VA) or compulsory admission (CA) for treatment were investigated at 6 months follow-up. Substance use related outcomes, level of mental distress and quality of life outcomes were assessed at 6 months following inpatient treatment. Furthermore, factors associated with these outcomes were analysed. Adopting a wider and more comprehensive range of treatment outcomes replicates modern approaches currently employed by the addiction field and are thought to be useful in informing clinical practice.

The outcomes and prognosis of the CA patients were given particular attention as we compared them with those of the VA patients. In Norway, patients treated pursuant the Norwegian Municipal Health Care Act (NMHCA) receive inpatient treatment for severe SUDs and little is known about their treatment outcomes.

1.1 Substance use disorders

SUDs represent important public health concerns that severely affect individuals and society. The lifetime prevalence of SUDs varies across settings and with diagnostic criteria. Approximately 10% of adult Americans will, during their lifetime, qualify for a drug use disorder according to diagnostic DSM criteria, whereas lifetime prevalence for alcohol use disorders was estimated at 29% among Americans in 2014 (4, 5). From adult Australians, past year prevalence for alcohol use disorders has been shown to be 6.5% according to ICD-10 criteria whereas drug use disorders were found at 2.2% past-year prevalence rates (6). In Norway, the lifetime prevalence for SUDs has been estimated to be in the range between 10-20% (7).

Numerous definitions and concepts for SUD have been proposed in the literature. They have changed significantly over the past decades as a result of various clinical, social, economic and political influences. Currently SUD is defined as a psycho-biological syndrome that comprises: impaired control over the substance use; tolerance; withdrawal symptoms; and is characterized by continued use of the substance despite harmful consequences (8). Diagnosing SUD is based on a set of criteria which reflect and often blend a variety of addiction constructs, including

tolerance and withdrawal, incentive salience of drug consumption, compulsive patterns of drug use, and negative interpersonal, physical, legal, or social consequences. The diagnosis of dependence syndrome is primarily made on specific criteria which tend to be self-perpetuating, and not on the level of consumption. The mandatory classification system in Norway is the International Classification of Disease ICD-10, the international basis for disease, morbidity and mortality coding published by the World Health Organization (3).

1.2 Treatment approaches for SUD

Currently, SUDs are conceptualized as chronic conditions consisting of multiple, alternating cycles of treatment and subsequent relapses with periods of varying lengths of remission (9-12). Accordingly, treatment efforts are increasingly being seen and contextualized within a disease management framework, similar to other chronic medical conditions such as diabetes and hypertension (13, 14). Still, there are considerable concerns by some members of the public that treatment is ineffective as complete remission is difficult to achieve (15). Although SUDs are often difficult to cure, treatment methods are currently available to stabilize patients, reduce functional decline, reduce harm, improve comorbid disorders and potentially increase life expectancy and quality of life. Moreover, treatment should be available, as needed, over long periods because of the typically fluctuating course of SUD with periods of remission and relapse (16, 17). By acknowledging the chronic relapse risk of SUDs, many treatment settings and services have expanded from models of conventional acute care to a three-phased model of SUD treatment (11): initial short detoxification (detox) and/or symptom stabilization, a second, time-limited and intensive treatment phase, followed by a continuing care phase that facilitates maintenance and/or further improvements in health and functioning over time (18, 19). The treatment of SUDs therefore, ideally involves varying levels and intensities of care and may include psychosocial approaches matched to patient needs and pharmacological agents when clinically indicated (20).

The initial phase of treatment typically includes detoxification, often residential, or partial hospital programmes, and in some cases, intensive outpatient treatment. This initial phase is aiming for detoxification and/or symptom stabilization and primarily focuses on reduction/cessation of substance intake. However, patients with SUDs

typically suffer from a number of other problems such as physical disease, mental disorders and dysfunctional familial, social and financial challenges. Thus, ongoing monitoring of the burden of symptoms across multiple domains, along with traditional assessments of SUD severity, is advocated from early stages.

The second phase therefore combines the use of varying psychosocial and medical interventions, based on a comprehensive patient assessment, along with other types of care such as individual and group counseling aiming at modifying substance use behaviours. This phase ranges in duration from a few weeks up to several months and typically involves developing and implementing a longer-term chronic care plan. Residential rehabilitation programmes are usually recommended during this stage, followed by the third phase of continuing care that includes some form of less intensive and tapered care such as community-based services, self-help/support groups and other peer support, which may last for several years. Continuing care generally appears to support a modest, reliable improvement in SUDs outcomes and enhances recovery (21). Recovery has generally been considered a period of time characterized by an enduring reduction/cessation in substance use, improved personal health, and improved social function (22).

Although the goal of SUD treatment has traditionally been to achieve total abstinence, or at least substantially reduced substance use, only a minority of individuals with SUDs are able to achieve lasting remission even after intensive stand-alone treatment events, despite the efforts of treatment providers and patients themselves (23). In the context of chronic disorders, it is often possible to improve patients' living conditions even if a complete absence of symptoms may be out of reach. In managing the symptoms and impairment associated with SUD, continuous monitoring of other integrate outcomes has similarly been considered to produce more efficient, clinically relevant, accountable evaluations (24). Overall, evaluation research has focused on and documented the effectiveness of SUD treatment primarily in terms of reduction in substance use and less frequently in terms of other improvements (25, 26). From the chronic medical disease perspective, it is important to use multiple outcome measures that include improvements in the psychosocial concomitants of the disease. Large sets of psychosocial tools have shown promise for a range of SUDs in the addiction field (27-29). Moreover, symptom assessment from the patient's perspective is routinely used in the research among SUD

population, highlighting the significance of patient-reported quality measures. This works well within a framework of care in which the intensity of care is adapted to the patient's response to treatment i.e., patients are moved between levels of care, which differ in intensity, as their symptoms improve or worsen (13). However, despite recommendations, there has been little consistency in including such multidimensional approaches and measures in research or clinical SUD practice (25).

In high-income country such Norway, SUDs are responsible for high levels of morbidity and mortality; in 2014, the drug-induced mortality rate among adults (aged 15–64) was 67.8 deaths per million. These figures are much higher than the European average of 19.2 deaths per million (30). It is estimated that 2% of all deaths and 7% of years of life lost are alcohol-attributable (31). The incidence of alcohol-related deaths is about three times higher among men than women; most of such deaths occur after the age of 45. In 2016 there were 336 alcohol-related deaths (252 men and 84 women) compared with 282 drugs-related deaths (87 women and 195 men); 80% of these drugs-related deaths were due to overdoses (32). In Norway, the state has been responsible for the specialist treatment of patients with SUDs since the reform in drugs policy from January 2004. Prior to 2004 the responsibility for SUD treatment in Norway was confined to the department of social care. The reform led to the creation of multidisciplinary specialist treatment service for addictive disorders (TSB) (33).

The TSB is subordinated to the state owned regional health care authorities and is responsible for all of the treatment and rehabilitation services for substance abusers in Norway – covering health, psychosocial, and social educational aspects for both inpatient and outpatient treatment at the specialist care level (34). Since its advent, it has been sought to improve and harmonize the standards of treatment services nationally, and treatment models have developed increasingly within the medical models and frameworks. Additionally, in 2014, a new speciality- addiction medicine was recognized and adopted among the other 44 approved specialties in Norway for physicians; by the end of 2017 there were 127 specialists in addiction medicine in registration (35).

The treatment and care programmes within TSB are mainly financed by public funds and may be classified into: outpatient and inpatient. Patients with SUDs may however

also receive treatment both in and outpatient within the psychiatric health care system. In 2015, 27 500 individuals received SUD treatment from the specialist health services combined; 9117 were inpatients whereas 18 383 were outpatients (32). Approximately one third of them received treatment for alcohol use disorders while two thirds received it for both legal and illegal substance use disorders.

Outpatient treatment varies in the types and intensity of services offered; for example, intensive day treatment, group counseling, or regularly individual appointments are routinely provided within this type of treatment framework. Outpatient functions and assessment units provide services and follow-up assessments; this may include for example, ambulatory detoxification and opioid maintenance treatment (OMT). In 2016, 7554 persons received OMT (36).

Inpatient treatment for SUDs in Norway covers a variety of differently structured services that take place in a range of settings and can be short- and long-term treatment. Inpatient treatment can involve detoxification, stabilization and/or rehabilitation, in combination, or one followed by the other with a variable length of stay (from weeks to up to several months). Overall, the number of patients with SUDs admitted to inpatient treatment within both the specialized addiction services authority and psychiatric health care system has increased gradually in the past years. For example, from 6 792 in 2012 to 8 848 in 2013 and to over 9 000 in 2015(32). Within the TSB alone the number of available inpatient beds has increased from 1593 in 2008 to 1947 in 2015, indicating an increasing demand for this type of treatment (37). Inpatient treatment, often considered a proxy for SUD severity, is viewed as a right choice when other measures are considered not to be sufficient. This will mainly apply to patients with severe symptoms and concurrent comorbidity, and who are reluctant or doubtful for the value of the outpatient treatment services.

Although the literature provides evidence that patients with SUDs are, in general, likely to benefit from treatment regardless of the level of care received (38-42), in this thesis the focus is primarily on inpatient treatment for individuals meeting ICD-10 criteria for substance dependence, including both alcohol and illicit drugs, i.e., in “second treatment phase” as described above. Furthermore, treatment was delivered to these patients within a period normally not exceeding 90 days and included: detoxification when necessary, stabilization, assessments of somatic and mental

health along with pharmacotherapy, cognitive milieu therapy, and individual motivation enhancement.

1.3. Voluntary and compulsory treatment for patients with SUDs

Voluntary treatment is the first choice and major gateway for treatment. This choice builds upon the fundamental right of the individual to choose his or her own actions and is perceived as the basic foundation of social freedom and moral responsibility (43, 44). Subsequently, an adult individual, in ordinary health care circumstances, has the right to refuse treatment, even if close relatives or health personnel believe it would be beneficiary.

In the field of addiction, voluntariness is the dominant principle in the treatment of patients. However, ambivalence in seeking treatment and patients' not following recommendations is routinely encountered and is considered an integral part of an SUD. While it is generally accepted that substance-dependent patients are likely to benefit from treatment, there is consensus that untreated individuals with a severe SUD, typically experience gradual deterioration (45). For example, patients gravely disabled by alcohol use disorders, have on average six comorbidities (92% have psychiatric diagnoses and 41% focal brain injury) and an annual mortality rate more than 20 times their expected age-adjusted rate (46). Society's response to the seriousness brought on by SUD has changed from repression towards restitution (47). Subsequently, many countries have legitimized that it can act on the presumption that a person with severe and life-threatening SUD is not able to make an autonomous decision to give up the abuse despite the experiences of harmful consequences. The World Health Organization defines compulsory treatment as treatment that does not require the person's informed consent and excludes treatment that requires informed consent within or as an alternative to being confined to prison (48, 49). For most severe cases with SUDs different approaches to compulsory care and treatment are a common legislative option worldwide. In an analysis including 90 countries, Israelsson and Gerdner found that 82% have laws on compulsory treatment for patients with SUDs (50). Three main legislative areas have been described as foundations for the compulsory treatment of patients with SUDs: mental health care acts; social services acts; and criminal justice acts. The first two, in combination, are called 'civil commitment' and are outside criminal justice

legislation. Under criminal justice acts, individuals with SUDs are provided with a choice by the legal system, to avoid serving time in prison by choosing treatment instead (51). Civil commitment consists of compulsory hospital treatment for individuals with SUDs unwilling or unable to obtain treatment services on their own (52). Such measures are socio-culturally distinct and in accordance with welfare reasoning and the power of the system of “patriarchal care” to protect its citizens from harming themselves or others, allowing compulsorily admission for treatment of individuals with severe SUDs for their own good (50). However, there is an on-going debate whether such admissions would violate the principle of respect for the autonomy of the individual (53). In the literature, compulsory admission is not described as a full programme of SUD treatment, but rather as a short-term approach to stabilize a person`s health and to restore his or her capacity to evaluate the risk of harm caused by SUD and to make decisions, while sober, about the need for further voluntary treatment (54).

1.4. Treatments modalities for patients with SUDs in Norway

Voluntary treatment for patients with SUDs is rather the norm and the latest directives from The Norwegian Ministry of Health emphasize on patients’ autonomy and choice of treatment. However, compulsory hospitalization for individuals with SUDs can be provided through the social services or health service legislation.

The municipal social welfare system allows compulsory admittance to hospitalization for persons with SUDs pursuant to NMHCA (for adults) or Child Welfare Services Act (for persons under 18 years). Additionally, the health care system enables compulsory hospitalization pursuant to the Mental Health Care Act. Common for both systems is that applications must be sanctioned by an administrative court, i.e. the county social welfare board for cases pursuant to NMHCA and the Control Commission for cases pursuant to the Mental Health Care Act. In 2015, there were 7788 provisions filled pursuant to Mental Health Care Act compared to 155 provisions for compulsory hospitalization pursuant to NMHCA (persons under 18 years and pregnant women with SUDs are not included (55).

According to the Norwegian Mental Health Care Act, compulsory observation (up to 20 days) and compulsory mental health care (indefinite period of time) may take

place when the patient is suffering from a suspected or established serious mental disorder, and if application of mental health care is necessary to prevent severe deterioration of the patient's health status or if there is an obvious threat to the patient's own life or the life of others (56). A serious mental disorder refers first of all to the cases with severe psychosis and/or severe depression. Trajectories in the course of SUD can lead to severe disturbances or have serious effects on individuals with severe form of SUD and many of them would arguably satisfy the criteria for compulsory admission to treatment required by the Mental Health Care when they are intoxicated or experiencing withdrawal symptoms. However, the Mental Health Care Act rules out compulsorily admission to treatment based solely on diagnosis of SUD.

Procedures established by the Mental Health Care Act start with the patient's examination by a physician. Within 24 hours, a psychiatrist or clinical psychologist makes the final decision on the legal basis for admission. The law was updated in 2017. Recently, it has been shown that nearly one third of patients with SUDs are compulsorily admitted to psychiatric hospitals pursuant to Mental Health Care Act (57). However, in this thesis, the focus will be on compulsory admittance to hospitalization of individuals with SUDs pursuant to the social services act.

The Social Services Act of 1992 sanctioned involuntary interventions for individuals with severe and life-threatening substance use. In 2011, this law was replaced by the Norwegian Municipal Health Care Act, in which § 10.2 sanctions involuntary interventions for adult patients with SUDs (58). The Act covers an option for retention (up to 3 months) when the health of the patient is seriously at risk because of extensive, prolonged substance use and voluntary efforts have proven insufficient. The treatment is designed as exclusively inpatient and refers to assessment and management of patients with severe SUDs where the individual has no choice.

In the acute phase, the main aim of the retention of compulsorily admitted patients is to provide life-saving treatment; over the long term the aim is to motivate patients to enter voluntary treatment (59). The Act allows compulsory admissions onto institutions indicated and approved by regional health authorities. Usually, such institutions are publicly funded and within TSB, but hospitalization can take place on psychiatric wards as well.

Prior to a compulsory admission, the municipal social services prepare the preliminary file, which is then submitted to the county social welfare board that makes the final decision regarding the application for compulsory admission to treatment.

In approximately 50% of cases the police are assisting in delivering the patients to compulsory admittance to treatment (60). Likewise, the police are responsible for bringing back those who leaved the treatment facilities without permission.

The NMHCA enables the institutions to refuse the patients permissions or the right to have visits during the period of compulsory admittance. Furthermore, it allows room search and partially-body search of patients, coerced drug testing (urine, saliva and hair), and confiscation of drugs, dangerous items or other means of communications. However, the NMHCA does not allow the use of coerced medication, restraint (except short restraint in the case of necessity) or seclusion. Additionally, it does not provide the means for prolonged treatment or coerced participation in aftercare after 3 months, although it is recommended to make preparations for and motivate patients to participate in community-based services following treatment (61). As a general rule, subsequent treatment following a 90-day compulsory treatment has to be voluntary. Although the NMHCA does not explicitly sanction compulsory admission to treatment one could argue that the plethora of comprehensive, multidisciplinary assessments and interventions employed during the hospitalization of CA patients represent nevertheless treatment. Thus, the term compulsory admission to treatment has been used throughout this thesis.

The Norwegian Ministry of Health intends with the new guideline (launched in 2017) to improve the provision and the effectiveness of aftercare services for CA patients (62). This provision highlights that the premises for discharge must include a coordinated and comprehensive treatment and care plan: the municipal social services and primary care are imposed an obligation to provide aftercare whereas the caregiver (TSB) must provide guidance, and, thereby, to facilitate the aftercare following discharge from inpatient treatment. Ideally the planning of the aftercare period should start very early during the up to 90-day retention as part of compulsory admission.

A separate provision of NMHCA on the detention of pregnant women with SUDs, § 10.3, can be ordered out of concern for the welfare of the unborn child. Likewise, persons under 18 years can be committed in specialized institutions against their will out of concern for their welfare pursuant to Child Welfare Services Act. Initially, the commitment is limited to four weeks (short-commitment) with the possibility of renewal for four more weeks. There is a 12 months commitment (long-commitment) which can be extended to an extra 12 month if necessary. However, if someone becomes 18 years during the commitment period, such extension is no longer permitted (63).

In this thesis the focus is on adult patients compulsorily admitted to treatment within specialized addiction treatment authority TSB pursuant to NMHCA§ 10.2. The pregnant women with SUDs and individuals under the age of 18 are not included.

1.5 Practices in the field of compulsory admission to treatment for patients with SUDs

The subject of compulsory admission to treatment has been widely debated, primarily in terms of legality, efficacy and ethical considerations. Acknowledging the differences in cultural heritage and welfare distribution models worldwide improves the understanding of current international practices in the field of compulsory admission to treatment for patients with SUDs. Countries with a history of strong temperance movements or distribution of welfare through the state tend to favor civil law, whereas countries which have a history of welfare distribution through insurance with less state interference tend to favor criminal justice legislation (47). Nordic countries apply a paternalistic approach, which involves acting against other people's choices and will for their own benefit or to prevent their being harmed. Nevertheless, there are significant differences between the Nordic countries in the use of compulsory admission to treatment because of legal and cultural differences. This makes direct comparisons of studies across national boundaries difficult. Although clinical experience, traditions and attitudes vary considerable our main focus is limited to the use of compulsory admission from a Nordic perspective, i.e. regulated by social service or health service acts (44, 60, 64, 65). For descriptive purposes, we

also consider the use of compulsory admission pursuant to criminal laws as in US and Australia.

In Denmark, patients with SUDs are restrained only by contract. The Act on Detention of Drug Abusers in Treatment (1992) provides for the detention of drug-dependent people only after an initial consent from the patient. The social services can decide whether or not they offer a patient with SUD a treatment contract (66).

In Finland, individuals may be subjected to a short period of compulsory treatment (5 days), intended to allow them to sober up so they can then decide whether to undergo further treatment on a voluntary basis (67).

In Sweden, approximately 1000 adults per year with SUDs are admitted to compulsory care under the Law on Compulsory Care for Substance Abusers (LVM, act 1988:870) (68). Under Section 4 of this law, a court can order compulsory care for a person whose health is deemed to be at risk, or who may be placing others at risk, and who is considered to need assistance in order to discontinue substance use. Such individuals can be placed in compulsory care institutions for up to six months. The Compulsory Care acts are unrelated to penal code or laws on psychiatric care. Individuals exhibiting a need for compulsory care are primarily reported to the court by social welfare services, the police, family members, psychiatrists, SUD treatment providers or, more rarely, a general practitioner. The objective of the intervention is to motivate patients with an SUD to accept treatment, as well as to fulfill the state's mandate to protect its citizens from harming themselves or others. In this respect it is different from Norwegian legislation (44, 69). Although Swedish research on compulsory admission to treatment shares many similarities with the Norwegian situation, interpretation of the results must be done with care because of differences in the legislation and medical framework (table 2).

Table 1 Compulsory admission to SUD treatment – comparing Norway and Sweden¹

	Norway	Sweden
Population	5.200.000 (70)	9.800.000 (71)
Number of decisions to compulsory treatment	155 in 2015 (32)	1.065 in 2015 (68)
Option for retention	3 months (58)	6 months (72)
Criteria of CA for adults with SUDs	Individuals with severe and life-threatening substance use whose health is seriously at risk because of extensive, prolonged substance use and voluntary efforts have proved insufficient.	Individuals whose health is deemed to be at risk and who are considered to need assistance in order to discontinue substance use. Individuals with severe substance use who may be placing others at risk.
Typical characteristics of patients	Relatively young males with severe SUD (73)	Older males with severe alcoholism (45, 74)
Treatment modalities	Mainly mixed gender inpatient treatment often together with voluntary patients	Male/female segregated inpatient

Legally coerced treatment pursuant to criminal justice laws is widespread in countries

¹Compulsory admission of pregnant women is only available in Norway and is not mentioned in this table

such as the USA and Australia. However, the legislation in these countries allows the civil commitment of patients with severe SUDs as well.

In Australia an estimated 2.7% burden of disease was attributed to alcohol in 2010 and a further 2.6% was attributable to the use of illicit drugs (75). In comparison the high 12-month prevalence rates of substance dependence in US adults (about 12% for alcohol and 2-3% for illicit drugs) approximate those of other mental disorders as well as chronic physical disorders with major public health impact (76). A report from 2010 suggests that nearly 1.47 million arrestees are likely to require SUD treatment when they enter the criminal justice system in the USA alone (77, 78). Additionally, it has been suggested that the majority of women in the American criminal justice meet the criteria for a SUD (79). While incarceration may temporarily stop offending and drug use, the majority resume their drug use after release (80). Because of the concomitant social problems associated with SUDs and law enforcement concerns, coercion has been recommended as a major law enforcement strategy in the USA (81). Accordingly, drug courts have been introduced to divert drug-using offenders away from prison into programs involving drug-testing, treatment and court-mandated sanctions for non-compliance (82, 83).

1.6. Research evidence on the compulsory admission to treatment for patients with SUDs

Reviewing the international research evaluating compulsory treatment for patients with SUDs is a challenging task due to different assumptions, theoretical approaches or research strategy shared by the scholars involved in the empirical field (84, 85).

Another challenge is that literature reviews that have appraised evidence regarding compulsory treatment do not always distinguish between different forms of compulsory treatment in conducting their analyses of outcomes (75). Most of the research evaluating the effectiveness of compulsory treatment has been conducted within an `offender` population i.e. within the criminal justice system, which is not the primary focus of this thesis (86, 87). For example, while US reviews have concluded that coercion `works`, some non- US reviews have pointed to inconclusive findings and methodological problems that support a more cautious and critical stance (84, 88, 89).

Further difficulties arise from different views about what counts as treatment success and different interpretations between studies. This is well illustrated in a meta-analyses study conducted by Werb et al in 2016 (90). Between September 2014 and July 2015, 430 English-, Spanish- and Portuguese-language studies were systematically reviewed. The primary outcome of interest was post-treatment drug use and secondary outcome of interest was post-treatment criminal recidivism. Excluded were studies that assessed mandated treatment for legal or licit substances along with studies where individuals were provided with a choice between treatment and a punitive outcome. Furthermore, studies that only evaluated outcomes such as attitudinal or psychosocial change related to substance use without providing specific data regarding the impact of compulsory treatment were excluded. This resulted in only nine studies meeting the inclusion criteria, i.e. they evaluated the impact of compulsory drug treatment on illicit drug-related outcomes. Additionally, they also evaluated compulsory treatment options including drug detention facilities, short (i.e., 21-day) and long-term (i.e., 6 months) inpatient treatment, community-based treatment, group-based outpatient treatment, and prison-based treatment.

Four studies come from Southeast Asia, four from North America and one study from Western Europe. Three studies (33%) reported no significant impacts of compulsory treatment compared with control interventions; for these studies the control interventions represented groups that received other modalities of treatment, primarily voluntarily. Two studies (22%) found equivocal results but did not compare against a control condition. Two studies (22%) observed negative impacts of compulsory treatment on criminal recidivism. Two studies (22%) observed positive impacts of compulsory inpatient treatment on criminal recidivism and drug use.

Overall, research studies of patients with SUDs legally coerced to treatment are mixed but generally support the notion that coerced patients can benefit from treatment for SUDs (46, 91, 92). At the general level, research on coercion has shown that patients with SUDs need not necessarily be internally motivated at the outset of treatment to benefit from it (93).

The focus in this thesis is on paternalistically motivated compulsory treatment pursuant to the social services acts concerning individuals with severe SUDs based on the individual's treatment needs. Evidence regarding the effectiveness of such

treatment in rehabilitating patients or achieving long-term behavioral change is more limited and it has been highlighted through case series of small numbers of patients treated in this way (87, 94). According to these studies compulsory admission to treatment in the emergency situations has been found to help to minimize harm in the short term.

In Sweden, compulsory treatment for patients with SUDs pursuant to the social services act has been explored to some extent (45, 95). After systematically reviewing both national and international studies, Gerdner and Berglund wrote that compulsory treatment seemed to increase the chance of completing the treatment programme and aftercare (96). Compulsorily admitted patients showed outcomes that were as good as, or even better than the outcomes of similar voluntarily treatment for corresponding groups of patients. Furthermore, the quality of treatment was of great importance in reducing the negative experiences associated with the use of coercion.

In another 2-year follow-up study, global outcomes and mortality were investigated between patients residing in municipalities with high or low rates of compulsory admission. While global outcome was not affected by the different ratios of compulsory admission, the SUD-related deaths were reduced by the compulsory admission (97).

Calls for longer period with compulsory treatment for patients with severe SUDs have been known (94). Advocates claim that in longer term, these patients' health may be substantially improved and their autonomy restored (46). This is rather the norm in some countries; New Zealand allows compulsory treatment up to two years and Sweden has a more specifically provision whereby a person with SUDs can be committed to compulsory community care, but not physically placed in a designed closed facility. In Australia, there has been advocacy both for revival and longer periods of compulsory treatment for patients with severe SUDs pursuant to social services (75).

In Norway, the area of clinical research is quite limited: according to a report from 1998 the majority of patient compulsory admitted to treatment were females, younger than the men who were admitted (98). Most of the patients also used multiple drugs,

especially the men, and often had comorbid severe mental disorders; Opsal et al. showed that patients who had been compulsory admitted were more likely to be males, had utilized public welfare services more often, presented more severe substance use patterns. Furthermore they had a history of more frequent visits to physicians for somatic complaints in the previous 6 months, but had fewer comorbid mental disorders (73). There are no studies investigating outcomes and prognosis of patients compulsorily admitted to addiction treatment pursuant to the social services acts from the Norwegian setting, prior to the present work.

1.7 Consequences of SUDs

Substance use disorder is a prevalent and costly health problem and is a component cause of more than 200 diseases in individuals which lead to increased morbidity and mortality (99-101). The morbid trajectories of those affected by SUD include physical, psychiatric comorbidities along with social misery.

Studies on the general population and clinical samples have consistently shown that psychiatric comorbidities are common among patients with SUDs (102-104). Some studies have shown that 30-40% of people with alcohol related disorders and 40-50% of people with other SUDs also have a comorbid psychiatric disorder (105-107).

In Sweden, for example, it is estimated that between 30 and 50% of patients with SUDs suffer from a comorbid psychiatric disorder (108). In Norway, up to half of the 148 000 persons who received psychiatric services in 2015 were also estimated to have a SUD (109).

Overall, while empirical evidence has not always been consistent, it has been shown that there are bi-directional influences between SUDs and psychiatric comorbidity; greater severity in one of these disorders can be associated with greater severity in the other, thus, the two conditions negatively influence each other (106, 110, 111). Subsequently, there have been renewed calls for routinely screening for psychiatric comorbidities of patients entering SUD treatment (112).

Mental distress, defined as an individual's level of mental complaints and symptoms, is frequently used as an outcome measure in medical and psychological research (113). In the field of SUD, mental distress could be a valuable concept as it may

significantly worsen the prognosis and development of SUD (114-116). In Norway, high prevalence of mental distress has been found among patients with SUD admitted to inpatient treatment (117).

While studies of (predominantly) untreated populations provide little support for the notion of an inevitable progression of symptoms for individuals in early stage of SUD, there is little disagreement that the majority of cases with severe SUD seem to follow a chronic course and, thus placing them at heightened risk of gradual deterioration and premature death (118-120). It makes sense, therefore, that treatment for severe SUD should not only be directed toward delaying the progressive course of the disease. Treatment should also aim for smaller improvements in symptom burden and harm reduction, while helping patients cope better with everyday situations, and maintaining or improving their degree of well-being and satisfaction with life (121). By this, treatment seeks to help patients increase control over their health and wellbeing by ongoing monitoring of other positive outcomes.

There is agreement that quality of life is a subjective and multi-dimensional concept that includes physical, psychological, social and spiritual dimensions (122, 123). As both mental and physical health is integral quality of life components, the potential negative consequences of SUDs on quality of life are obvious (124). Conversely, emerging changes in SUD treatment will require the incorporation of quality of life indices as example of patient centred and reported outcomes, in treatment development and research (125). After all, the objective of evaluating quality of life among individuals with SUDs should not only be to evaluate patients with regard to the presence or absence of symptoms or adverse reaction to treatment, but also to focus on how patients with SUDs experience their daily life (25, 126). The patients, therefore, may become aware that improved wellbeing is more than reduced substance use. This may lead to increased patient engagement in treatment and ultimately enhance recovery. Indeed, while there are numerous of cross-sectional studies highlighting the association between substance use and poorer quality of life, qualitative studies suggest that treatment initiation may be triggered by an enhanced quality of life and not by the actual limitation of substance use (127, 128).

Overall, high rates of SUDs, combined with the persistent and pervasive problems of substance use suggest that SUDs are associated with considerable negative

outcomes leading to increased use of health care services (129). The addiction field has increasingly recognized the consequences of SUDs on outcomes such as quality of life and psychological wellbeing.

In this thesis, the focus is on the consequences in quality of life and mental distress in addition to substance use patterns brought by the SUD.

1.8 Improving clinical outcomes following treatment for SUDs

Interventions addressing both the SUD and comorbid psychiatric disorder are more effective than interventions targeting either disorder alone. Therefore, diagnostic-based approaches are now often integrated in the treatment of SUD and other psychiatric disorders (130, 131).

Evidence-based treatment modalities have increasingly shown promise for improving SUD outcomes and preventing harms. Overall, empirical evidence suggests that substance-dependent patients are likely to benefit from treatment despite differences in the specific theoretical orientation of the clinician, professional background and personal substance use history of the clinician, and in many instances, level of care received (13, 132). Generally, there is agreement that active continuing care interventions can improve post-treatment outcomes for patients with SUDs. For example, patients who received enhanced services during treatment showed significant improvement at 6 months follow-up in terms of reduced drug use, better psychiatric status and increased employment (133). However, what can be considered a reasonable or appropriate outcome in terms of substance use behaviour following treatment is nevertheless debatable.

Successful treatment outcomes can be presented in a number of ways, but most studies typically focus on measures related to substance use; the percentage of patients who report being continuously abstinent from alcohol and drugs for the entire follow-up period (continuous abstinence), and the percentage of days during the follow-up period that patients remain abstinent. Other outcomes vary; from preventing drop-outs to improvements in individuals' substance involvement or from complete abstinence to reduction of drug use and increased harm reduction. However, other measures of life functioning can provide a more relevant and nuanced picture of

treatment success. These measures include quality of life, level of psychological distress, level of functioning in career or job, level of involvement with the legal system, and the extent to which a person requires medical care or hospitalization for medical problems associated with alcohol or drug use.

Nevertheless, total abstinence is still a main focus for many SUD treatment settings despite adult studies suggesting that it may take several treatment episodes to achieve a year of fully sustained remission (9). However, reductions in substance use have also been associated with improved outcomes of comorbid disorders (134). If we see SUD as a chronic disease, monitoring outcomes such as general well-being, daily functional capability and current symptom measures are important. Repeated measures of functioning may enable patients to engage more in the recovery process because such measures focus on patient-centered aims. In this way, it makes more sense to see the level of abstinence as part of a process towards improvement, rather than viewing it as the only valuable outcome. While complete abstinence is still often assumed to be an important predictor of improved outcomes and level of functioning, this broadened focus may be more suitable and provide richer information on the symptom experiences of patients with SUDs.

The research literature suggests that offering a combination of services after discharge from primary treatment represents the best practice if a long-term recovery is to be expected (135, 136). Long-term abstinence appears to be important in achieving a successful recovery especially for patients with severe SUD.

Another important question about outcomes following inpatient treatment has been the duration of effects: when changes resulting from treatment can be expected and how long they can be expected to last. Most of the studies which assess treatment effectiveness measure traditional outcomes at discharge and 6-12 months post discharge, so there is a scarcity of studies measuring the impact of treatment on various other outcomes over time (137). Generally, studies have found reduced drug use and better psychosocial functioning when patients are in treatment longer (133). Lately, considerable changes have occurred in diagnostic concepts and terminology. ICD is undergoing revision with the 11th revision (ICD-11) due soon. DSM-IV has been replaced by DSM-V (138). Among other changes, the American Psychiatric Association notes that, "early remission from a DSM-V substance use disorder is

defined as at least 3 but less than 12 months without substance use disorder criteria (except craving), and sustained re-mission is defined as at least 12 months without criteria (except craving)". Whereas a diagnosis of substance abuse previously required only one symptom, mild substance use disorder in DSM-V requires two to three symptoms from a list of 11. Hence, there is a more dimensional approach as opposed to the more categorical approach (yes/no) in DSM-IV. Such changes yield important consequences for SUD treatment and clinical outcomes as well.

For compulsorily admitted patients in particular, most studies examined treatment completion rates, reductions in substance use and, less frequently, looked at improvements in other areas such as psychological symptoms (51). Moreover, there has been little systematic assessment of the outcomes or efficacy of compulsory treatment pursuant to social services intervention. The impact of treatment on various outcome measures has rarely been compared over time (94). In summary, there is a dearth of studies investigating other viable outcomes of care for patients who are compulsorily admitted pursuant to social services acts (97). In Norway, there are no follow-up studies focusing on this particular group of patients, although treatment according to the principles of the current legislation has occurred since 1992.

Throughout the papers included in this thesis, the relationship between changes in quality of life, mental distress and abstinence following inpatient treatment were given particularly attention in addition to the traditional measures related to the level of substance use. Although socially desirable outcomes such as employment, living conditions, and reduced crime represent important measures of treatment success they were not prioritized for this study.

1.9 The need for prospective, follow-up studies to evaluate treatment effectiveness for patients with SUDs

As treatment effects may wane in the months after interventions, a legitimate goal is to assess treatment outcomes after discharge (139). It is therefore important to examine the outcomes at some point after the initial treatment episode has ended to investigate the "real" outcomes following treatment.

In the area of compulsory treatment of patients with SUDs, it has been stated that future research on effectiveness of treatment can benefit from the inclusion of large sets of variables, including: treatment characteristics; post-treatment follow-up and support; and people`s experience of compulsory admission (140). In Norway, there have been calls to investigate the longer term outcomes of compulsorily admitted patients pursuant the NMHCA (60).

1.10 Overall objectives and aims

This thesis considers a cohort of adult patients with substance use disorders who underwent either voluntary or compulsory admission for treatment and investigates their outcomes at 6 months follow-up. The overall aim of this thesis was to investigate patient-centered and relevant outcomes at 6 months follow-up for both voluntary and compulsory admitted patients. More specific aims were to examine changes and duration of changes in substance use related outcomes, level of mental distress and quality of life outcomes at 6 months after discharge and to investigate factors associated with these changes.

2.0 Materials and methods

2.1 Design

This thesis is based on data from a naturalistic observational study on patients with SUDs who underwent either voluntary or compulsory admission for treatment pursuant to the NMHCA. All the patients were recruited consecutively from January 1, 2009 to May 31, 2011. A prospective cohort design was used. The patients were re-interviewed at a 6 months follow-up after hospital discharge between May 2009 and December 2011.

2.1.1 Setting and inclusion of participants

Originally the study was projected to include two different addiction treatment centers located in Kristiansand and Tønsberg, Norway. Each of them had four beds for patients admitted compulsory and they had approximately 35 compulsorily admitted patients annually combined. A third treatment center was later included in order to ensure a sufficient sample. It was located in Oslo and had three beds for compulsorily admitted patients.

All centers were publicly funded and part of the TSB within the South-Eastern Health Trust. They were organized quite similarly with multidisciplinary staff, including psychiatrists, psychologists, social workers, occupational therapists, specialized nurses, and other trained staff. They offered treatment for patients of both genders, with primary substance use disorders, often combined with mental health disorders; exceptions were cases with acute psychosis which were primarily treated on the specialized psychiatric wards. Treatment included assessments of somatic and mental health along with pharmacotherapy, cognitive milieu therapy, and individual motivation enhancement therapy. Although the centers described their treatment in similar ways, one could expect some variations in clinical practice across the wards. All centers were organized and designed as services to provide compulsory treatment according to the NMHCA.

The majority of patients (both CA and VA) were recruited from Kristiansand. The treatment ward had 14 beds; 10 for VA patients and 4 for CA patients. The wing accommodating the CA beds along with a communal area was behind locked doors.

The detoxification of CA patients occurred on the locked-up wing and consisted of medically supported withdrawal from substances. The VA patients requiring detoxification upon admission on the treatment ward received it on a special detoxification unit located within the same building. Both groups of patients were attended by the same multidisciplinary staff on the treatment wards.

The Tønsberg addiction center provided only CA patients for this study. They were initially detoxified on a locked-up wing within the detoxification unit along with VA patients. The period on the detoxification unit was regarded as an acute phase having its focus on tackling intoxication or withdrawal. Both groups of patients were treated by the same multidisciplinary staff. The CA patients were then moved to one of the two treatment wards (one section exclusively for alcohol and legally prescribed substances and one exclusively for illegal substances) where treatment was provided by the same multidisciplinary staff to both CA and VA patients.

Oslo addiction center provided only CA patients for this study. They were detoxified on a separate detoxification ward upon admission. The detoxification unit offered treatment exclusively for CA patients and had locked doors. After detox they were transferred to the treatment ward which accommodated exclusively CA patients and had locked doors. However, they were gradually allowed to share the communal area with the VA patients hospitalized within the same building.

While the voluntary patient population was drawn mainly from the South-East of Norway both urban and suburban areas, the compulsory group of patients came from all over the country, although primarily from the same region as the VA patients.

Upon study's commence, common procedures were designed by the project's committee with regards to the collection of socio-demographic and clinical data of the participants. Subsequently, a common and comprehensive set of assessments tools was agreed upon which included both clinician-rated and self-reported questionnaires (see table 2). All patients admitted to the wards were approached with the same procedures during the study period. A psychiatrist or clinical psychologist performed diagnostic interviews (MINI) and other members of the multidisciplinary staff performed the other assessments. The EuropASI interviews were performed by trained and certified staff. Coordinators were elected at each center; they were in

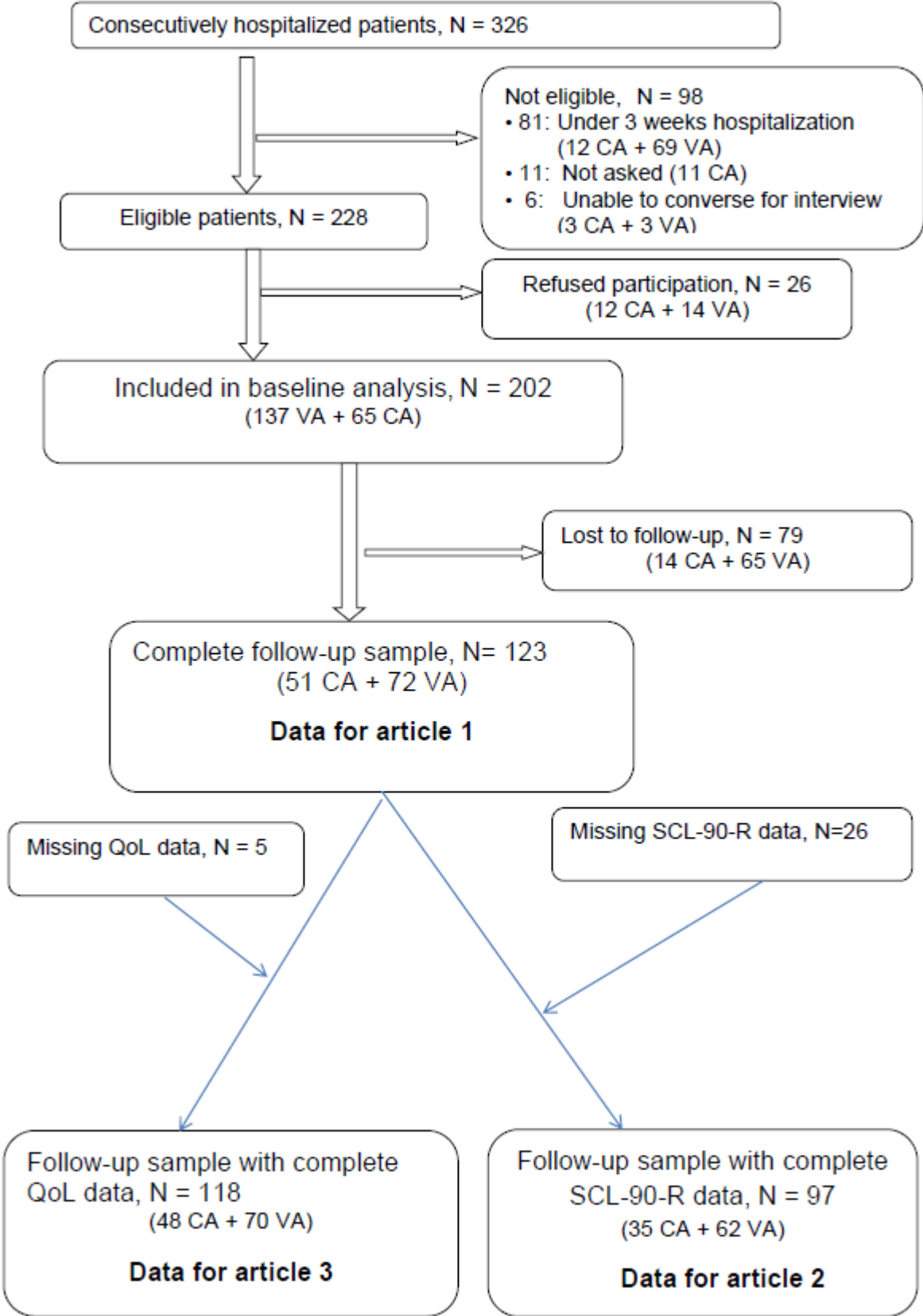
charge of data collection and ensured that the study's procedures were followed. Data was then sent to the project committee. There were two coordinators for Kristiansand (a specialized nurse and a nurse), one in Tønsberg (a social worker) and one in Oslo (a psychologist). Upon project start they received additional training in regards to the newly designed common procedures.

Table 2 Assessments tools used throughout the 3 papers

Test	Baseline	Discharge	Follow-up at 6 months
M.I.N.I interview	✓		
EuropASI interview	✓		✓
SCL-90-R	✓	✓	✓
Quality of life questionnaire	✓	✓	✓
Feedback questionnaire			✓

The project procedures required that the patients were detoxified and in a stabilized phase in order to establish baseline values not influenced by withdrawal. This was accomplished by three criteria: (1) a standard detoxification regimen on a separate ward (according to local practices as described above), or (2) a minimum of 2 weeks stay on the treatment ward or (3) verification of negative urine tests for alcohol, opioids, central stimulants (amphetamines, methamphetamines, and cocaine), benzodiazepines. From early on, it was observed that some patients left the treatment wards shortly after admittance. In order to ensure that patients had a minimal treatment exposure, the project committee made a post-hoc administrative decision; a period of treatment exposure of minimum 3 weeks on the treatment wards was required for inclusion in analysis (see figure 1).

Figure 1 Patient flowchart



Other criteria for study inclusion were as follows: established substance use disorder, age ≥ 18 years and understanding/speaking Norwegian, with the ability to converse for interviews

After final agreements were made and the coordination between project staff were ensured the recruitment commenced: a consecutive sample of 326 patients both voluntarily and compulsorily admitted during a specified period of time between 2009 and 2011 were identified as potentially relevant for this study when they were admitted to the participating facilities (see figure 1). Seventeen patients were not considered for eligibility for various reasons including administrative issues (primarily due to insufficient staff capacity to screen) or being unable to converse meaningfully for the interview (see figure 2). Furthermore, 81 patients with less than 3 weeks treatment exposure were not included in baseline analysis. This resulted in 228 eligible patients. Twenty six patients refused to participate. Thus, 202 patients were enrolled in the baseline analysis: 183 patients (41 CA and 137 VA) were recruited from Kristiansand addiction center along with 16 and 8 CA patients from Tønsberg and Oslo addiction center respectively (see table 3).

Table 3 Patients distribution throughout the study`s treatment centers

	Kristiansand Addiction Center	Tønsberg Addiction Center	Oslo Addiction Center
Recruitment	VA and CA patients	Only CA patients	Only CA patients
Consecutively hospitalized patients, N = 326	223 VA + 52 CA	36	15
Not eligible patients, N = 98	72 VA + 7 CA	14	5
Patients refusing participation, N = 26	14 VA + 4 CA	6	2
Patients included in baseline analysis, N = 202	137 VA + 41 CA	16	8
Patients included at follow-up, N = 123	72 VA + 33 CA	13	5

To confirm that the study procedures were followed consistently, a review of data in 2018 showed that 1) 73 patients had undergone detox, 2) 87 patients had been at least 14 days on the treatment wards and 3) 38 patients had been less than 14 days on the treatment wards but they had negative urine test upon admittance. Thus, the described procedures were followed in 98% of the cases (N=198). For four patients, the clinical record showed that they had had spent 10, 8, 5 and 4 days respectively on the treatment wards before assessment, but negative urine tests were not recorded. Nevertheless, we assumed that these patients were considered to be stable prior to assessment based on clinical evaluation in accordance with the overarching description of the study procedure; patients should not be included or assessed before they were considered detoxified and stable.

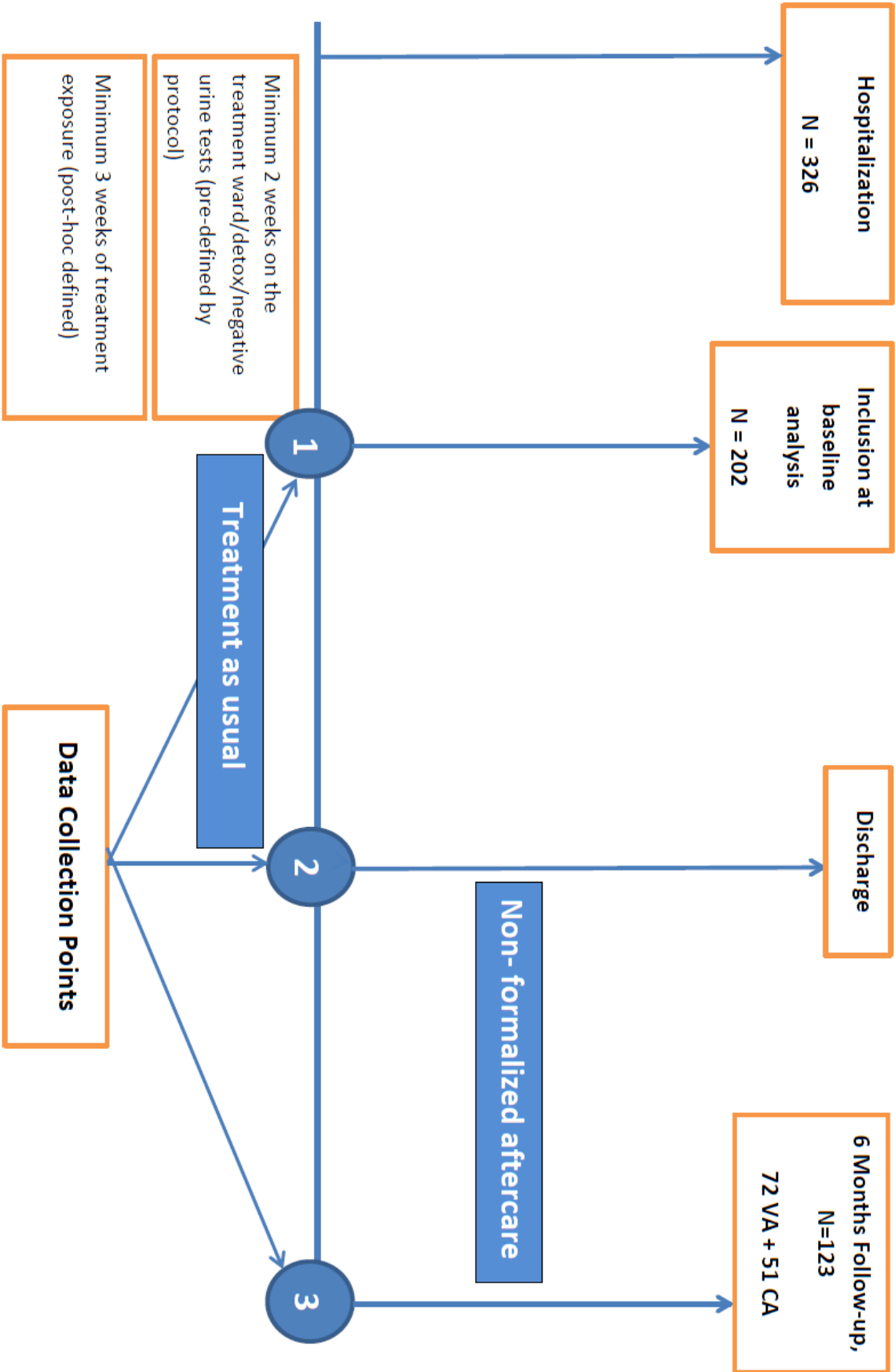
Of the 202 patients enrolled at baseline (65 CA and 137 VA), 123 (61%) were interviewed at 6 months follow-up following hospital discharge.

No formalized aftercare service was routinely provided by the wards themselves upon discharge, this applied to both CA and VA patients, but individual aftercare plans were made according to clinical needs in cooperation with primary care services or with social services (see figure2).

In the published papers the timelines for inclusion have been described with some variation, which may have caused misunderstandings. The reviewed procedures and timelines as presented in the current version of the thesis, with two weeks of treatment on the treatment wards as one of the three inclusion criteria regarding stability prior to examinations is now highlighted. Similarly, the post-hoc administrative decision to include only those with a minimum of three weeks on the treatment wards in the baseline sample for analysis, in order to include a sample with a minimum of treatment exposure, is now clarified.

Follow-up interviews were performed six months after discharge from the treatment wards and took place between May 2009 and May 2011. They consisted of both clinician-rated and self-reported questionnaires and were performed by the two project-coordinators from Kristiansand or by the Ph.D-fellow (Opsal) of the study in one session. Because patients at follow-up resided all over the country (particularly the compulsory admission group), the project staff attempted to contact all patients

Figure 2 Study's timeline



directly by phone, email, or post. In some cases, patients were found to be in prison or in inpatient treatment institutions and arrangements were made to meet them there, which included extensive travelling for the data collection team as all the interviews were conducted face to face. Due to limitations in funding and the large geographical uptake area, compulsory admission patients were prioritized for follow-up (78% CA patients versus 53% VA patients were included) because there were fewer of them in the sample at baseline.

This thesis focuses primarily on the outcomes at 6 months following hospital discharge for patients with SUDs both voluntarily and compulsorily admitted. A baseline article based upon data from the same project was included in a thesis by Opsal in 2013 (73).

2.2 Measurements

All the patients were subject to a clinical psychiatric examination and diagnosed according to the Mini-international neuropsychiatric interview (M.I.N.I.) version 5.0 (141). The interviews were conducted by experienced psychiatrists and psychologists at baseline to assess SUD and other psychiatric diagnosis for patients included in the three papers of this thesis. All the patients met the ICD-10 criteria for SUD. In the analysis, SUD diagnosis was dichotomized to alcohol use disorder or drug use disorder. Those with both alcohol and drug use disorder were coded as alcohol use disorder.

In paper 2, for descriptive purposes only, the five-part axis systems of the DSM-IV were used, with Axis I covering symptom disorders and Axis II covering personality disorders and intellectual disabilities.

To assess demographics and severity of substance use variables, the most commonly used measure within addiction treatment research was used; the European Addiction Severity Index (EuropASI) (1, 142). The variables used cover different periods of time in relation to the time of the interview. For example, information about patients living arrangements refers to the last 6 months before the interview whereas information about incomes concern the last 30 days. In other cases, same variable was used to investigate different periods of time, drug use for example, were assessed at both 30 days and 6 months before the interview.

Variables from the EuropASI used in the analyses included severity of substance use variables, such as frequency of substance use in the last 6 months (0 = never used; 1 = sometimes, but less than 2–3 times a month; 2 = 1–3 days a week; 3 = everyday use), duration (in years) of most problematic substance use and whether the patient had injection use in the last 6 months. Furthermore, we chose to define improvement as reduction in frequency of preferred drugs. Frequency of use is very well correlated with quantity and they provide essentially redundant information regarding the severity of a patient's problem (142). Accordingly, reporting frequency of use was preferred in the EuropASI, also due to the difficulty in getting accurate information regarding the reported quantity of substance used. Whether patients were abstinent or not was determined according to self-reported alcohol and drug use for the 30 days prior to the follow-up interview, i.e., the abstinent group had no alcohol or drug use during this period. The EuropASI does not use the concept "preferred substance". Thus, we defined the preferred substance of use as the substance reported by the patients as their major problem; for this study we registered the use of alcohol, amphetamine, cannabis, opioids, or benzodiazepines.

The same questionnaire was used to follow-up. In addition, another variable, i.e. time in a controlled environment as defined by the EuropASI as days in jail or SUD treatment in the 30 days before follow-up was used. Moreover, whether the patients had overdoses in the last 6 months following discharge was recorded as well; in the analysis this variable was dichotomized: no reported overdoses and at least one (or more) reported overdose.

Mental distress is commonly measured with the Symptom Checklist-90-R (SCL-90-R) a self-reported screening-instrument for psychiatric disorders in the last 7 days (143, 144). SCL-90-R has been widely used clinically in Scandinavia to monitor psychological distress both before and after treatment (145-148). Additionally, the SCL-90-R has been tested in a Norwegian population sample (149). The SCL-90-R has 90 items rated on a five-point Likert-type scale, ranging from "not at all" (0) to "extremely" (4), and includes nine subscales (somatization, obsessive-compulsive, depression, anxiety, hostility, interpersonal sensitivity, phobic anxiety, paranoid ideation, and psychoticism). Our study uses the Global Severity Index (GSI), which is the average rating of all 90 items. GSI is often used as an overall index of mental distress in studies of substance dependent samples (150); the higher the score, the

greater the distress (143, 144). A score of $GSI > 1$ is considered to be a pathological score. In addition, as a rough proxy for severe mental distress, we assessed whether patients had ever had suicidal attempts in their lifetime using the EuropASI.

QoL was measured with QoL- 5, a generic, self-reported QoL instrument intended to measure satisfaction with life in general; i.e., it is not disease-specific and based on the integrative theory of the QoL concept (151). Generic instruments are commonly preferred in diseases with multi-dimensional consequences, like substance use disorders (152). The integrative theory of quality of life is the theoretical and philosophical framework of the Danish Quality of Life Survey (153, 154).

QoL-5 consists of five subjective QoL questions; two questions about health - physical and mental - two questions about the quality of relationships with important others (partner and friends); and one question about existential QoL, i.e., the relationship with oneself. The questions are intended to assess the respondent perceived quality of live at present. Responses were based on 5-step ordinal scales that varied from 1 = very good to 5 = very bad. The raw scores were recoded into a decimal scale, where 1 = 0.9 (the best score) and 5 = 0.1 (the worst score) (155). Mean scores for health, relationships, and existential QoL aspects were calculated, and the total QoL score was calculated as the mean of these three scores. When the patient did not have a partner, the relationship sub-score was calculated on the basis of one question. Normative data from a general population sample showed a mean QoL score of 0.69 (124). The cut-off score for a markedly low QoL has been suggested to be a score below 0.55, and an extremely low QoL score < 0.4 (124).

Changes in QoL were computed by subtracting the QoL determined at admission from the QoL determined at follow up, hereafter called the 'QoL-5 score change'.

According to the clinical interpretation of the scale, a QoL score increase from baseline to follow-up of 0.2 (equated to a one-point increase on the raw score scale, e.g., from "good" to "very good") or higher was denoted as substantial and indicated a clinically important improvement; other improvements were considered moderate (≥ 0.1 score), small (≥ 0.05 score), or very small (< 0.05) (152, 156).

Participants` involvement with the health and care system during the 6 months follow-up were investigated based on self-composed questionnaires; they were asked to

answer with yes or no to questions assessing their engagement with the health and care system after discharge i.e. are you engaged with social services, or general practitioner, or multidisciplinary resource group, and have you been referred to further specialized treatment or do you have an individual plan.

2.3 Data analyses

Analyses were performed with SPSS 19.0 Software (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to elaborate baseline characteristics. Continuous variables are reported as means and standard deviations (SD). Categorical variables are reported as frequencies. Inter-group variation was investigated by comparing means with student's t-test and chi-square tests for categorical variables. Both linear and logistic regression was used to examine predictors of changes in different outcomes, from baseline to the 6 months follow-up. Preliminary bivariate analyses were first undertaken. Variables with seemingly little influence on the dependent variable (p -value >0.20) were not included in the multiple regression (adjusted model), as recommended by Altman (157). The final multiple regression model used simultaneous entry of variables (the "enter" method). Results were presented as unstandardized beta coefficients or as the odds ratio (OR) with 95% confidence intervals (CIs). P -values <0.05 were considered statistically significant

In paper 1, changes in frequency of the preferred substance of use at 6 months follow-up were performed using the matched-pairs Wilcoxon signed-rank test for VA and CA patients separately. This was because of the ordinal (non-parametric) measurement level of this variable. In this way, it was possible to decide whether the use of these substances had increased, decreased, or remained constant over time. Only the preferred substances that were reported by a sufficient number of patients (defined as >40 patients) were examined in this way in order to have sufficient power and justify the analyses. For paper 2, in order to examine the change in psychiatric distress between discharge and the six-month follow-up, we used the paired sample t-test, for the CA and VA group respectively. Changes in mental distress were computed by subtracting the GSI determined at follow-up from the GSI determined at admission, hereafter called the 'GSI change'. A 'positive score change' shows reduced mental distress at follow-up.

In paper 3, the QoL-5 score change was dichotomized into groups of high and low score changes, with a cut-off value of ≥ 0.2 (i.e., a large and clinically relevant QoL change).

Table 4 Statistical analyses used throughout the study`s 3 papers

Article	Main outcomes	Type of analysis	N=
1	Changes in frequency of the preferred substance of use at follow-up ^a Predictors of abstinence at the follow-up ^b	- Match-pairs Wilcoxon signed-rank test - Logistic regression	123
2	Change in mental distress between discharge and the follow-up ^a Predictors of change in psychiatric distress, from baseline to follow-up ^a	- Paired sample t-test - Linear regression	97
3	Factor associated with QoL at baseline ^a Factors associated with markedly improved QoL at follow-up ^b	- Linear regression - Logistic regression	118

Notes:

^a Continuous variable

^b Categorical variable

2.4 Ethics

All the studies were approved by the Regional Committee for Medical and Health Research Ethics in Norway (REK 08/206d, 2008/2900, 12.09.2015) and by the Privacy Issues Unit, Norwegian Center for Research Data (NSD no. 18782).

2.4.1 Consent

Participants received written information and they gave their written consent. They were informed that refusing to participate in the study would not interfere or have negative consequences with respect to any aspect of treatment.

3.0 Results

3.1 Baseline characteristics

There were significantly more female patients in the CA group than in the VA group (48% vs. 27%, respectively). During the 6 months before admission, significantly more patients in the CA group reported injection use than patients in the VA group; 71% versus 47%. Additionally, patients compulsory admitted had experienced more overdoses during their lifetime compared with patients admitted voluntarily.

Furthermore, both groups had many years of drug use experience. However, only 7% of VA patients and 12% of CA patients received OMT. All patients met the ICD-10 criteria for SUDs and the majority had a drug use disorder rather than an alcohol use disorder. Among patients with comorbid mental disorders, 61% of VA patients had Axis I diagnoses compared to 52% of CA patients; only 23% of VA patients had only SUD diagnoses compared to 32% of CA patients.

Table 5 Baseline socio-demographic variables, mental stress and quality of life scores for patients included at baseline, N = 202 [N (%) or mean (SD)]

Variables	VA (N=137)	CA (N=65)
Age, years, mean (SD)	31 (9)	29 (11)
Female	37 (27)	31 (48)
Education, years	11 (2)	11 (2)
Relationship status, single (N=198)	42 (31)	20 (32)
Source of financial support ^{a,b}		
Employment (N=190)	24 (18.5)	6 (10)
Public welfare benefits (N=194)	52 (39)	37 (62)
Illegal activity (N=190)	48 (37)	25 (42)
Living arrangements (N=190) ^b		
Alone	62 (48)	30 (51)
With family*	42 (32)	18 (30)
Institutions/jail	15 (12)	3 (5)
Not stable living arrangements	11 (8)	8 (14)
Severity scores		
Injection use last 6 months (N=195)	64 (47)	43 (71)
Duration of most problematic substance use, years	11	10
Overdoses lifetime (N=189)	63 (48.5)	41 (69)
Time in treatment, days	50 (20)	70 (26)

Variables	VA (N=137)	CA (N=65)
Main SUD diagnosis		
Alcohol use disorder (AUD) or AUD with co-occurring drug use disorders	25 (18)	9 (14)
Drug use disorders	112 (82)	56 (86)
Psychiatric diagnosis		
Axis I disorders	83 (61)	34 (52)
Axis II disorders	4 (3)	5 (8)
Both Axis I and II	19 (14)	5 (8)
Only SUD diagnosis	31 (23)	21 (32)
Mental stress score (SCL-90-R, GSI), (N =197)	1 (1)	1 (1)
Attempted suicide, lifetime, (N=191)	71 (54)	23 (38)
Quality of life (QoL-5 score), (N = 195)	0.5 (0.2)	0.5(0.1)
Opioid maintenance treatment (OMT)	10 (7)	8 (12)

* Including with partner and children, only with partner, only with children, with parents, with friends, with another family

^aSome participants had more than one source of financial support

^bLast 6 months before admission

3.2 Examining specific outcomes at 6 months following inpatient treatment²

3.2.1 Improved drug-use patterns at 6 months post-discharge from inpatient substance use disorder treatment: results from compulsorily and voluntarily admitted patients

Background

Treatment services to patients with substance use disorders (SUDs), including those mandated to treatment, needs to be evaluated and evidence based. The Norwegian Municipal Health Care Act calls for mandated treatment for persons with “severe and life-threatening substance use disorder” if these individuals are not otherwise willing to be voluntarily treated and consequently risk their lives over drug use. This study aims to examine substance use–related outcomes at 6 months following inpatient treatment and to analyse factors associated with improved outcomes and abstinence.

² The result section 3.2 – 3.4 have been directly copied from the articles

Method

This prospective study followed 202 hospitalized patients with SUD who were admitted voluntarily (VA; n = 137) or compulsorily (CA; n = 65). The European Addiction Severity Index was used at baseline and at follow-up to assess socio-demographic and substance use variables. Regression analysis was conducted to investigate factors associated with abstinence at 6 months of follow-up.

Results

The frequency of use of a preferred substance showed marked improvement for both VA and CA patients (61% and 37%, respectively) at follow-up. Seventy-five percent of VA patients using amphetamine reported improvement compared to 53% of CA patients. At follow-up, the CA group continued to have a higher rate of injection use. The CA group had experienced higher rates of overdose in the past 6 months and lower abstinence rates (24% versus 50%) at follow-up. A lower severity of drug use at intake (non-injection drug use), voluntary treatment modality, and higher treatment involvement during follow-up all were significant factors associated with abstinence at 6 months after treatment.

Conclusion

Voluntary treatment for SUD generally yielded better outcomes; nevertheless, we also found improved outcomes for CA patients. It is important to keep in mind that in reality, the alternative to CA treatment is no treatment at all and instead a continuation of life-threatening drug use behaviours. Our observed outcomes for CA patients support the continuation of CA treatment.

3.2.2 Mental distress following inpatient substance use treatment, modified by substance use; comparing voluntary and compulsory admissions

Background

Treatment services to patients with substance use disorders (SUDs), including those mandated to treatment, needs to be evaluated and evidence based. The Norwegian Municipal Health Care Act (NMHCA) calls for compulsory treatment for persons with “severe and life-threatening substance use disorder” if these individuals are not

otherwise willing to be voluntarily treated and consequently risk their lives over drug use. Mental distress is known to be high among SUD patients admitted to inpatient treatment. The purpose of this study is to describe changes in mental distress from admission to a six-month follow-up in patients with SUDs, which underwent either voluntary or compulsory treatment.

Method

This prospective study followed 202 hospitalized patients with SUDs who were admitted voluntarily (VA; n = 137) or compulsorily (CA; n = 65). Levels of mental distress were assessed with SCL-90-R. Of 123 patients followed-up at six months, 97 (62 VA and 35 CA) had rated their mental distress at admission, discharge and follow-up. Sociodemographics and substance use severity were recorded with the use of The European Addiction Severity Index (EuropASI). We performed a regression analysis to examine factors associated with changes in psychiatric distress at the six-month follow-up.

Results

The VA group exhibited higher mental distress than the CA group at admission, but both groups improved significantly during treatment. At the six-month follow-up, the VA group continued to show reduced distress, but the CA group showed increases in mental distress to the levels observed before treatment. The deterioration appeared to be associated with higher scores that reflected paranoid ideas, somatization, obsessive-compulsive symptoms, interpersonal sensitivity, and depression. Active substance use during follow-up was significantly associated with increased mental distress.

Conclusion

Inpatient treatment reduces mental distress for both CA and VA patients. The time after discharge seems critical especially for CA patients regarding active substance use and severe mental distress. A greater focus on continuing care initiatives to assist the CA patients after discharge is needed to maintain the reduction in mental distress during treatment. Continuing-care initiatives after discharge should be

intensified to assist patients in maintaining the reduced mental distress achieved with treatment.

3.2.3 Quality of life improved following in-patient substance use disorder treatment

Background

Quality of life (QoL) is increasingly recognized as central to the broad construct of recovery in patients with substance use disorders (SUD). However, few longitudinal studies have evaluated changes in QoL after SUD treatment and included patients with SUD that were compulsorily hospitalized. This study aimed to describe QoL among inpatients admitted either voluntarily or compulsorily to hospitalization and to examine patterns and predictors of QoL at admission and at 6 months post treatment.

Methods

This prospective study followed 202 hospitalized patients with SUD that were admitted voluntarily (N=137) or compulsorily (N=65). A generic QoL questionnaire (QoL-5) was used to assess QoL domains. Regression analysis was conducted to identify associations with QoL at baseline and to examine predictors of change in QoL at 6month follow-up.

Results

The majority of patients had seriously impaired QoL. Low QoL at baseline was associated with a high psychiatric symptom burden. Fifty-eight percent of patients experienced a positive QoL change at follow-up. Although the improvement in QoL was significant, it was considered modest (a mean 0.06 improvement in QoL-5 scores at follow-up; 95% confidence interval: 0.03 - 0.09; $p < 0.001$). Patients admitted voluntarily and compulsorily showed QoL improvements of similar magnitude. Female gender was associated with a large, clinically relevant improvement in QoL at follow-up.

Conclusions:

Inpatient SUD treatment improved QoL at six month follow-up. These findings showed that QoL measurements were useful for providing evidence of therapeutic benefit in the SUD field.

3.3 Additional and previously unpublished results and analysis

The timeline that formed the basis for additional results and analysis was the review of data from 2018. This new revision provided also an opportunity to investigate for the potential utility of an alternative outcome (a new dependent variable) at 6 months follow-up. Furthermore, it also allowed analyzing the impact brought by new independent variables on the main outcomes along with description of participants' involvement with the health and care system during the 6 months after discharge. Thus, the following presentations include unpublished results and tables considered relevant for the thesis that correspond with the intentions stated above.

In paper 1, the dependent variable in our regression analysis was patients reported abstinence in the previous 30 days before the 6 months follow-up interview and it was reported by 48 of 123 participants (39%). However, 26 patients (similarly distributed across groups) had been in a controlled environment during the last 30 days. Thus, one could question whether those who were “involuntary abstinent” should be included in the dependent variable. Upon revision of data we created a new dependent variable, i.e. “voluntary abstinence” as reported abstinence in a non-controlled environment. Only 22 patients (18%) reported abstinence in a non-controlled environment; 17 VA patients and 5 CA. To investigate whether this changed our previous reported analysis, the data was re-examined with this revised abstinence variable. We followed the same statistical procedures as in the previous analysis (first bivariate and then multivariate analysis). The new analysis did not alter the findings concerning socio-demographics and substance use severity; relationship status was still non-significant and injection use was retained as a factor negatively associated with voluntary abstinence at follow-up (OR of 0.07 (95% CI = 0.01 - 0.62. $p = 0.016$), (table 6). However, treatment modality turned out non-significant (VA or CA patient). Controlled environment before follow-up was now logically not part of the analysis.

Table 6 Predictors of voluntary abstinence from baseline to follow-up, N = 123

Parameter	Multivariate analysis OR (95 % CI)	P-value
Relationship status, single	-0.28 (0.23 - 2.47)	0.642
Injection use the last 6 month	0.07 (0.01 - 0.62)	0.016
Compulsory treatment	0.50 (0.14 - 1.74)	0.277

One could argue that the inclusion of other independent variables could have been cofounders to this study's outcomes. For example, patients living/work situations or having the social service needs met are variables usually influencing the outcomes in the field of SUD treatment (158). Accordingly, for the new revision of the thesis, new socio-demographic variables were also used at 6 months follow-up and showed that 10 (20%) of CA patients reported non-stable living arrangements compared with 5 (7%) of VA patients (see table 7). Furthermore, only 3 (6%) of CA patients reported own work as source of income compared to 10 (14%) of VA patients. Nine CA patients (18%) and 13 VA patients (18%) were included in OMT. These new socio-demographic variables were then included in the regression analysis in order to investigate the impact on each of the main outcomes. Upon performing the statistical analysis, the living arrangements variable was dichotomized; non stable living arrangements as reported by the participants and stable living arrangements (all the other options). Similarly, the source of incomes in the last 30 days was dichotomized; having an income based on own work and not having an income (all the other options).

Table 7 Living arrangements the last 30 days before the 6 months follow-up interview, N = 123

	VA (72)	CA (51)
With family*	19 (26%)	15 (29%)
Alone	28 (39%)	15 (29%)
Institutions/Jail	20 (28%)	11 (22%)
Not stable living arrangements	5 (7%)	10 (20%)

* Including with partner and children, only with partner, only with children, with parents, with friends, with another family

The same principles stated in statistical chapter were then followed upon performing the new analysis; i.e. preliminary bivariate analyses were first undertaken and variables with seemingly little influence on the dependent variable (p-value >0.20) were not included in the multiple regression (adjusted model).

None of these new variables were significant in the bivariate analyses on the dependent variables presented in paper 1 and 2, i.e. abstinence and mental distress. Thus, there was no indication for a new multivariate analysis model.

In paper 3, both of these new variables showed p-values below the cut-off for inclusion in multivariate analysis. A revised multivariate model with the additional variables showed that having an income based on own work was significantly associated with large QoL improvement (OR of 4.08 (95% CI = 1.05 – 15.78, p = 0.041), while living arrangements at follow-up was non-significantly associated with QoL (see table 8). As in the original model, female gender was retained as a factor associated with a clinically relevant improvement in QoL, while mental distress measured by GSI was still non-significant.

Table 8 Predictors of Quality of Life change* from baseline to follow-up, N = 118

Parameter	Multivariate analysis OR (95 % CI)	P-value
Gender (women)	3.71 (1.46 – 9.36)	0.006
Own work	4.08 (1.05 – 15.78)	0.041
Global Score Index (GSI) SCL-90-R	1.56 (0.85 – 2.86)	0.154
Living arrangements	0.09 (0.01 – 0.02)	0.998

*The dependent variable was a dichotomized QoL-5 score change, with a cut-off value of > 0.2 (i.e. a large and clinically relevant QoL change)

Finally, results regarding reported engagement with the health and care system during the 6 months prior follow-up interviews which were collected from 119 participants; 70 VA and 49 CA are presented below. It showed comparable rates between the two groups of patients, at follow-up.

Table 9 Engagement with the health and care system after discharge, N = 119

Parameter	CA patients	VA patients
Individual care plan, N = 83	12 (39 %)	19 (37 %)
Social services, N = 114	33 (70 %)	42 (63 %)
General practitioner, N = 108	26 (59 %)	33 (52 %)
Multidisciplinary resource group, N = 110	32 (70 %)	42 (66 %)
Referred for further treatment, N = 118	27 (55 %)	35 (51 %)

4.0 Methodological considerations

4.1 Design

The studied cohort consisted of patients with SUDs who underwent either voluntary or compulsory admission for inpatient treatment. We aimed to examine changes in substance use related outcomes, level of mental distress and quality of life outcomes at 6 months following discharge and to investigate factors associated with these changes.

The study of patients undergoing compulsory admission leads to restrictions of the choice of design. Randomizing compulsorily admitted patients into a group who receive treatment and a group that is not offered treatment is difficult for ethical reasons, though some examples exist (45). The study's design is therefore a naturalistic observational study in which we followed a combined and mixed cohort of patients with SUDs.

Data was first collected at baseline and again at two defined time points during follow-up, at the end of treatment (some variables) and 6 months following the completion of the index treatment. This corresponds to an observational, longitudinal design that involves obtaining several measures of variables from the same group of individuals over an extended period of time (159). This type of design has previously been used successfully in treatment evaluation studies (160) and it allows in principle both 'between groups' and 'within group' comparisons of different groups (161). Although this may imply a comparative aspect between the voluntarily and compulsorily admitted patients, the study was not regarded as primarily a comparative study. With a specific focus in the project on CA patients and their outcomes, the VA group served as a reference population in order to put the findings of the CA group into perspective and the design did not include a formal matching of participants. A primary focus in the presented results has been to study change in a given variable (i.e. outcome such as Quality of life) within a group over time and following treatment. Such observational longitudinal designs are the common choice methods in attempts to investigate results from a treatment provided in patient groups, where experimental designs are not an option. Although observational studies do not enable final conclusions about cause and effect, they are suitable for

investigation of post treatment results and for estimating association between variables. Such non-experimental design may provide data that is closer to “real world” and thus, the results obtained may have a higher applicability to clinical practice. Throughout the papers included in this thesis, we tested the degree to which a range of relevant variables from baseline predicted the chosen outcomes. However, due to the nature of our study design, which was observational , it is important to bear in mind that the outcomes following discharge and at 6 months follow-up might have been affected also by other variables than those included in the dataset/and or analyses (i.e. confounders are discussed in 4.4).

4.2 Selection bias

The main purpose of research is drawing inferences from study findings to the real world (162). Selection bias is a systematic error resulting in erroneous estimations of the true association between an exposure variable and the outcome. Such biases arise from the procedure used to select subjects and from factors that influence study participation (163). Selection biases are likely to occur when, for example, the characteristics differ between those who participate and those from the source population who do not participate in the study. Such errors should be minimized in order to make a sample as representative as possible (164).

In order to obtain a homogeneous baseline sample according to the purposes of the study the project committee required a minimum of 3 weeks treatment exposure; this along with other criteria i. e. being unable to converse meaningfully for the interview and administrative issues resulted in 30% (98) out of all consecutively hospitalized patients were considered non-eligible and thus not included in analyses: 32% VA and 25% CA patients respectively ($\chi^2 = 1.6$, $p = 0.2$).

Further comparison of the eligible versus non-eligible participants was not possible due to the lack of data. We can expect that those who left early may have had a lower motivation to change and possibly a higher burden of pathology. Thus, overall problem severity may have been underestimated in the presented results. Due to similar rate of non-eligible in the two groups, there is no reason to expect a considerably different underestimation pattern or mechanism between groups. It should also be repeated that our data are representative only for patients who have

the minimal treatment exposure (3 weeks on the treatment wards) as described in the study procedures. The rates of consent among *the eligible* patients were 84% for compulsorily admitted patients and 91% for voluntarily admitted patients; i.e., a slightly higher refusal rate in the CA group. Information on the socio-demographic data for patients who were not included was not available. The inclusion of compulsorily admitted patients in a study may be considered an ethical problem, as this may be perceived as a context lacking “freedom of choice”. However, similar and low rates of refusal in both groups were observed.

The main feature of the project, the follow-up study was conducted at 6 months after discharge from treatment and included 123 patients (61% of baseline sample). However, different numbers of patients are reported at follow-up throughout the 3 published papers included in this thesis. The paper specific attrition is due to non-responders in the follow-up (N=79) as well as some item-missing data on the different dependent variables. Attrition analysis for the follow-up sample versus those lost to follow-up is listed below (table 10, next page).

None of the variables showed significant differences between those retained and lost to follow-up, except type of admission. The latter was due to limitations in funding and the large geographical uptake area; compulsorily admitted patients were prioritized for follow-up (78% CA patients versus 53% VA patients were included) because they were less represented numerically in the sample at baseline. Thus, the higher loss to follow-up in the voluntary admission group was mainly caused by administrative and logistical reasons. The attrition is therefore not likely due to a specific selection pattern, for example caused by differences in psychopathology, but considered “missing at random”.

The clinician- rated interview (at follow-up) required up to 90 minutes to complete. In some cases, patients reported fatigue and concentration difficulties after the completion of it and were unable or unwilling to proceed with the self-reported questionnaires after the initial interview. This resulted in 26 participants with missing data on the mental distress variable. Furthermore, due to administrative issues, 5 participants had missing data on the quality of life variable. Overall, this may suggest lower inclusion rates at follow-up among the “worst off” follow-up participants, and some follow-up bias, favouring those with better functioning, cannot be ruled out.

Table 10 Attrition analysis for the follow-up sample versus those lost to 6 months follow-up*

Variables	All patients, N = 202	Follow-up sample, N = 123	Lost to follow-up, N=79	p-value attrition analysis
Mean age, years	30.0 (±8.9)	30.4 (±9.8)	29.6 (±9.2)	0.561
Female	68 (34)	47 (38)	21 (27)	0.091
Education, years	10.8 (±1.9)	10.8 (±2.1)	10.8 (±1.8)	0.945
Relationship status, single	136 (69) ^a	84 (69) ^b	52 (66)	0.780
Severity scores:				
Injection use	105 (54) ^c	71(60) ^d	36 (46)	0.076
Duration of most problematic substance use	11.1 (±7.6)	11.6 (±7.6)	10.4 (±7.5)	0.291
Suicidal attempts – lifetime prevalence	94 (47)	60 (51) ^e	34 (43)	0.472
SCL-90-R GSI, mean (SD)	1.2 (±0.70)	1.2 (±0.74)	1.2 (±0.62)	0.751
Time in treatment, days	57 (26)	58 (26)	55 (26)	0.344
Compulsory admission	65 (32)	51 (41)	14 (18)	0.001

*Values represent the numbers of patients (%) or mean ±SD); in some cases, the total number of patients changed, as follows: ^aN = 198; ^bN = 121; ^cN = 195; ^dN = 119; ^eN=117

To summarize, the SUD sample presented is considered fairly representative for voluntarily and compulsorily admitted patients on intermediate long term SUD treatment centres in Norway, and if there is a selection bias represented, it is likely in the direction of underestimations of the symptom burden in the presented findings.

4.3 Information bias

Information bias is a systematic error that can occur when information about or from the study subjects is erroneously collected or recorded (164). A multitude of factors

related to the quality of measurement might lead to measurement errors and therefore influencing the reliability of the findings. Moreover, as with all multicenter studies, data collection from different treatment sites may vary in ways that are difficult to control.

Using questionnaires or scales that have been validated and found reliable in previous research is the norm (165). The data collected for this study came primarily from such instruments. The content validity of those instruments was emphasized by following the procedures described in the methods section (see chapter 2), and, therefore supporting the validity of the outcomes. The structured interviews and the questionnaires used in this study focus on different periods of time in respect to the outcomes measured. They were undertaken by trained and certified staff members and upon project start they received additional training in order to ensure good and comparable quality data. However, as part of data cleaning it was discovered that at baseline, one member of the project's staff had recorded substance use at baseline the last 30-days before the interview instead of 30-days prior to admission on the treatment ward as was described in the project's procedure. This represented 16% of patients interviewed. This error was observed after data collection and the project committee therefore decided that the EuropASI composite scores from baseline data could not be used, as this score relies on the data collected in the "previous 30-day window. Consequently, other severity variables had to be used for analyses, i.e., injection use and years of using most problematic substance were available in the dataset. Although not "optimal", the use of these alternative variables was regarded as satisfactory because such variables have been used as proxy for substance use severity in previous research (166).

Overall, the main outcomes from the three domains investigated in this study were collected by reliable and validated measurement tools and, data quality investigations were performed and resulted in identification of a weak point in the dataset that was handled appropriately. Therefore it is considered that, the levels of information bias pertaining to the included variables in the analyses are low.

4.4 Confounding

A simple definition of confounding would be the confusion, or mixing, of effects; such that the observed associations between dependent and independent variables may be better explained by a variable that was not examined or asked for (164). As a result, the distortion caused by a confounding factor can lead to over- or underestimation of an effect depending of the association between these and the “unmeasured factor”. Confounding can, to some extent, be handled through a well-designed project and data collection including a systematic analytic approach with stratification and/or multivariate analyses (164). Thus, in order to minimize the potential confounding effects the analytic process was approached in a systematic manner, including variables primarily known as potential relevant factors from previous literature. Moreover, explorative bivariate analyses were undertaken and variables that seemed to have some influence on the dependent variable (p -value < 0.2), were retained in the multivariate analysis.

One could argue that the inferior outcomes for CA patients compared to those of VA`s might be explained by the use of coercion or by the lack of motivation to change, and that one should control for perceived coercion or patient motivation. This was partly undertaken in a separate published paper by Opsal et al. (73). Her findings showed that patients admitted voluntarily and those admitted compulsory mainly experienced similar levels of perceived coercion, despite the different legal statuses of these groups upon admission to the hospital. Also voluntary admitted patients experience coercion in form of threats or ultimatums initiated by family members, friends or employer in order to motivate the persons with SUDs to enter treatment (84, 167).

The study collected a comprehensive set of variables, and it could have been argued that more of these variables were relevant for the analyses. For example, the EuropASI consists of a number of additional socio-demographic variables, such as living arrangements and source of incomes at follow-up. Such variables might have confounded the findings presented in the papers as severe forms of SUDs are often associated with social dysfunction. However, due to a relatively small number of included participants at follow-up, statistical power was too low to include covariates in large numbers and strict priorities had to be made.

Additionally; the coding of living arrangements and source of incomes variables in the EuropASI, include ambiguous and numerous options, and were omitted for those reasons. The EuropASI has a choice for “no stable living arrangement” in its living arrangements variable, but this variable is a multi-choice variable that also contain options that might as well be deemed as “unstable”; for example living with other family & friends and living in controlled environment. Similarly, there is no obvious variable to account for stability in terms of income. One could for example use, a dichotomized “income by own work: yes/no» variable, but this is a very broad term, and does not separate between sporadic work and full time. Similarly, a large proportion of patients in this population will typically report zero working days in the last 30 days, making the use of a continuous “working days” variable challenging analytically. Thus, we decided to use none of these variables in the original analyses. During the current revision, two such variables have nonetheless been tried out and presented as additional analyses (see page 50). However, the impact of the additional variables on the outcomes was low in the multivariate model except that income based on own work was an additional variable associated with changes in QoL. However that particular variable included only 3 individuals (CA) who reported own income illustrating the critical issue with statistical power, as viewed by the wide CIs for this variable.

Based on previous literature and examination of the dataset for relevant variables to include in multivariate analyses, there is no reason to believe that major confounders that could have impacted the results have been left out. Overall, the models presented originally, fairly well represent the outcomes from the project, also after controlling for potential additional confounders.

4.5 External validity

The extent to which a study`s results can be generalized to similar patients or extended to other target populations reflects the external validity (165). Before generalizing the findings reported in the papers included in this thesis, it is important to acknowledge that differences might exist between the cohort studied and the corresponding clinical drug using populations in other regions or countries. There are differences between countries regarding the legal, administrative and medical frameworks, and therefore there are likely to be different selection mechanisms into

treatment. For compulsory admissions in particular, there may be considerable variation across settings and regions with different laws.

For this study the population was a specific SUD sample. While the voluntary patient population was drawn mainly from the South-East of Norway both urban and suburban areas, the compulsory group of patients came from all over the country, although primarily from the same region as the voluntary admitted patients. Findings as presented may still be of relevance in settings outside of Norway with similar substance use patterns and legislations.

Furthermore, the 65 compulsorily admitted patients came from three different locations, and represented 22% of all compulsorily admitted patients nationally in treatment pursuant to NMHCA between 2009 and 2011 in Norway (168, 169). There was no selection to preferred institutions as a “choice of hospital” was not offered to this group of patients. We have no reason to believe that the CA patients included were different than similar groups from other parts of Norway. Generally it is expected that point estimates of prevalence are less generalizable across time and setting compared with estimations of associations. The latter are considered as more robust findings that will have stronger external validity.

An example of estimations of association in this study is the association between ongoing drug use at follow-up and higher levels of reported mental distress. Point estimates, such as the mean score of mental distress in this particular sample, will be less generalizable.

To summarize, the associations presented in this thesis are considered relatively robust, as the overall impression is that no major known mechanism of selection bias, information bias, or confounding have severely impacted the results.

4.6 Strengths

No other Norwegian study has assessed the outcomes and prognosis in patients with substance use disorders from admission to a 6 months follow-up, in a way which allowed some comparison between patients undergoing voluntary and compulsory admission to treatment. The study is also among the few that has examined changes in mental distress and quality of life following inpatient treatment, which we

considered to be very relevant given the chronic nature of SUD. The study had a moderately large sample size with a high inclusion rate as well as a fairly good follow-up rate. Standardized and established instruments were used in the study and this supports the reliability of the findings. When low data quality was observed in some variables (i.e., EuropASI composite scores at baseline), replacement variables were used in the analyses. By obtaining longitudinal data on a group of compulsorily admitted patients who were discharged from treatment and followed up at 6 months, our study has helped fill some knowledge gaps regarding longer term outcomes following SUD treatment. Furthermore, although our study did not use a randomized design, it provides an opportunity for assessing the value of treatment for both groups of included patients.

5.0 Discussion of results

This thesis explored changes and duration of changes in substance use related outcomes, level of mental distress and quality of life outcomes at 6 months after discharge and investigated factors associated with these changes for both groups of patients. The thesis` findings showed modest improvements in QoL and substance-use related outcomes at 6 months following inpatient treatment for both groups of patients. Furthermore, we found that inpatient treatment reduced mental distress for both CA and VA patients. However, CA patients` level of mental distress which at baseline was lower compared to VA patients returned to levels similar to pre-treatment at 6 months follow-up whereas VA patients maintained their improvement.

As it has been highlighted previously, a gradual deterioration is the expected outcome in a group of persons with severe SUD burdens and who in fact were considered to take drugs in life-threatening ways prior to treatment (as for CA patients). Thus, in this perspective even a modest improvement or even a steady level of symptom burden may be considered a beneficial outcome of treatment compared with the grave alternatives expected from no treatment. Overall, the study`s findings add to the previous evidence of limited but beneficial outcomes of compulsory treatment in achieving long-term improvements for patients with severe SUDs (94).

5.1. Examining outcomes and prognosis of inpatient treatment from admission to a 6 months follow-up

Our findings showed that the majority of study`s cohort (54%) approaching inpatient treatment were engaged in injecting behavior prior to baseline treatment, and with many years of drug use experience, suggesting a high SUD burden. Moreover, they had mental distress levels above the clinical cut-off at baseline and a seriously impaired QoL. The severely impaired QoL at baseline was associated with high mental distress but not with the severity of substance use. This corroborates with an analysis of incoming patients with SUD in Norway showing that physical, mental and social well-being measures were of more consequence to QoL than SUD-specific indicators (170).

At 6 months follow-up, the frequency of preferred substance use, injection use, and QoL showed positive, although modest results for both CA and VA patients, when comparing with baseline. In terms of mental distress, the compulsory admitted group returned to the levels observed prior to treatment, but the voluntary admitted group retained the improvement achieved with treatment. Although abstinence at follow-up was not a predictor for large improvements in QoL, its absence was the sole predictive factor of negative change in mental distress. Our findings are therefore in accordance with other studies which indicate that: although abstinence from substance usage is important, rehabilitation should be seen as a more complex process than simply an altered pattern of substance use (124, 171).

No standard formalized aftercare service was routinely provided by the wards themselves upon discharge, this applied to both CA and VA patients, but individual aftercare plans were made according to clinical needs in cooperation with primary care services or with social services. Currently, according to the Norwegian Municipal Health Care Act, it is not possible to make engagement in aftercare services mandatory for these patients. This treatment phase is also preferably voluntary by nature. Our additional results (see page 52) suggest that the degree of engagement with the health and care system during the 6 months follow-up was approximately similar for both groups.

Assuming that the 6 months follow-up which both groups were exposed to contained “real” and similar options to choose between regarding engagement with health and care system it may be argued that the CA patients - a patient group with high degree of treatment reluctance as they refused treatment even when necessary for their survival - might require a specific care pathway; they may need for example, extra support to build motivation toward change during the inpatient stay and as part of aftercare. Furthermore, patients should be encouraged to obtain abstinence-oriented support to maximize their chances of obtaining a successful recovery among sober peers (124).

In Norway, the government’s aim to increase treatment participation of patients with severe SUD and in particular, compulsorily admitted patients has lately been highlighted (62). Accordingly, the Norwegian Ministry of Health intends with the new guideline (released during 2017) to improve the provision and the effectiveness of

aftercare services and reduce inequality in provision for compulsorily admitted patients. The goal is a better collaboration between the specialized services and primary care services or social services with an emphasis on integrated modalities such as an individual care plan and a crisis plan.

5.2 Examining substance-use related outcomes following inpatient treatment

Abstinence from all substances during the previous 30 days was reported by 50% of voluntarily admitted patient at 6 months follow-up. With this observation, our findings replicated earlier results showing abstinence rates at follow-up in the range 42-67% at 5 and 6 months follow-up respectively (172, 173). These studies have comparable attrition rates to our study. However, the study with 42% abstinence rate investigated only patients with alcohol dependency (172). Within the compulsorily admitted group, we found that 24% of patients reported abstinence at follow-up. This finding is similar to reports from Sweden: Lindahl et al. found that 26% of compulsorily admitted patients reported abstinence at 6 months follow-up in a study which is also based on treatment pursuant to social health care acts (95). In that study, there were significant difference between those who were given case management based aftercare (46% abstinence) compared to those who received treatment as usual (no formal aftercare; 14% abstinence).

In our study 53% in the voluntary group and 58% in the compulsory group had been involved with SUD treatment (of these, most commonly inpatient treatment) for all days the last 30 days before the follow-up. In paper 2 this was termed “treatment involvement” in accordance to the intention of the law that recommends further, voluntary participation in community-based services following compulsory treatment. Furthermore, this was positively associated with achieving abstinence at follow-up along with non-injection behavior and voluntary treatment modality. However, one could argue that “truly” abstinent participants were only those who had the possibility to use substances but managed to refrain from doing so. Thus, upon the current revision we created a new dependent variable, i.e. voluntary abstinence as reported abstinence in a non-controlled environment (see results chapter, page 50) and examined if the original findings changed.

Subsequently, fewer patients reported abstinence when the results were interpreted in this conservative manner, i.e. 13% of CA patients and 35% of VA patients. For CA patients, this is more in line with the treatment as usual group (no formal aftercare) presented in the Swedish study. However, according to this new multivariate analysis model, compulsory treatment modality was no longer a negative predictor for abstinence at follow-up as only the non-injection drug use variable explained the abstinence at follow-up. This implies a severity of SUD dimension to be present in explaining long-term outcomes. Although the abstinence rate in the CA group was numerically low, one could nevertheless interpret this revised model in a slightly better light. In other words, the most important predictor for abstinence at follow-up was not whether patients were treated voluntary or compulsory, but the severity of SUD (injection use) regardless of treatment modality.

Severity of SUD has been shown to be associated with route of administration, i.e. injection as well as type of drug (174). Injection use is often associated with a more severe SUD and is a well-established risk factor for overdose (175). Conversely, lower injection frequency before admission has been associated with twofold increases in the likelihood of having favourable follow-up outcomes on illicit drug use (176). However, in more homogenous samples with only heroin users, as in a study investigating the 12 month outcomes for heroin dependence, the route of admission was not a predictor of probable outcome (177). Our study, with a mixed SUD population, regarded injection use as a proxy variable for substance use severity, and showed that lower severity at baseline (non-injection behaviour prior to treatment) was positively associated with achieving abstinence at follow-up. In terms of frequency of substance use and injection use, significantly more voluntary than compulsory patients reported improved outcomes, in line with the observation that compulsorily admitted patients had more severe SUD at baseline. Studies from the USA have shown better outcomes for compulsorily admitted patients, possibly because of better retention and hence longer periods in a treatment environment.

In summary, our findings on substance use outcomes for voluntarily admitted patients corroborate with current findings in the field. For compulsorily admitted patients our findings are somewhat modest and more in line with Swedish studies, which are the most relevant for us to compare with.

5.3 Examining changes in mental distress following inpatient treatment

The study's findings showed high levels of mental distress at baseline. Likewise, previous studies have shown that patients with SUDs experienced high levels of mental distress compared to general populations (178). The voluntarily admitted group, in particular, had a higher burden of mental distress than the compulsorily admitted group. At the end of treatment, the majority of patients (67%) had reduced their mental distress scores to below the clinical cut-off for pathology, with a similar score in both groups. Previous studies have shown significant reductions of psychiatric symptoms during inpatient treatment for SUD (116). For this study, one could argue that mental distress in part was substance-induced and therefore improved with discontinuation of substance-use or existed independent of substance-use and yet responded favorably to treatment provided. Although we do not have a clear explanation for our findings, treatment effect may be explained by the integrated treatment (a model with treatment for both the SUD and mental disorders in parallel and integrated in the same treatment), which is the recommended model of care in Norway (179). This model was provided for both groups of patients. As both groups were treated as a whole and with the same access to treatment during inpatient treatment, similar improvements for both groups regarding mental distress was in this perspective as expected. However, following treatment termination, the voluntarily admitted group maintained the improvement gained in treatment at 6 months follow-up whereas the levels of mental distress in the compulsorily admitted group at 6 months follow-up returned to pre-treatment levels. The set-back in mental distress appeared to be associated with higher rates of relapse to drug use among compulsorily admitted patients. Active drug use was the only variable that predicted increased levels of mental distress at follow-up. Achieving longer periods of abstinence may be more the exception than the rule among patients with severe SUDs and this seemed particularly true among the CA group; those with the most severe drug use problems at baseline. However, it has previously been shown that the symptoms of mental distress may spontaneously dissipate with reduction or cessation of substance use in patients who have SUDs and co-occurring psychiatric comorbidity, suggesting that the relationship between SUD and mental distress is more complex and influenced by a range of factors (180-182). Our results show that patients who reported abstinence had a marked reduction in mental distress shown

by a considerable GSI improvement of ~ 0.6. While most inpatients are likely to experience reduced symptoms of mental distress because of the controlled environment provided by inpatient settings, our findings imply that patients who actively used drugs after discharge were less likely to retain the improvement in mental distress achieved during treatment. The mental distress findings therefore seem to be closely linked to the drug taking behavior during follow-up. We have observed that the CA group with the most severe SUD at baseline also experienced the least favorable substance use behavioral outcomes at 6 months follow-up.

5.4 Examining changes in quality of life at 6 months follow-up

The majority of patients with SUD who were hospitalized had a seriously impaired QoL at treatment intake. A low QoL at baseline was associated with a high psychiatric symptom burden and, in the multivariate analysis, no association was found between the substance use severity indices at baseline and QoL. Similarly, a previous study showed that the odds of poor QoL at intake were more than quadrupled by psychological distress, and this was the strongest explanatory factor of low QoL. However, in that study, the severity of dependence was also significantly associated with impaired QoL (183). In a multi-site prospective Norwegian study including 175 treatment-seeking patients with SUDs, higher psychological burden was associated with lower QoL at baseline (184). Overall, the severity of SUD seems to be associated with low QoL in simple models, while in a more complex models, the severity of psychiatric symptom burden seems to be a more potent explanatory factor than the severity of substance use variable.

The QoL scores at baseline were not different between the voluntary and compulsory groups, although there was a higher burden of psychiatric distress in the voluntarily admitted group. This suggests that, in the compulsory admission group, the relative importance of severity factors may be different.

Following treatment, both groups of patients showed a significant, though modest improvement in QoL of similar magnitude at 6 months follow-up. These findings corroborate with current evidence that QoL will improve as a function of treatment and recovery in patients with SUD (158, 185, 186).

While traditional programmes serving inpatients with SUDs require detoxification and aims at ongoing abstinence, less focus may have been placed on other treatment goals (187). This thesis` findings showed that abstinence at follow-up was not a predictor for large improvements in QoL. This highlights the potential for positive treatment outcomes other than abstinence which patients with SUDs may perceive as “worthwhile”. These results add, therefore, to the current debate in SUD treatment, whether abstinence is a necessary precondition for improved QoL outcomes or whether any reduction in substance use leads to improved QoL (125). Only female gender was associated with a clinically relevant improvement in QoL at follow-up. This is in line with previous findings. Although not specifically addressing QoL, a study aimed at exploring gender differences in long-term recovery patterns among heroin dependent patients showed that female patients tend to have more positive recovery outcomes than male patients at 5 years following discharge from compulsory treatment (188).

5.5 Concluding remarks

The main objective of this thesis was to explore the outcomes and prognosis from admission to a 6 months follow-up in patients with SUDs, who underwent either voluntary or compulsory admission to treatment. This study`s specific aims were to examine changes and duration of these changes in substance use related outcomes, level of mental distress and quality of life outcomes for the cohort of patients as a whole following inpatients treatment discharge along with factors associated with these changes.

It has been suggested that inpatient treatment for SUDs provides positive outcomes lasting up to 9 months after discharge; treatment lasting longer is recommended for maintaining positive outcomes (189). The findings presented in this thesis suggest that specialized SUD treatment provided improvements, although modest in a range of outcomes at 6 months follow-up for patients with SUDs who underwent either compulsory or voluntary treatment.

The last couple of decades provided a limited availability of data for patients with SUDs admitted to inpatient treatment compared to outpatient treatment (190). Providing inpatient care for the patients in this study seems adequate and it is

supported by current evidence suggesting that patients with severe SUDs benefit most from inpatient treatment (191, 192).

According to the criteria of the continuing care model, successful completion of the initial phase of SUD treatment is followed by some form for continuing care, in which patients receive lower intensity outpatient care following completion. If treatment is viewed from a chronic care perspective, particularly for patients with severe SUDs such as compulsorily admitted patients who often require many cycles of inpatient treatment, it becomes important that aftercare services are seen as an integral part of the specialized SUD inpatient treatment. This raises issues about the importance of more formal aftercare provision following discharge from specialized services. A model of “case management” with its core elements - assessment, planning, linkage and monitoring, along with special focus on the aftercare period - is relevant. In Sweden, compulsorily admitted patients routinely receive individual case management (95). This may be important to ensure that gains from previous periods of treatment are not lost during follow-up (97). This approach may also better fulfill the other aims of NMHCA which focuses on obtaining maximum long-term benefits for compulsorily admitted patients in Norway (62).

The importance of acknowledging the potentially damaging consequence of coercion in order to promote a more balanced perspective in the addiction field has been highlighted (89). However, the patients included in this study were investigated in regards to the perceived coercion by Opsal et al in an article from 2016. The results showed that patients admitted voluntarily and those admitted involuntarily experienced similar levels of perceived coercion. Despite the different legal statuses of these groups upon admission to the hospital, the CA group did not report more perceived coercion, overall. Although formal causal assertions regarding the effects of coercion, particularly on CA patients` outcomes, cannot be made from the current study design, our findings align to other studies suggesting that comprehensive assessment and treatment that incorporate multi-dimensional and patient-oriented measures of disease burden can lead to improved outcomes (46).

The CA patients represent a small group of people with highly complex health and needs associated with severe SUDs. In these cases voluntary treatment was not possible (according to the NMHCA recommendations) as the CA patients were

deemed to be temporarily unable to reach an autonomous decision because of their compulsive substance use, despite its negative consequences. Providing temporary compulsory treatment may be, therefore, a sensitive tool legitimized on the basis of the Norwegian paternalistic approach which enables society to protect its citizens from harming themselves. In Norway this is a highly debated and controversial topic. For example, there has been a national action plan to reduce both compulsory admissions and compulsory treatment in psychiatry (193, 194). Conversely, political consensus has emerged supporting a more offensive and comprehensive use of the measures regulated by the NMHCA (60).

However, when the alternative to compulsory treatment is not voluntary treatment, but more likely lack of treatment (45), and instead a continuation of life-threatening drug use behaviours, we suggest that there is no need to totally dismiss paternalistic measures for patients with severe SUDs. Far from minimizing the multitude of negative consequences associated with the use of coercion and claiming that compulsory admission to treatment for patients with SUDs 'works', the thesis' findings suggest that improvements although modest are achievable. But, whether or not these practices should be intensified depends on further improvement of the quality and effectiveness of this type of treatment. Better availability of voluntary treatment, more tailored to patients' needs and perceived as a more attractive option by patients could potentially reduce the need for compulsory treatment, although this was not covered by our study.

6.0 Implications

Investing in treatment provision, with psychosocial interventions and pharmacotherapy is a cost-effective alternative to non-treatment or imprisonment (195). The findings of this thesis contribute to knowledge about SUD inpatient treatment, across a range of outcomes, for patients both voluntarily and compulsorily hospitalized and may have important implications for clinical practice. Several strategies should be considered in order to improve clinical practices.

1. The incorporation of self-reported questionnaires on symptom burden into treatment practices represents modern treatment approaches based on multi-dimensional measures of symptoms experienced by patients with SUDs. This is in accordance with the latest psychiatric manuals (138). By obtaining information on patients' degree of well-being and satisfaction with their life, during the course of treatment, treatment providers can produce more accountable evaluations leading to better insights into the burden of chronic illness in patients with SUDs. This would equip both therapists and patients with a sensible common ground to tailor the treatment and ultimately allow enhanced recovery.
2. To be more successful, treatment approaches for SUDs need to be perceived as attractive and relevant to individuals with SUDs, providing worthwhile, achievable and rewarding experiences. This requires that treatment services consider patient needs in many areas of life, and monitor changes in clinically relevant outcomes throughout the course of treatment and following treatment episodes. Screening and monitoring for psychiatric co-morbidities among patients with SUDs admitted to inpatient treatment is important for determining effective treatment options. Appropriate treatment for mental disorders in an integrated treatment model is considered important and is likely to support improvements in SUD-related outcomes. Attractive and available services may reduce the need for the use of coercive treatment options.
3. If treatment provision to patients with SUD is viewed from a chronic care perspective, the intensity of the disorder should be expected to vary with time and patients will require treatment adapted to the severity of the symptoms. They may, therefore, need multiple cycles of inpatient treatment. Ongoing and repeated

monitoring of outcomes such as QoL and mental distress can be used as markers of severity and deterioration of symptom burden and should facilitate entry into a corresponding level of care in the treatment system. A stronger and more formal aftercare provision following hospitalization should be built into the care model after intensive care periods such as inpatient hospitalization. Stand-alone interventions should not be considered adequate treatment for individuals with severe SUDs, particularly if the initial treatment episode was compulsory (196).

4. The rate of injection use at 6 months follow-up among compulsorily admitted patients was disturbing and improved only modestly compared to pre-admission levels. Harm reduction is now considered a legitimate alternative to abstinence in a broad array of health and mental health services (197). Nevertheless, long-term improvement and harm reduction for compulsorily admitted patients requires addressing the dangers of injection behaviour. This should be an explicit goal during treatment. For example, the Norwegian Ministry of Health has a campaign, SWITCH, encouraging inhalation as an alternative to injection for patients with heroin addiction (198).
5. The continued use of compulsory treatment for patients with SUD should rely on a model of care that is evidence-based and which provides benefits in terms of outcomes. The treatment should be experienced as meaningful and relevant for the patients and should be provided as part of a continuum of care in order to support long term recovery for as many patients as possible.

7.0 Future research

The papers included in this thesis focus on patients with SUDs who were admitted voluntarily or compulsorily to treatment in Norway. As highlighted throughout this dissertation, long-term follow-up and outcomes in particular are a concern for compulsorily admitted patients. Assessing the results and prognosis of inpatient treatment on the main outcomes at follow-up was in focus.

The continuing care approach in the treatment of SUD has shown promises. An important characteristic of any continuing care model is that patients receive some form of lower intensity treatment following completion of the primary phase of treatment. Evaluating treatment outcomes of lower intensity aftercare services will become increasingly important when the effectiveness of combinations of interventions is to be evaluated from a long-term perspective (196).

If the goal shifts from substance use patterns to improving QoL or reducing the mental distress, it may influence the structure and content of SUD treatment in the future. Future studies could investigate whether improved QoL and/or reduced symptoms of psychopathology before substance use itself is reduced can result in less substance use.

Studies which focus on treatment outcomes for individuals admitted to compulsory treatment pursuant to social care acts are rare. Research in this field is at an early stage. Between Norway and other countries there are many differences in treatment provision for individuals with SUD compulsorily admitted to treatment. Exploring these differences and their outcomes could help us understand which measures are most effective in preventing harm from SUDs in our societies.

In the past, there has been raised concern about the impact of patients' motivation on treatment outcomes. Generally, it is accepted that higher motivation and therapeutic alliances are advantageous to treatment outcomes although this was not considered in this thesis. In this study, treatment for the compulsorily admitted group was integrated with that of the voluntary group as soon as possible after admission. This might have contributed to the perceived normalization of the coerced experience among compulsorily admitted patients.

As a final remark, examination of treatment outcomes is particularly important for patients who are compulsorily admitted. Having compulsory treatment available in the legislation provides an ethical obligation for health authorities and law providers to engage in a continuous evaluation of the results of such interventions.

8.0 References

1. Kokkevi A, Hartgers, C. EuropASI: European adaptation of a multidimensional assessment instrument for drug and alcohol dependence. *Eur Addict Res.* 1995;1(4):208-10.
2. American Psychiatric Association (APA). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition-Text Revision (DSM-IV-R)*. Washington DC; 2000.
3. World Health Organization (WHO). *The ICD-10 Classification of Mental and Behavioural Disorders; Clinical descriptions and diagnostic guidelines*. Geneva: WHO; 2007.
4. Grant B, Goldstein R, Saha T, Chou S, Jung J, Zhang H, et al. Epidemiology of DSM-5 alcohol use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA psychiatry.* 2015;72(8):757-66.
5. Grant B, Goldstein R, Saha T, Chou S, Jung J, Zhang H, et al. Epidemiology of DSM-5 drug use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions—III. *JAMA psychiatry.* 2016;73(1):39-47.
6. Teesson M, Hall W, Lynskey M, Degenhardt L. Alcohol-and drug-use disorders in Australia: Implications of the National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry.* 2000;34(2):206-13.
7. Skurtveit S, Skogen JK, Handal M. Substance use disorders in Norway [Ruslidelser i Norge] Oslo: Folkehelseinstituttet; 2016 [Available from: <https://www.fhi.no/nettpub/hin/psykisk-helse/ruslidelser-i-norge---folkehelserap/>].
8. Saunders J, Latt N. *Diagnosis and classification of substance use disorders*. Addiction Medicine: Springer; 2010. p. 95-113.
9. Dennis ML, Scott CK, Funk R, Foss MA. The duration and correlates of addiction and treatment careers. *J Subst Abuse Treat.* 2005;28(2 SUPPL.):S51-S62.
10. McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness implications for treatment, insurance, and outcomes evaluation. *J Am Med Assoc.* 2000;284(13):1689-95.
11. Bergman B, Hoepfner B, Nelson L, Slaymaker V, Kelly J. The effects of continuing care on emerging adult outcomes following residential addiction treatment. *Drug Alcohol Depend.* 2015;153:207-14.
12. Leshner A. Addiction is a brain disease, and it matters. *Science.* 1997;278(5335):45-7.
13. Proctor S, Herschman P. The continuing care model of substance use treatment: What works, and when is “enough,” “enough?”. *Psychiatry journal.* 2014;2014.
14. DuPont RL, Seppala MD, White WL. The three missing elements in the treatment of substance use disorders: Lessons from the physician health programs. *J Addict Dis.* 2016;35(1):3-7.
15. Weisner C, Matzger H, Kaskutas L. How important is treatment? One-year outcomes of treated and untreated alcohol-dependent individuals. *Addiction.* 2003;98(7):901-11.

16. O'Brien CP, McLellan AT. Myths about the treatment of addiction. *The Lancet*. 1996;347(8996):237-40.
17. White W. Treating Substance Use Disorders with Adaptive Continuing Care. *Addiction*. 2011;106(2):453.
18. Kelly J, White W. *Addiction recovery management: Theory, research and practice*: Springer Science & Business Media; 2010.
19. McKay JR. Continuing care research: What we have learned and where we are going. *J Subst Abuse Treat*. 2009;36(2):131-45.
20. Uchtenhagen A, Carra G. Main Elements of a System Approach to Addiction Treatment. *Textbook of Addiction Treatment: international perspectives vol. 2*. Milan: Springer-Verlag Italia; 2015. p. 1211-3.
21. American Psychiatric Association (APA). *Practice Guideline for the Treatment of Patients with Substance Use Disorders, Second Edition*. 2010.
22. Pasareanu AR, Opsal A, Vederhus JK, Kristensen O, Clausen T. Quality of life improved following in-patient substance use disorder treatment. *Health and Quality of Life Outcomes*. 2015;13(1) (no pagination)(35).
23. Finney J, Moos R, Timko C. The course of treated and untreated substance use disorders: Remission and resolution, relapse and mortality. *Addictions: A comprehensive guidebook*. 1999:30-49.
24. Wood-Dauphinee S. Assessing quality of life in clinical research: from where have we come and where are we going? *J Clin Epidemiol*. 1999;52:335-63.
25. Tiffany S, Friedman L, Greenfield S, Hasin D, Jackson R. Beyond drug use: a systematic consideration of other outcomes in evaluations of treatments for substance use disorders. *Addiction*. 2012;107(4):709-18.
26. McLellan AT, McKay JR, Forman R, Cacciola J, Kemp J. Reconsidering the evaluation of addiction treatment: from retrospective follow-up to concurrent recovery monitoring. *Addiction*. 2005;100(4):447-58.
27. Hofmann SG, Asnaani A, Vonk IJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: a review of meta-analyses. *Cognit Ther Res*. 2012;36(5):427-40.
28. Mooney ME, Herin DV, Schmitz JM, Moukaddam N, Green CE, Grabowski J. Effects of oral methamphetamine on cocaine use: a randomized, double-blind, placebo-controlled trial. *Drug Alcohol Depend*. 2009;101(1):34-41.
29. Dutra L, Stathopoulou G, Basden SL, Leyro TM, Powers MB, Otto MW. A meta-analytic review of psychosocial interventions for substance use disorders. *Am J Psychiatry*. 2008;165(2):179-87.
30. European Monitoring Center for Drugs and Drug Addiction (EMCDDA). *European Drug Report: Trends and developments 2014* [Available from: http://www.emcdda.europa.eu/publications/edr/trends-developments/2014_en].

31. Storvoll E, Rossow I, Moan I, Norstrøm T-A, Scheffels J, Lauritzen G. Injuries and problems associated with alcohol, drug and tobacco use [Skader og problemer forbundet med bruk av alkohol, narkotika og tobakk]. Oslo: SIRUS; 2010. Report No.: 8271713450.
32. Skretting A, Bye EK, Vedøy TF, Lund KE. The drug situation in Norway in 2016 [Rusmidler i Norge i 2016]. Oslo; 2016.
33. The Drug Reform-Patient Rights and Amendments to the Special Health Services Act [Rusreformen - pasientrettigheter og endringer i spesialisthelsetjenesteloven], I-8/2004 (2004).
34. Nesvaag S, Lie T. The Norwegian Substance Treatment Reform: Between New Public Management and conditions for good practice. *Nordic Studies on Alcohol and Drugs*. 2010;27(6):655-66.
35. The Norwegian Medical Association. Approved specialists in Addiction medicine [Godkjente spesialister i Rus- og avhengighetsmedisin]. 2017 [Available from: http://legeforeningen.no/Emner/Andre-emner/Spesialistutdanning/Godkjente-spesialister/rus_og_avhengighetsmedisin/].
36. Waal H, Bussesund K, Clausen T, Skeie I, Håseth A, Lillevold P. The annual OMT status survey for 2016: Is quality improvement now more important than capacity development? [Er kvalitetsforbedring nå viktigere enn kapasitetsutvikling?]. Oslo: SERAF; 2016.
37. Norwegian Ministry of Health. Samdata Specialist Health Services 2015 [Samdata spesialisthelsetjenesten 2015]. Oslo; 2016.
38. Cummings NA. Inpatient versus outpatient treatment of substance abuse: Recent developments in the controversy. *Contemp Fam Ther*. 1991;13(5):507-20.
39. Harrison P, Asche SE. Comparison of substance abuse treatment outcomes for inpatients and outpatients. *J Subst Abuse Treat*. 1999;17(3):207-20.
40. Mattick RP, Jarvis, T. In-patient setting and long duration for the treatment of alcohol dependence? Out-patient care is as good. *Drug and Alcohol Review*. 1994;13(2):127-35.
41. Rychtarik RG, Connors GJ, Whitney RB, McGillicuddy NB, Fitterling JM, Wirtz PW. Treatment settings for persons with alcoholism: evidence for matching clients to inpatient versus outpatient care. *J Consult Clin Psychol*. 2000;68(2):277.
42. Miller W, Hester R. Inpatient alcoholism treatment: Who benefits? *Am Psychol*. 1986;41(7):794.
43. Fry CL, Hall, W. An ethical framework for drug epidemiology: identifying the issues. *Bull Narc*. 2002;54(1):131.
44. Nilssen E. Coercion and justice: a critical analysis of compulsory intervention towards adult substance abusers in Scandinavian social law. *International Journal of Social Welfare*. 2005;14(2):134-44.
45. Gerdner A, Berglund M. Review on compulsory care of substance misuse-Effect and quality [Översikt om tvångsvård vid missbruk-effekt och kvalitet]. Stockholm: Statens Offentliga Utredningar (SOU); 2011.

46. McCormack RP, Williams AR, Goldfrank LR, Caplan AL, Ross S, Rotrosen J. Commitment to assessment and treatment: comprehensive care for patients gravely disabled by alcohol use disorders. *The Lancet*. 2013;382(9896):995-7.
47. Israelsson M. Welfare, temperance and compulsory commitment to care for persons with substance misuse problems: A comparative study of 38 European countries. *Eur Addict Res*. 2011;17(6):329-41.
48. World Health Organization (WHO). *The world health report 2002: reducing risks, promoting healthy life*. Geneva: WHO; 2002. Report No.: 9241562072.
49. World Health Organization (WHO). *Lexicon of alcohol and drug terms 1994* [Available from: http://apps.who.int/iris/bitstream/10665/39461/1/9241544686_eng.pdf].
50. Israelsson M, Gerdner, A. Compulsory commitment to care of substance misusers—a worldwide comparative analysis of the legislation. *The Open Addiction Journal*. 2010;3(1).
51. Bright D, Martire K. Does coerced treatment of substance-using offenders lead to improvements in substance use and recidivism? A review of the treatment efficacy literature. *Aust Psychol*. 2013;48(1):69-81.
52. Lunze K, Idrisov B, Golichenko M, Kamarulzaman A. Mandatory addiction treatment for people who use drugs: global health and human rights analysis. *BMJ*. 2016;353:i2943.
53. Tannsjo T. *Coercive Care: Ethics of Choice in Health & Medicine*. London: Routledge; 2002.
54. Pritchard E, Mugavin J, Swan A. *Compulsory treatment in Australia: a discussion paper on the compulsory treatment of individuals dependent on alcohol and/or other drugs*. Australian National Council on Drugs; 2008.
55. Norwegian Ministry of Health. *Activity data for mental health care for adults and interdisciplinary specialized drug treatment [Aktivitetsdata for psykisk helsevern for voksne og tverrfaglig spesialisert rusbehandling]*. Oslo: Norsk pasientregister; 2017.
56. Act relating to the provision and implementation of mental health care, with later amendments (Mental Health Care Act) [Lov om etablering og gjennomføring av psykisk helsevern (psykisk helsevernloven)], LOV-1999-07-02-62 (2002).
57. Opsal A, Clausen T, Kristensen O, Elvik I, Joa I, Larsen TK. Involuntary hospitalization of first-episode psychosis with substance abuse during a 2-year follow-up. *Acta Psychiatr Scand*. 2011;124(3):198-204.
58. The Act of Public Health and Care Services [Lov om kommunale helse- og omsorgstjenester m.m. (helse- og omsorgstjenesteloven)]. LOV 2011-06-24-30 (2011).
59. Lundeberg I, Mjåland K, Søvig K. *Coercion in the field of substance abuse - Rules, practices and experiences with coercion [Tvang i rusfeltet - Regelverk, praksis og erfaringer med tvang]*: Gyldendal Juridisk; 2014.
60. Lundeberg I, Mjåland K, Nilssen E, Søvig K, Ravneberg B. *Compulsory intervention of substance and alcohol abusers. Evaluation of the Social Service Act §§ 6-2, 6-2a og 6-3 [Tvang overfor rusmiddelavhengige. Evaluering av Lov om sosiale tjenester §§ 6-2, 6-2a og 6-3]*. Bergen Uni Rokkasenter; 2010.

61. Regulations on rights and use of coercion during stay at the institution for the treatment, care and rehabilitation of people with substance abuse problems [Forskrift om rettigheter og bruk av tvang under opphold i institusjon for behandling, omsorg og rehabilitering av personer med rusmiddelproblemer] FOR-2016-08-26-1003 (2016).
62. Norwegian Ministry of Health. Guide to coercive measures against people with substance abuse problems - according to the Health and Care Services Act, Chapter 10 [Veileder om tvangstiltak overfor personer med rusmiddelproblemer-etter helse- og omsorgstjenesteloven kapittel 10]. Oslo. 2016.
63. Child Welfare Services Act [Lov om barneverntjenester (barnevernloven)], LOV-2017-12-19-122 (2017).
64. Iversen K, Høyer G, Sexton H. Rates for civil commitment to psychiatric hospitals in Norway. Are registry data accurate? *Nordic journal of psychiatry*. 2009;63(4):301-7.
65. Nilssen E. Politics, profession and law: The legal development of compulsory intervention towards substance abusers in Scandinavian social law. *Scandinavian Political Studies*. 2007;30(1):20-37.
66. Ministry of Social Affairs and Integration. Detaining of drug users in treatment [Bekendtgørelse af lov om tilbageholdelse af stomisbrugere i behandling] 2014 [Available from: <http://www.socialjura.dk/content-storage/regler/2017/vejil-10327-af-1412-2017/#c116449>].
67. Ministry of Social Affairs and Health. Social Welfare Act. Helsinki. 2014 [Available from: <http://www.finlex.fi/fi/laki/alkup/2014/20141308>].
68. National Board of Institutional Care [Statens Institutions Styrelse (SiS)]. SIS i korthet 2015 Stockholm.2016 [Available from: <http://www.stat-inst.se/globalassets/arlig-statistik/sis-i-korthet-2015.pdf>].
69. Palm J, Stenius K. Sweden: integrated compulsory treatment. *Eur Addict Res*. 2002;8(2):69-77.
70. Kristiansen J, Modig I. This is Norway in 2016. What the numbers tell [Dette er Norge 2016. Hva tallene forteller]. Oslo: Statistisk sentralbyrå; 2016.
71. Johansson T. Population statistics [Befolkningsstatistik 2016]. Stockholm: Statistiska centralbyrån; 2016.
72. Law on Compulsory Care for Substance Abusers [Lag (1988:870) om vård av missbrukare i vissa fall], 1988-06-14 [<https://lagen.nu/1988:870#P20>]
73. Opsal A, Kristensen O, Larsen TK, Syversen G, Rudshaug EB, Gerdner A. Factors associated with involuntary admissions among patients with substance use disorders and comorbidity: a cross-sectional study. *BMC Health Serv Res*. 2013;13:57.
74. Statens offentliga utredningar (SOU). Compulsion and change: legal security, care content and aftercare. Report of the LVM investigation [Tvång och förändring: Rätts-säkerhet, vårdens innehåll och eftervård. Betänkande av LVM-utredningen]. Stockholm: SOU; 2004.
75. Wellington H, French R, Shaw K. Severe Substance Dependence Treatment Act 2010. Melbourne: DLA Piper; 2015.

76. Merikangas K, McClair V. Epidemiology of substance use disorders. *Hum Genet.* 2012;131(6):779-89.
77. Kopak A, Hoffmann N, Proctor S. Key Risk Factors for Relapse and Rearrest Among Substance Use Treatment Patients Involved in the Criminal Justice System. *American Journal of Criminal Justice.* 2016;41(1):14-30.
78. Bhati AS, Roman JK. Simulated evidence on the prospects of treating more drug-involved offenders. *Journal of Experimental Criminology.* 2010;6(1):1-33.
79. Kopak A, Hoffmann N, Proctor S. Pathways to rearrest among court mandated female substance use treatment patients. *The American Journal on Addictions.* 2015;24(6):495-8.
80. Klag S, O'Callaghan F, Creed P. The use of legal coercion in the treatment of substance abusers: an overview and critical analysis of thirty years of research. *Subst Use Misuse.* 2005;40(12):1777-95.
81. U.S. Federal Advisory Committee. Methamphetamine Interagency Task Force: Final Report. Washington, DC: National Institute of Justice; 2000.
82. Copeland J, Maxwell J. Cannabis treatment outcomes among legally coerced and non-coerced adults. *BMC Public Health.* 2007;7(1):111.
83. Caplan A. Ethical issues surrounding forced, mandated, or coerced treatment. *J Subst Abuse Treat.* 2006;31(2):117-20.
84. Wild TC. Social control and coercion in addiction treatment: towards evidence-based policy and practice. *Addiction.* 2006;101(1):40-9.
85. Giacomini M. Interdisciplinarity in health services research: dreams and nightmares, maladies and remedies. *J Health Serv Res Policy.* 2004;9(3):177-83.
86. Brecht M, Greenwell L, Von Mayrhauser C, Anglin M. Coerced treatment for methamphetamine abuse: Differential patient characteristics and outcomes. *The American journal of drug and alcohol abuse.* 2005;31(2):337-56.
87. Broadstock M, Brinson D, Weston A. The effectiveness of compulsory, residential treatment of chronic alcohol or drug addiction in non-offenders. Canterbury: Health Services Assessment Collaboration (HSAC), University of Canterbury; 2008.
88. Wild TC, Roberts AB, Cooper EL. Compulsory substance abuse treatment: An overview of recent findings and issues. *Eur Addict Res.* 2002;8(2):84-93.
89. Stevens A, Berto D, Frick U, Hunt N, Kerschl V, McSweeney T, et al. Quasi-compulsory treatment of drug dependent offenders: An international literature review. *Subst Use Misuse.* 2005;40(3):269-83.
90. Werb D, Kamarulzaman A, Meacham M, Rafful C, Fischer B, Strathdee S, et al. The effectiveness of compulsory drug treatment: A systematic review. *International Journal of Drug Policy.* 2016;28:1-9.

91. Kelly J, Finney JW, Moos R. Substance use disorder patients who are mandated to treatment: characteristics, treatment process, and 1- and 5-year outcomes. *J Subst Abuse Treat.* 2005;28(3):213-23.
92. Sweeney TJ, Strolla MP, Myers DP. Civil commitment for substance use disorder patients under the Florida Marchman Act: demographics and outcomes in the private clinical setting. *J Addict Dis.* 2013;32(1):108-15.
93. Lowinson JH. Substance abuse: A comprehensive textbook. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2005.
94. Hall W, Farrell M, Carter A. Compulsory treatment of addiction in the patient's best interests: more rigorous evaluations are essential. *Drug and alcohol review.* 2014;33(3):268-71.
95. Lindahl M, Berglund M, Tonnesen H. Case management in aftercare of involuntarily committed patients with substance abuse. A randomized trial. *Nordic Journal of Psychiatry.* 2013;67(3):197-203.
96. Gerdner A. Outcome of LVM care - Overview and synthesis of current studies [Utfall av LVM-vård - Översikt och syntes av hittillsvarande studier]. *Tvång och förändring.* Stockholm: Socialdepartementet & Fritzes Förlag 2004. p. 303-414.
97. Lindahl M, Ojehagen A, Berglund M. Commitment to coercive care in relation to substance abuse reports to the social services. A 2-year follow-up. *Nordic Journal of Psychiatry.* 2010;64(6):372-6.
98. Welle-Strand G. Detention of substance abusers [Compulsory treatment of drug addicts]. Section 6-2, 6-2a and 6.3 in the Social Service Act. An evaluation from Emergency ward, a detoxification and evaluation clinic in Oslo between 01.01.94 and 30.04.98. Oslo: Ullevål Akuttinstitusjon, Oslo Kommune Rusmildeletaten; 1998.
99. Olsson T, Fridell M. Women with comorbid substance dependence and psychiatric disorders in Sweden: a longitudinal study of hospital care utilization and costs. *BMC Health Serv Res.* 2015;15(1):1.
100. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet.* 2013;382(9904):1575-86.
101. Lynskey MT, Strang, J. The global burden of drug use and mental disorders. *The Lancet.* 2013;382(9904):1540-2.
102. Stinson FS, Grant BF, Dawson DA, Ruan WJ, Huang B, Saha T. Comorbidity between DSM-IV alcohol and specific drug use disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Drug Alcohol Depend.* 2005;80(1):105-16.
103. Flynn P, Brown B. Co-occurring disorders in substance abuse treatment: Issues and prospects. *J Subst Abuse Treat.* 2008;34(1):36-47.
104. Hall W, Teesson M, Lynskey M, Degenhardt L. The 12-month prevalence of substance use and ICD-10 substance use disorders in Australian adults: Findings from the National Survey of Mental Health and Well-Being. *Addiction.* 1999;94(10):1541-50.

105. Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62(6):617-27.
106. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, et al. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatrica Scandinavica, Supplementum*. 2004(420):21-7.
107. Jane-Llopis E, Matytsina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug and alcohol review*. 2006;25(6):515-36.
108. Larsson G, Wiklund H, Sandlund M, Grönwall L. Better efforts in addiction and addiction: the individual, the knowledge and the responsibility (Bättre insatser vid missbruk och beroende: individen, kunskapen och ansvaret). Stockholm: Statens Offentliga Utredningar; 2011.
109. Norwegian Ministry of Health. Activity data for mental health care for adults and interdisciplinary specialized drug treatment [Aktivitetsdata for psykisk helsevern for voksne og tverrfaglig spesialisert rusbehandling]. Norsk Pasientregister 2015.
110. Gilman S, Abraham H. A longitudinal study of the order of onset of alcohol dependence and major depression. *Drug Alcohol Depend*. 2001;63(3):277-86.
111. Conway KP, Compton W, Stinson FS, Grant BF. Lifetime comorbidity of DSM-IV mood and anxiety disorders and specific drug use disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *The Journal of clinical psychiatry*. 2006;67(2):247-58.
112. Kavanagh DJ, Connolly JM. Interventions for co-occurring addictive and other mental disorders (AMDs). *Addict Behav*. 2009;34(10):838-45.
113. Olsen L, Mortensen E, Bech P. Mental distress in the Danish general population. *Acta Psychiatr Scand*. 2006;113(6):477-84.
114. Nordfjaern T. Prevalence of substance use and mental distress among patients on waiting lists for substance use disorder treatment. *J Psychoactive Drugs*. 2013;45(3):233-40.
115. Teesson M, Slade T, Mills K. Comorbidity in Australia: findings of the 2007 National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry*. 2009;43(7):606-14.
116. Hoxmark E, Benum V, Friberg O, Wynn R. Reduction in mental distress among substance users receiving inpatient treatment. *International Journal of Mental Health Systems*. 2010;4 (no pagination)(30).
117. Wynn R. Prior psychotic episodes among patients in a substance abuse clinic. *Journal of Substance Use*. 2007;12(2):127-32.
118. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *The Lancet*. 2012;379(9810):55-70.
119. Dennis M, Scott CK. Managing addiction as a chronic condition. *Addict Sci Clin Pract*. 2007;4(1):45.

120. Humphreys K, Moos RH, Finney JW. Two pathways out of drinking problems without professional treatment. *Addict Behav.* 1995;20(4):427-41.
121. Hser YI, Longshore D, Anglin MD. The life course perspective on drug use: A conceptual framework for understanding drug use trajectories. *Evaluation Review.* 2007;31(6):515-47.
122. Estwing FC. Differences in what quality-of-life instruments measure. *JNCI: Journal of the National Cancer Institute.* 2007(37).
123. Ventegodt S, Merrick J, Andersen N. Measurement of quality of life III. From the IQOL theory to the global, generic SEQOL questionnaire. *The Scientific World Journal.* 2003;3:972-91.
124. Vederhus J, Birkeland B, Clausen T. Perceived quality of life, 6 months after detoxification: Is abstinence a modifying factor? *Qual Life Res.* 2016:1-8.
125. Laudet AB. The case for considering quality of life in addiction research and clinical practice. *Addict Sci Clin Pract.* 2011;6(1):44-55.
126. Revicki DA, Osoba D, Fairclough D, Barofsky I, Berzon R, Leidy N, et al. Recommendations on health-related quality of life research to support labeling and promotional claims in the United States. *Qual Life Res.* 2000;9(8):887-900.
127. Laudet AB, Stanick V, Sands B. What could the program have done differently? A qualitative examination of reasons for leaving outpatient treatment. *J Subst Abuse Treat.* 2009;37(2):182-90.
128. Weiss L, Gass J, Egan JE, Ompad DC, Trezza C, Vlahov D. Understanding prolonged cessation from heroin use: findings from a community-based sample. *J Psychoactive Drugs.* 2014;46(2):123-32.
129. McLellan AT, Starrels JL, Tai B, Gordon AJ, Brown R, Ghitza U, et al. Can substance use disorders be managed using the chronic care model? Review and recommendations from a NIDA consensus group. *Public Health Rev.* 2013;35(2):8.
130. Morrissey J, Jackson E, Ellis A, Amaro H, Brown VB, Najavits L. Twelve-month outcomes of trauma-informed interventions for women with co-occurring disorders. *Psychiatr Serv.* 2005;56(10):1213-22.
131. Kushner MG, Donahue C, Sletten S, Thuras P, Abrams K, Peterson J, et al. Cognitive behavioral treatment of comorbid anxiety disorder in alcoholism treatment patients: Presentation of a prototype program and future directions. *Journal of Mental Health.* 2006;15(6):697-707.
132. Culbreth JR. Substance abuse counselors with and without a personal history of chemical dependency: A review of the literature. *Alcoholism Treatment Quarterly.* 2000;18(2):67-82.
133. Walker MA. Program characteristics and the length of time clients are in substance abuse treatment. *J Behav Health Serv Res.* 2009;36(3):330-43.
134. Kaskutas LA, Borkman TJ, Laudet A, Ritter LA, Witbrodt J, Subbaraman MS, et al. Elements that define recovery: the experiential perspective. *Journal of Studies on Alcohol & Drugs.* 2014;75(6):999-1010.
135. Miller N, Hoffmann N. Addictions treatment outcomes. *Alcoholism Treatment Quarterly.* 1994;12(2):41-55.

136. Sannibale C, Hurkett P, Boscche E, O'Connor D, Zador D, Capus C, et al. Aftercare attendance and post-treatment functioning of severely substance dependent residential treatment clients. *Drug and Alcohol Review*. 2003;22(2):181-90.
137. Hubbard R, Craddock S, Anderson J. Overview of 5-year followup outcomes in the drug abuse treatment outcome studies (DATOS). *J Subst Abuse Treat*. 2003;25(3):125-34.
138. American Psychiatric Association (APA). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. Washington DC; 2013.
139. Lydecker KP, Tate SR, Cummins KM, McQuaid J, Granholm E, Brown SA. Clinical Outcomes of an Integrated Treatment for Depression and Substance Use Disorders. *Psychol Addict Behav*. 2010;24(3):453-65.
140. Larsson-Kronberg M, Öjehagen A, Berglund M. Experiences of coercion during investigation and treatment. *Int J Law Psychiatry*. 2005;28(6):613-21.
141. Sheehan D, Lecrubier Y, Sheehan K, Amorim P, Janavs J, Weiller E. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59 22-33.
142. McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, et al. The Fifth Edition of the Addiction Severity Index. *J Subst Abuse Treat*. 1992;9(3):199-213.
143. Derogatis L. *Symptom Checklist-90-R: Administration, Scoring, and Procedures Manual (3rd ed.)*. Minneapolis, MN: NCS Pearson; 1994.
144. Derogatis LR, Lipman RS, Covi L. SCL-90: An outpatient psychiatric rating scale, preliminary report. *Psychol Bull*. 1973;9(1):13-28.
145. Haver B. The DSM-III diagnosis of alcohol use disorders in women: Findings from a follow-up study of 44 female alcoholics. *Acta Psychiatr Scand*. 1986;73(SUPPL. 328):22-30.
146. Barth K, Nielsen G, Havik OE, Haver B, Molstad E, Rogge H, et al. Assessment for three different forms of short-term dynamic psychotherapy. Findings from the Bergen Project. *Psychother Psychosom*. 1988;49(3-4):153-9.
147. Mehlum L, Friis S, Irion T, Johns S, Karterud S, Vaglum P, et al. Personality disorders 2-5 years after treatment: A prospective follow-up study. *Acta Psychiatr Scand*. 1991;84(1):72-7.
148. Benjamin AB, Mossman D, Graves NS, Sanders RD. Tests of a symptom checklist to screen for comorbid psychiatric disorders in alcoholism. *Compr Psychiatry*. 2006;47(3):227-33.
149. Vassend O, Lian L, Andersen HT. Norske versjoner av NEO-Personality Inventory, Symptom Checklist 90 Revised og Giessen Subjective Complaints List. Del I. *Tidsskrift for Norsk Psykologforening*. 1992.
150. Fridell M, Hesse M. Psychiatric severity and mortality in substance abusers: A 15-year follow-up of drug users. *Addict Behav*. 2006;31(4):559-65.
151. Ventegodt S, Merrick J, Andersen NJ. Quality of Life Theory I. The IQOL Theory: An Integrative Theory of the Global Quality of Life Concept. *The Scientific World Journal*. 2003;3:1030-40.

152. Lindholt JS, Ventegodt S, Henneberg EW. Development and validation of QoL5 for clinical databases. A short, global and generic questionnaire based on an integrated theory of the quality of life. *Eur J Surg*. 2002;168(2):107-13.
153. Ventegodt S, Merrick J. Lifestyle, quality of life, and health. *The Scientific World Journal*. 2003;3:811-25.
154. Ventegodt S, Kandel I, Merrick J. Quality of life and philosophy of life determines physical and mental health: status over research findings from the Quality of Life Research Center, Copenhagen, 1991-2007. *The Scientific World Journal*. 2007;7:1743-51.
155. Ventegodt S, Merrick J, Andersen NJ. Measurement of Quality of Life II. From the Philosophy of Life to Science. *The Scientific World Journal*. 2003;3:962-71.
156. Ventegodt S, Merrick J, Andersen NJ. Editorial: A new method for generic measuring of the global quality of life. *The Scientific World Journal*. 2003;3:946-9.
157. Altman DG. *Practical statistics for medical research*. London: Chapman & Hall/CRC; 1991.
158. Laudet A, Becker J, White W. Don't wanna go through that madness no more: quality of life satisfaction as predictor of sustained remission from illicit drug misuse. *Subst Use Misuse*. 2009;44(2):227-52.
159. Menard S. *Handbook of longitudinal research: Design, measurement, and analysis*: Elsevier; 2007.
160. Gossop M, Marsden J, Stewart D, Kidd T. The National Treatment Outcome Research Study (NTORS): 4–5 year follow-up results. *Addiction*. 2003;98(3):291-303.
161. Pincus T, Swearingen C, Wolfe F. Toward a multidimensional health assessment questionnaire (MDHAQ). *Arthritis Rheum*. 1999;42(10):2220-30.
162. Buhringer G, Sassen, M. Reliability and validity. *Addiction research methods*. 2010:11-25.
163. Kleinbaum DG. Epidemiologic methods: the “art” in the state of the art. *J Clin Epidemiol*. 2002;55(12):1196-200.
164. Rothman KJ, Greenland S, Lash T. *Modern epidemiology*. Third ed. Philadelphia: Lippincott Williams & Wilkins; 2008.
165. McDowell I. *Measuring health: a guide to rating scales and questionnaires*: Oxford university press; 2006.
166. Bovasso GB, Alterman AI, Cacciola JS, Cook TG. Predictive validity of the Addiction Severity Index's composite scores in the assessment of 2-year outcomes in a methadone maintenance population. *Psychol Addict Behav*. 2001;15(3):171.
167. Marlowe DB, Kirby KC, Merikle EP, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychol Addict Behav*. 2001;15(2):97-108.

168. Edland-Gryt M, Bryhni A, Skretting A, Lund M, Bye E. The drug situation in Norway in 2011 [Rusmidler i Norge 2011]. Oslo: Folkehelseinstituttet; 2011 [Available from: <https://www.fhi.no/publ/2011/rusmidler-i-norge-2011/>].
169. Edland-Gryt M, Skretting A, Lund M, Bye E. The drug situation in Norway in 2012 [Rusmidler i Norge 2012]. Oslo: Statens institutt for rusmiddelforskning (SIRUS); 2012 [Available from: <https://www.fhi.no/publ/2012/rusmidler-i-norge-2012/>].
170. Muller AE, Skurtveit S, Clausen T. Many correlates of poor quality of life among substance users entering treatment are not addiction-specific. Health and quality of life outcomes. 2016;14(1):1.
171. Foster J, Marshall E, Peters T. Application of a Quality of Life Measure, the Life Situation Survey (LSS), to Alcohol-Dependent Subjects in Relapse and Remission. Alcoholism: Clinical and Experimental Research. 2000;24(11):1687-92.
172. Engel K, Schaefer M, Stickel A, Binder H, Heinz A, Richter C. The Role of Psychological Distress in Relapse Prevention of Alcohol Addiction. Can High Scores on the SCL-90-R Predict Alcohol Relapse? Alcohol and Alcoholism 2015;51(1):27-31.
173. Hoffmann NG, Miller NS. Treatment outcomes for abstinence-based programs. Psychiatric Annals. 1992;22(8):402-8.
174. Gossop M, Griffiths P, Powis B, Strang J. Severity of dependence and route of administration of heroin, cocaine and amphetamines. Br J Addict. 1992;87(11):1527-36.
175. Domier CP, Simon SL, Rawson RA, Huber A, Ling W. A comparison of injecting and noninjecting methamphetamine users. J Psychoactive Drugs. 2000;32(2):229-32.
176. Simpson D, Joe G, Rowan-Szal G. Drug abuse treatment retention and process effects on follow-up outcomes. Drug Alcohol Depend. 1997;47(3):227-35.
177. Darke S, Ross J, Teesson M. Twelve-month outcomes for heroin dependence treatments: does route of administration matter? Drug and alcohol review. 2005;24(2):165-71.
178. Landheim A, Bakken K, Vaglum P. Impact of comorbid psychiatric disorders on the outcome of substance abusers: A six year prospective follow-up in two Norwegian counties. BMC Psychiatry. 2006;6 (no pagination)(44).
179. Norwegian Ministry of Health. National Guideline for the Treatment and Rehabilitation of Drug Disorders and Addiction [Nasjonalt faglig retningslinje for behandling og rehabilitering av rusmiddelproblemer og avhengighet]. Oslo; 2015.
180. Schuckit MA. Comorbidity between substance use disorders and psychiatric conditions. Addiction. 2006;101(s1):76-88.
181. Pettinati H, O'Brien C, Dundon W. Current status of co-occurring mood and substance use disorders: a new therapeutic target. Am J Psychiatry. 2013;170(1):23-30.
182. Kendler KS, Prescott CA, Myers J, Neale MC. The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. Arch Gen Psychiatry. 2003;60(9):929-37.

183. Lahmek P, Berlin I, Michel L, Berghout C, Meunier N, Aubin H-J. Determinants of improvement in quality of life of alcohol-dependent patients during an inpatient withdrawal programme. *Int J Med Sci.* 2009;6(4):160-7.
184. Stallvik M, Clausen, T. HRQoL and its association with clinical severity and service needs among individuals with a substance use disorder. *Journal of Substance Use.* 2017:1-7.
185. Raisch D, Campbell H, Garnand D, Jones M, Sather M, Naik R, et al. Health-related quality of life changes associated with buprenorphine treatment for opioid dependence. *Qual Life Res.* 2012;21(7):1177-83.
186. McNeese-Smith DK, Wickman M, Nyamathi A, Kehoe P, Earvolino-Ramirez M, Robertson S. Gender and ethnicity group differences among substance abuse treatment clients insured under managed care. *J Addict Nurs.* 2009;20(4):185-202.
187. Marlatt G, Blume A, Parks G. Integrating harm reduction therapy and traditional substance abuse treatment. *J Psychoactive Drugs.* 2001;33(1):13-21.
188. Haifeng J, Di L, Du Jiang SH, Zhikang C, Liming F, Min Z. Gender differences in recovery consequences among heroin dependent patients after compulsory treatment programs. *Sci Rep.* 2015;5.
189. Steiro A, Dalsbø T, Smedslund G, Hammerstrøm K, Samdal K. What is the effect of long-term treatment in the institution for addicts compared to outpatient short-term treatment? [Hva er effekten av langtidsbehandling i institusjon for rusavhengige sammenlignet med poliklinisk korttidsbehandling?]. Oslo: Kunnskapsenteret; 2010.
190. Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. Results from the 2013 national survey on drug use and health: summary of national findings. Rockville, MD: U.S. Department of Health and Human Services; 2014.
191. Finney JW, Moos RH, Wilbourne PL. Effects of treatment setting, duration, and amount on patient outcomes. 4th ed. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins; 2009.
192. Reif S, George P, Braude L, Dougherty R, Daniels A, Ghose S, et al. Residential treatment for individuals with substance use disorders: assessing the evidence. *Psychiatr Serv.* 2014;65(3):301-12.
193. Ellingstad T, Sobell L, Sobell M, Planthara P. Drug treatment outcome methodology (1993-1997): Strengths, weaknesses, and a comparison to the alcohol field. *Addict Behav.* 2002;27(3):319-30.
194. Norwegian Ministry of Health. Action plan for reduced and quality-assured use of coercion [Tiltaksplan for redusert og kvalitetssikret bruk av tvang i psykisk helsevern]. Oslo; 2006.
195. Beynon CM, Bellis MA, McVeigh J. Trends in drop out, drug free discharge and rates of re-presentation: a retrospective cohort study of drug treatment clients in the North West of England. *BMC Public Health.* 2006;6:205.
196. Clausen T. Coherent long-term treatment approaches—superior in the treatment of opioid dependence. *Addiction.* 2015;110(6):1006-7.

197. Henwood B, Padgett D, Tiderington E. Provider views of harm reduction versus abstinence policies within homeless services for dually diagnosed adults. *The journal of behavioral health services & research*. 2014;41(1):80-9.

198. Norwegian Ministry of Health. *National Overdose Strategy 2014-2017* [Nasjonal Overdosestrategi 2014-2017]. Oslo; 2017.

9.0 Errata

Paper I: In table 3 (the footnote d), the percentage about changes in the frequency of cannabis and amphetamine use represent those with 'daily or near daily use' at baseline, not those who had these as preferred substance as noted in the table.

In table 4, the odds stated in the bivariate analysis regarding the VA group was 0.31 (0.14-0.68). Accidentally, this was the OR for the opposite (CA) group. The correct OR for the VA group was 2.9 (1.2-7.0). In the multivariate analysis the correct OR is presented and the conclusions stated in the article were correct.

Paper II: The colors used to describe voluntary and compulsory admitted patients used in the Figure 1 were accidentally mixed. The correct should have been: Red color describes the CA group while blue color describes the VA group.

These errata were reported to the journal.

Papers

RESEARCH ARTICLE

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Improved drug-use patterns at 6 months post-discharge from inpatient substance use disorder treatment: results from compulsorily and voluntarily admitted patients

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Abstract

Background: Treatment services to patients with substance use disorders (SUDs), including those mandated to treatment, needs to be evaluated and evidence based. The Norwegian Municipal Health Care Act calls for mandated treatment for persons with “severe and life-threatening substance use disorder” if these individuals are not otherwise willing to be voluntarily treated and consequently risk their lives over drug use. This study aims to examine substance use-related outcomes at 6 months following inpatient treatment and to analyse factors associated with improved outcomes and abstinence.

Method: This prospective study followed 202 hospitalized patients with SUD who were admitted voluntarily (VA; $n = 137$) or compulsorily (CA; $n = 65$). The European Addiction Severity Index was used at baseline and at follow-up to assess socio-demographic and substance use variables. Regression analysis was conducted to investigate factors associated with abstinence at 6 months of follow-up.

Results: The frequency of use of a preferred substance showed marked improvement for both VA and CA patients (61 and 37 %, respectively) at follow-up. Seventy-five percent of VA patients using amphetamine reported improvement compared to 53 % of CA patients. At follow-up, the CA group continued to have a higher rate of injection use. The CA group had experienced higher rates of overdose in the past 6 months and lower abstinence rates (24 % versus 50 %) at follow-up. A lower severity of drug use at intake (non-injection drug use), voluntary treatment modality, and higher treatment involvement during follow-up all were significant factors associated with abstinence at 6 months after treatment.

Conclusion: Voluntary treatment for SUD generally yielded better outcomes; nevertheless, we also found improved outcomes for CA patients. It is important to keep in mind that in reality, the alternative to CA treatment is no treatment at all and instead a continuation of life-threatening drug use behaviours. Our observed outcomes for CA patients support the continuation of CA treatment.

Keywords: Substance use disorder, Compulsory treatment, Treatment outcome

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Background

Substance use disorder (SUD) is a chronic relapsing disorder better managed by ongoing monitoring and extended services than by acute care model treatment approaches [1, 2]. Improved life functioning and quality along with substance use reduction are increasingly recognized as appropriate measures of effective addiction treatment outcomes [3].

It is generally accepted that external pressure has an influence on treatment seeking, and a high proportion of SUD patients may not have received treatment without pressure from friends, family, or the courts, which could be considered informal coercion [4]. In many countries, formal coercion is also an option when voluntary treatment has proven unsuccessful, but the compulsory hospitalization of SUD patients has been a controversial option [5]. This controversy sometimes centres on ethical or due process issues associated with use of forced entry into treatment but also often focuses on debate about the effectiveness of such compulsory treatment because motivation for change is likely to be low among those coerced into treatment [6]. Research into the effectiveness of compulsory treatment has yielded a mixed and inconclusive pattern of results, in part because of considerable differences in contexts and regulations around it [7, 8]. In Norway, the Social Services Act of 1993 allowed compulsory admissions to the hospital for persons with severe and life-threatening substance use. In 2012, this law was replaced by the Norwegian Municipal Health Care Act, in which § 10.2 (NMHCA) sanctions involuntary interventions for non-psychotic adult patients with SUDs [9]. The Act covers an option for retention (up to 3 months) when the health of the patient is seriously at risk because of extensive, prolonged substance use and voluntary efforts have proven insufficient. Despite over 20 years of practice under these compulsory treatment acts, little is known about the outcomes for the patients, as this question has not been previously addressed.

Inpatient SUD treatment is generally an effective approach that can initiate changes in behaviour and increase motivation for a lifetime of recovery rather than a situation dominated by drug use [10]. Although most of the questions of concern for inpatient treatment have been about the duration of effects, there are calls for research that examines which subpopulations of patients benefit most from various inpatient treatment modalities [11].

Assessments of such treatment effects should not only take place at treatment completion or when patients are transferred from one treatment phase to another but also after a certain time following a completed treatment episode. Especially for compulsory admitted patients (CA), it is important to examine the outcomes at some point after the initial treatment episode has ended to investigate the “real” outcomes following treatment.

Aims

The aims of this study were to examine treatment outcomes in terms of drug use at the 6-month follow-up of inpatient SUD treatment, as follows: (1) Describe drug use and drug use patterns at the 6-month follow-up; (2) investigate changes in drug use at follow-up compared with intake to treatment, by voluntary and compulsory treatment status; and (3) analyse factors associated with abstinence and improvement in drug use at the 6-month follow-up.

Methods

Participants

A total of 326 SUD patients, either voluntarily admitted (VA) or CA, were invited to participate in this prospective study. Participants were eligible for this study if they were >18 years of age, had a SUD, could understand Norwegian, and were admitted at least 3 weeks prior to study inclusion, allowing them enough time for detoxification and stabilization before giving informed consent. According to the inclusion criteria, 228 were eligible, but 26 patients refused to participate. Of the 202 patients enrolled at baseline (65 CA and 137 VA), 123 (61 %) were interviewed at 6 months of follow-up. Because of limitations in funding and the large geographical uptake area, CA patients were prioritized for follow-up (82 % CA patients versus 59 % VA patients were included) because the CA patients were less represented in the sample at baseline. Thus, the higher loss to follow-up in the VA group was for mainly administrative and logistic reasons. The further attrition analysis showed no other differences between those who were and were not reached at follow-up in terms of demographic data, severity scores, or length of stay in the initial treatment episode.

Data collection

Recruitment for this prospective study continued consecutively between January 2009 and May 2011 from three different publicly funded treatment centres in the southeastern part of Norway. SUD patients, CA or VA, were treated together in the same mixed-gender wards. The treatment wards had multidisciplinary staff, including psychiatrists, psychologists, social workers, occupational therapists, specialized nurses, and other trained staff. The centres offered treatment for patients with primary SUD, often combined with mental disorders. Treatment included assessments of somatic and mental health along with pharmacotherapy, cognitive milieu therapy, and individual motivation enhancement. Before study inclusion, the patients were either detoxified, which was verified by negative urine tests for alcohol, opioids, central stimulants (amphetamines, methamphetamines, and cocaine), benzodiazepines, and cannabis; or they spent

a minimum of 3 weeks days in detoxification to establish baseline values not influenced by withdrawal symptoms.

No standard aftercare service was routinely provided by the wards themselves, but individual aftercare plans were made according to clinical needs in cooperation with primary care services or with social services. All patients were diagnosed based on a structured interview and examination in accordance with the International Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). Follow-up interviews were performed 6 months after discharge from the hospitals and took place between July 2009 and December 2011, which included extensive travelling for the data collection team. Because patients came from all over the country (particularly the CA group), a team of dedicated project staff attempted to contact all patients directly by phone, mail, or post. In some cases, patients were found to be in prison or in inpatient treatment institutions, and arrangements were made to meet them there.

Instruments and measure

The Mini International Neuropsychiatric Interview, version 5.0, was conducted at baseline to confirm the SUD diagnosis [12]. To assess demographics and severity of substance use variables, the most commonly used measure within addiction treatment research was used; the European Addiction Severity Index (EuropASI) [13, 14]. The EuropASI is a structured interview performed by trained and certified staff. Variables from the EuropASI used in the analyses included severity of substance use variables, such as frequency of substance use in the last 6 months (0 = never used; 1 = sometimes, but less than 2–3 times a month; 2 = 1–3 days a week; 3 = everyday use) and whether the patient had injection use or overdoses in the last 6 months. Whether patients were abstinent or not, was determined according to self-reported alcohol and drug use for the 30 days prior to the follow-up interview, i.e., the abstinent group had no alcohol or drug use during this period. The patients also disclosed their preferred substance of use (alcohol, amphetamine, cannabis, opioids, or benzodiazepines) and were assessed whether they had had suicidal attempts in their lifetime. Other variables used were type of admission to inpatient treatment (CA or VA).

The same questionnaire was used at follow-up. In addition, time in a controlled environment as defined by the EuropASI as days in jail or SUD treatment in the 30 days before follow-up was used.

Analysis and statistical methods

Continuous variables are reported as means and standard deviations. Categorical variables are reported as frequencies. Changes in frequency of the preferred substance of use at the 6-month follow-up were performed using the

matched-pairs Wilcoxon signed-rank test for the CA and VA patients separately. Thus, it was possible to decide whether the use of these substances had increased, decreased, or remained constant over time. Also changes in amphetamine and cannabis use are described because only these two single substances were reported as having been used as preferred substances by a sufficient number of patients to justify an analysis. Bivariate logistic regression was used to compare severity variables between groups at 6 months after treatment. Logistic regression was also used to examine predictors of abstinence at the follow-up. From bivariate analyses, variables with a p value < 0.2 were included in the multivariate analysis [15]. Results are presented as odds ratio (ORs) with 95 % confidence interval (CIs). P values < 0.05 were considered statistically significant. Analyses were performed with the Statistical Package for the Social Sciences software, version 21.0 (SPSS Inc., Chicago, IL, USA).

Results

The 202 participants at baseline had a mean age of 30 years, and 34 % were women (Table 1). The proportion of CA patients was 32 % (65) versus 68 % (137) VA. All patients met the ICD-10 criteria for SUD; the majority had a drug use disorder (83 %). Injection use 6 months prior to hospitalization was reported by 54 % of the participants.

Table 1 Baseline socio-demographic variables for patients included at baseline (202) and those reached at follow-up (123) [N (%) or mean (SD)]

Variables	All patients, N = 202	Follow-up sample, N = 123
Mean age, years	30.0 (8.9)	30.4 (9.8)
Female	68 (34)	47 (39)
Education, years	10.8 (1.9)	10.8 (2.1) ^a
Relationship status, single ^b	136 (69)	84 (68) ^c
Main diagnosis		
Alcohol use disorder (AUD) or AUD with co-occurring drug use disorders	34 (17)	20 (16)
Drug use disorder	168 (83)	103 (84)
Severity scores		
Injection use ^d	105 (54)	71 (60) ^e
Duration of most problematic substance use, years	11.1 (7.6)	11.6 (7.6) ^f
Suicidal attempts – lifetime prevalence ^g	94 (49)	60 (51) ^h
Treatment variables		
Time in treatment, days	57 (26)	58 (26)
Compulsorily admitted	65 (32)	51 (42)

^aN = 117; ^bN = 198; ^cN = 121; ^dN = 195; ^eN = 119; ^fN = 117; ^gN = 191; ^hN = 117

At the 6-month subsequent treatment, there was an 11 % reduction in injection use from baseline to follow-up (55 to 44 %, $p = 0.001$, Wilcoxon signed-rank test). The reductions were 10 % (from 71 to 61 %) for the CA group and 16 % (from 47 to 31 %) for the VA group.

A total of 31 CA patients (61 %) reported injecting drugs compared to 22 VA patients (31 %) (OR = 3.38, 95 % CI = 1.59–7.20, $p = 0.001$) (Table 2). Only one VA patient (1 %) reported an overdose during follow-up, compared to 11 CA patients (22 %) (OR = 19.25, 95 % CI = 2.40–154.65, $p = 0.001$). Compared to CA patients, twice as many VA patients reported total abstinence from all substances in the 30 days prior to the interview (50 % versus 24 %; OR = 0.31, 95 % CI = 0.14–0.68, $p = 0.013$).

Both groups had a significant reduction in the frequency of the preferred substance (61 % of VA patients and 37 % of CA patients) (Table 3). Amphetamine and cannabis were significantly less used in both groups at the follow-up. However, 75 % of VA patients using amphetamine reported improvement compared to 53 % of CA patients. Improvement in cannabis use was quite similar for both CA and VA patients (62 and 61 %) (Table 3).

At follow-up, 48 of 123 (39 %) participants reported having abstained from all substances during the previous 30 days. However, 19 of 36 (53 %) and 7 of 12 (58 %) in the VA and CA groups, respectively, had been in a controlled environment for the majority of the 30 days before the follow-up, which for most of them meant inpatient SUD treatment. Thus, we hereafter also refer to this variable as “treatment involvement”.

Route of drug administration at intake (injection drug use), treatment modality, and treatment involvement during follow-up were all significant factors explaining abstinence at follow-up (Table 4). In this analysis we systematically included and controlled for variables that was found to be significantly different between groups at baseline [16]. The multivariate analysis retained days in a controlled environment (OR = 1.08, 95 % CI = 1.04–1.12, $p < 0.001$), non-injection use at baseline (OR = 3.36,

95 % CI = 1.32–8.56, $p < 0.011$), and voluntary admission (OR = 3.40, 95 % CI = 1.29–8.93, $p < 0.013$) as factors positively associated with abstinence at follow-up.

Discussion

The majority of SUD patients approaching inpatient treatment engaged in injecting behaviour prior to baseline treatment and had many years of drug use experience, indicating a severe SUD level. At 6 months of follow-up, injection use showed improvement in both groups. Self-reported improvements regarding frequency of use of the “preferred substance” were observed for the majority of VA patients and more than one third of CA patients. Non-injection behaviour prior to treatment along with treatment involvement and voluntary treatment modality were positively associated with achieving abstinence at follow-up.

The SUD outcome measures (frequency of substance use, injection use, and overdoses) at 6 months of follow-up showed positive results for these SUD patients. This outcome indicates long-lasting consequences of the index treatment beyond hospitalization. Significantly more VA than CA patients reported improved outcomes. US studies have shown better outcome for CA than VA patients owing to better retention and hence longer periods in a controlled regime [17]. In contrast, comparisons of CA and VA patients in Swedish settings have shown no difference between these two groups regarding outcomes. The quality of the treatment provided seems to be a crucial factor because motivation is mutable and can be developed or diminished by the quality of support and services offered to patients, which is especially important to CA patients [18]. Structured, integrated, and long-term treatments that consider patient perspectives and needs may provide superior benefits compared to a plain “holding” strategy [17, 19].

In Norway, injection drug use is more common in CA compared to VA patients [16]. In the current work, significantly more CA than VA patients had been injecting illicit drugs at 6 months of follow-up (61 vs. 31 %). Similar high rates of injection use at follow-up have also been observed previously among injection substance users (up to 75 %) [20–22]. The continued high rate of injection use post treatment in the CA group is a challenge for treatment providers, and it is a concern that change in injection behaviour did not improve more following long-term inpatient treatment. Injection along with severe SUD provides a serious risk for overdose [23]. A long-term improvement and harm reduction for SUD patients requires addressing and changing injection behaviour, which should be an explicit goal during treatment. The time available in inpatient treatment is a window of opportunity that should be maximized in terms of prevention, intervention, testing, and vaccination for

Table 2 Outcome measures at 6 months of follow-up for compulsorily and voluntarily admitted SUD patients

Variable	Group	N (%)	OR ^b	95 % CI	P value
Patients with injection drug use (%) ^a	CA	31 (61)	3.38	1.59–7.20	0.001
	VA	22 (31)	1.00 ^d		
Patients with overdose during follow-up (%) ^c	CA	11 (22)	19.25	2.40–154.65	<0.001
	VA	1 (1)	1.00 ^d		
Patients with abstinence 30 days before follow-up (%)	CA	12 (24)	0.31	0.14–0.68	0.013
	VA	36 (50)	1.00 ^d		

^aN = 121

^bOR obtained from logistic regression

^cN = 122

^d = reference group

Table 3 Perceived changes in frequencies of substance use at 6 months of follow-up (from baseline)

		Mean score baseline ^a	Mean score follow-up ^a	Deterio-ration	No change	Improved	<i>P</i> value ^b
Frequency of preferred substance ^c (<i>n</i> = 120)	VA (71)	2.7	1.5	4 (5 %)	24 (34 %)	43 (61 %)	<0.001
	CA (49)	2.8	2.2	2 (4 %)	29 (59 %)	18 (37 %)	<0.001
Cannabis ^d (<i>n</i> = 49)	VA (28)	2.7	1.5	3 (11 %)	8 (28 %)	17 (61 %)	<0.001
	CA (21)	2.6	1.5	2 (9 %)	6 (28 %)	13 (62 %)	0.006
Amphetamine ^d (<i>n</i> = 43)	VA (24)	2.8	1.2	0 (0 %)	6 (25 %)	18 (75 %)	<0.001
	CA (19)	2.5	1.7	2 (10 %)	7 (37 %)	10 (53 %)	0.026

^aThe ordinal ASI scale (frequency of use in the last 6 months) was defined as follows: 0 = never used; 1 = sometimes, but less than 2–3 times a month; 2 = 1–3 days a week; 3 = everyday use

^b*P* value from Wilcoxon signed-rank test

^cPreferred substance according to the ASI interview

^dSub-analyses of specific preferred drug if more than 40 patients reported preference for this substance

blood-borne viruses and for overdose prevention training. Specific overdose preventive programs could include aspects of identification and risk factors of overdose, recognize signs of an overdose and how to respond appropriately; call ambulance, provide rescue breathing and administer naloxone if available. Distribution of naloxone rescue kits together with overdose prevention training, to drug users prior to discharge from drug treatment would empower the drug user. This would be a way for clinicians to introduce a preventive message and harm reduction interventions prior to discharge, in a patient centered fashion.

The importance of assessing treatment outcome by principal drug of concern has been highlighted [24]. Accordingly, our results showed solid reductions in frequency of

preferred drug use at follow-up compared to baseline for all patients. One explanation for this outcome might be that in Norway, the treatment for most patients in the CA group is integrated with that of the VA group, which is considered to be an approach that would benefit CA patients in particular because they then receive the treatment approaches that any other SUD patient does during treatment [25]. In addition, being in a shared environment with VA patients would likely “normalize” the treatment experience for CA patients.

In a US study, Brecht et al. performed a simple comparison between CA and VA patients in regards to different outcomes for coerced treatment for methamphetamine abuse and found no significant differences [26]. Although our study showed that the VA patients were somewhat

Table 4 Predictors of abstinence from baseline to follow-up (*N* = 123 patients)

Parameter	Bivariate analysis	<i>P</i> value ^a	Multivariate analysis	<i>P</i> value ^b
	OR (95 % CI)		OR (95 % CI)	
Age	1.02 (0.98–1.06)	0.267	–	
Female	1.27 (0.60–2.67)	0.528	–	
Education (years)	1.05 (0.88–1.25)	0.619	–	
Relationship status, single	0.56 (0.25–1.30)	0.175	0.45 (0.17–1.25)	0.127
Main diagnosis	1.23 (0.45–3.34)	0.687	–	
Severity scores				
Non-injection use	2.59 (1.21–5.54)	0.014	3.36 (1.32–8.56)	0.011
Years of using most problematic substance	1.01 (0.96–1.1)	0.699	–	
Overdoses	0.92 (0.43–1.97)	0.840	–	
Suicide attempts lifetime	1.32 (0.63–2.79)	0.456		
Treatment variables				
Days in treatment	1.00 (0.98–1.02)	0.511	–	
Voluntary treatment	0.31 (0.14–0.68)	0.004	3.40 (1.29–8.93)	0.011
Follow-up variables				
Abstinence at follow-up	1.51 (0.63–3.66)	0.356	–	
Time in a controlled environment (days) ^c	1.07 (1.03–1.10)	<0.001	1.08 (1.04–1.12)	<0.001

^a*P* value obtained from bivariate logistic regression

^b*P* value obtained from multivariable logistic regression; multivariable analysis included variables with *p* values <0.20 in bivariate analyses

^cTime in controlled environment in last 30 days before follow-up interview

better off at 6 months after treatment, there were marked improvements in amphetamine use also in the CA group (53 % reported reduction in the frequency of use). In terms of cannabis use, the two groups had a similar reduction; about half of both groups had reduction of use. Thus, the results suggest optimism for individuals and psychosocial intervention outcomes for SUD treatment in both VA and CA patients. In addition, having an aftercare plan and evaluating treatment outcomes in terms of appropriate patient-centred measures, such as quality of life, might become increasingly important when combinations of interventions are to be evaluated for chronic conditions within a long-term perspective [27, 28].

It has been highlighted that it remains largely unclear to what extent many of the commonly employed methods for getting people into treatment may be detrimental to the treatment process and longer-term outcomes [19]. Our results at follow-up showed a negative association between CA and abstinence when compared with VA. Nevertheless, within the CA group, we found that 24 % of patients achieved abstinence.

In the acute phase of CA treatment, the main target for the retention of patients is to provide life-saving treatment; in the longer term, the aim is to reduce drug use and increase motivation for further treatment, leading to long-term recovery [29]. Thus, our findings provide somewhat mixed results particularly regarding CA patients because many had less favourable drug use outcomes at 6 months of follow-up compared to VA patients. Still, we are optimistic that by integrating the results of our research it may help further improve abstinence rates at 6 months among CA patients.

However, the comparison between the VA and CA groups is somewhat unfair in this respect because the motivation for change was likely very different at treatment intake. Hence, the positive outcomes for the CA group need to be interpreted against this background. The only real alternative to CA treatment is no treatment at all.

Methodological considerations

This study had some limitations that should be considered when interpreting the results. Caution should be taken in generalizing these findings on the basis of a relatively small sample at follow-up. Attrition rate at follow-up was larger in the VA group, which could have biased results toward a better outcome for the VA responders. However, the attrition analyses of background data for the VA group showed no difference between those reached at follow-up compared with non-responders. It is not ethical to randomize to voluntary treatment patients that are deemed in need for compulsory treatment. Conversely; patients that are not deemed in need for compulsory treatment should not be randomized to a CA group. Thus, there were no random allocations of the participants in this study.

This study is based on self-reported data. Although the dataset is likely representative for hospitalized SUD populations in Norway, particularly the observed outcomes for CA patients may vary considerably across settings and regions with differing laws regarding compulsory SUD treatment.

This study was, to our knowledge, the first in Norway to provide follow-up outcomes in patients hospitalized by CA with a comparison to VA patients.

Conclusion

We showed that specialized SUD treatment provides improvement in drug use outcomes overall at 6 months of follow-up. Although voluntary treatment generally showed better outcomes, we found encouraging outcomes also among CA patients. It is important to keep in mind that the alternative to CA treatment in reality is no treatment at all and instead a continuation of life-threatening drug use behaviours. Therefore, we ideally should judge CA outcomes as contrasting with “no treatment”. Still, the results for CA patients that are comparable with those for VA treatment provide support for the continuation of CA treatment.

Abbreviations

CA, compulsory admitted; CI, confidence intervals; EuroPASI, European addiction severity index; ICD-10, International classification of diseases and related health problems; NMHCA, Norwegian Municipal Health Care Act; OR, odd ratio; SUD, substance use disorders; VA, voluntarily admitted

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Availability of data and materials

The data used in this study forms the basis of a still ongoing PhD study which will be finalized in 2018. According to current Norwegian regulations and practice, the data will be anonymized 31.12.18 and will then be deposited to the publicly available data repository of the Norwegian Centre for Research Data.

Authors' contributions

ARP participated in designing the study and interpreting results; in addition, ARP performed the analysis and drafted the manuscript. AO participated in designing the study, collecting data, interpreting results, and drafting the manuscript. JKV participated in designing the study, performing the analysis, interpreting results, and drafting the manuscript. ØK and TC participated in designing the study, interpreting results, and drafting the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

The study participants have given written approval for non-identifiable study data to be published in summary form.

Ethics approval and consent to participate

The study was approved by The Regional Committee for Research Ethics in Norway (08/206d, 2008/2900, 12.09.2015) and by the Privacy Issues Unit, Norwegian Social Science Data Services (NSD no. 18782). Written informed consent was obtained from all study participants.

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References

- McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness implications for treatment, insurance, and outcomes evaluation. *J Am Med Assoc.* 2000;284:1689–95.
- Dennis M, Scott CK. Managing addiction as a chronic condition. *Addict Sci Clin Pract.* 2007;4:45–55.
- McLellan A, McKay JR, Forman R, Cacciola J, Kemp J. Reconsidering the evaluation of addiction treatment: from retrospective follow-up to concurrent recovery monitoring. *Addiction.* 2005;100:447–58.
- Marlowe DB, Kirby KC, Merikle EP, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychol Addict Behav.* 2001;15:97–108.
- Israelsson M. Welfare, temperance and compulsory commitment to care for persons with substance misuse problems: a comparative study of 38 European countries. *Eur Addict Res.* 2011;17:329–41.
- Marshall GN, Hser YI. Characteristics of criminal justice and noncriminal justice clients receiving treatment for substance abuse. *Addict Behav.* 2002;27:179–92.
- Broadstock M, Brinson D, Weston A, Collaboration HSA. The effectiveness of compulsory, residential treatment of chronic alcohol or drug addiction in non-offenders: a systematic review of the literature. Health Services Assessment Collaboration (HSAC). Christchurch: University of Canterbury; 2008.
- Gottfredson DC, Kearley BW, Najaka SS, Rocha CM. The baltimore city drug treatment court: 3-year self-report outcome study. *Eval Rev.* 2005;29:42–64.
- Ministry of Health and Care Services (MHCS). The Norwegian Public Health Act. MHCS ed; 2011
- Shumway ST, Bradshaw SD, Harris KS, Baker AK. Important factors of early addiction recovery and inpatient treatment. *Alcohol Treat Q.* 2013;31:3–24.
- Weiss RD, Potter JS, Iannucci RA, Galanter M, Kleber H, Galanter M, Kleber H. Inpatient treatment, The american psychiatric publishing textbook of substance abuse treatment. Arlington: American Psychiatric Publishing, Inc; 2008. p. 445–58.
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E. The mini-international neuropsychiatric interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry.* 1998;59:22–33.
- Kokkevi A, Hartgers C. EuropASI: European adaptation of a multidimensional assessment instrument for drug and alcohol dependence. *Eur Addict Res.* 1995;1:4:208–10.
- McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, Pettinati H, Argeriou M. The fifth edition of the addiction severity index. *J Subst Abuse Treat.* 1992;9:199–213.
- Altman DG. Practical statistics for medical research. London: Chapman & Hall/CRC; 1991.
- Opsal A, Kristensen O, Larsen TK, Syversen G, Rudshaug EBA, Gerdner A. Factors associated with involuntary admissions among patients with substance use disorders and comorbidity: a cross-sectional study. *BMC Health Serv Res.* 2013;13:57.
- Gerdner A, Berglund M. Compulsory care of substance misuse-effect and quality; in Governments Task Force on Substance Misuse, Knowledge, Care. Affairs MoHaS ed. Stocklom; 2011. pp. 653-770.
- Stevens A, Berto D, Frick U, Hunt N, Kersch V, McSweeney T, Oeuvray K, Puppo I, Maria AS, Schaaf S, et al. The relationship between legal status, perceived pressure and motivation in treatment for drug dependence: results from a European study of quasi-compulsory treatment. *Eur Addict Res.* 2006;12:197–209.
- Urbanoski KA. Coerced addiction treatment: client perspectives and the implications of their neglect. *Harm Reduction J.* 2010;7:31.
- Evans JL, Hahn JA, Lum PJ, Stein ES, Page K. Predictors of injection drug use cessation and relapse in a prospective cohort of young injection drug users in San Francisco, CA (UFO Study). *Drug Alcohol Depend.* 2009;101:152–7.
- Huo D, Bailey SL, Ouellet LJ. Cessation of injection drug use and change in injection frequency: the chicago needle exchange evaluation study. *Addiction.* 2006;101:1606–13.
- Shah NG, Galai N, Celentano DD, Vlahov D, Strathdee SA. Longitudinal predictors of injection cessation and subsequent relapse among a cohort of injection drug users in Baltimore, MD, 1988-2000. *Drug Alcohol Depend.* 2006;83:147–56.
- Clausen T. Coherent long-term treatment approaches—superior in the treatment of opioid dependence. *Addiction.* 2015;110:1006–7.
- Copeland J, Maxwell JC. Cannabis treatment outcomes among legally coerced and non-coerced adults. *BMC Public Health.* 2007;7:1111.
- Opsal A, Kristensen O, Ruud T, Larsen TK, Grawe RW, Clausen T. Substance abuse in patients admitted voluntarily and involuntarily to acute psychiatric wards: a national cross-sectional study. *Norsk Epidemiologi.* 2011;21:85–91.
- Brecht ML, Anglin MD, Dylan M. Coerced treatment for methamphetamine abuse: differential patient characteristics and outcomes. *Am J Drug Alcohol Abuse.* 2005;31:337–56.
- Olsson TM, Fridell M. Women with comorbid substance dependence and psychiatric disorders in Sweden: a longitudinal study of hospital care utilization and costs. *BMC Health Serv Res.* 2015;15:224.
- Laudet AB. The case for considering quality of life in addiction research and clinical practice. *Addict Sci Clin Pract.* 2011;6:44–55.
- Lundeberg IR, Mjåland K, Søvig KH: *Tvang i rusfeltet - Regelverk, praksis og erfaringer med tvang.* Oslo: Gyldendal Juridisk; 2014.

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RESEARCH ARTICLE

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Mental distress following inpatient substance use treatment, modified by substance use; comparing voluntary and compulsory admissions

Adrian R. Pasareanu^{1,3*}, John-Kåre Vederhus¹, Anne Opsal^{1,2}, Øistein Kristensen¹ and Thomas Clausen^{1,3}

Abstract

Background: Treatment services to patients with substance use disorders (SUDs), including those mandated to treatment, needs to be evaluated and evidence based. The Norwegian Municipal Health Care Act (NMHCA) calls for compulsory treatment for persons with “severe and life-threatening substance use disorder” if these individuals are not otherwise willing to be voluntarily treated and consequently risk their lives over drug use. Mental distress is known to be high among SUD patients admitted to inpatient treatment. The purpose of this study is to describe changes in mental distress from admission to a 6-month follow-up in patients with SUDs, which underwent either voluntary or compulsory treatment.

Method: This prospective study followed 202 hospitalized patients with SUDs who were admitted voluntarily (VA; $n = 137$) or compulsorily (CA; $n = 65$). Levels of mental distress were assessed with SCL-90-R. Of 123 patients followed-up at 6 months, 97 (62 VA and 35 CA) had rated their mental distress at admission, discharge and follow-up. Sociodemographics and substance use severity were recorded with the use of The European Addiction Severity Index (EuropASI). We performed a regression analysis to examine factors associated with changes in psychiatric distress at the 6-month follow-up.

Results: The VA group exhibited higher mental distress than the CA group at admission, but both groups improved significantly during treatment. At the 6-month follow-up, the VA group continued to show reduced distress, but the CA group showed increases in mental distress to the levels observed before treatment. The deterioration appeared to be associated with higher scores that reflected paranoid ideas, somatization, obsessive-compulsive symptoms, interpersonal sensitivity, and depression. Active substance use during follow-up was significantly associated with increased mental distress.

Conclusion: In-patient treatment reduces mental distress for both CA and VA patients. The time after discharge seems critical especially for CA patients regarding active substance use and severe mental distress. A greater focus on continuing care initiatives to assist the CA patients after discharge is needed to maintain the reduction in mental distress during treatment. Continuing-care initiatives after discharge should be intensified to assist patients in maintaining the reduced mental distress achieved with treatment.

Trial registration: ClinicalTrials.gov NCT 00970372 December 02, 2016.

Keywords: Compulsory admission, Substance use disorders, Mental distress, follow-up

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Background

Studies on the general population and clinical samples have consistently shown that psychiatric comorbidities are common among patients with substance use disorders (SUDs) [1–3]. Comorbidities have been associated with frequent psychiatric admissions [4], violence [5], suicidal behavior [6], poor treatment response [7, 8], poor long-term prognosis [9], severe impairments and disabilities [9], and high mortality rates [10], particularly among adolescents and young adults [9]. SUDs have also been positively correlated to different types of psychiatric disorders, such as depression or agoraphobia, and to the severity of the disorder [11]. Mental distress, defined as an individual's level of mental complaints and symptoms, is frequently used as an outcome measure in medical and psychological research [12]. In screening for psychiatric disorders, the concept of mental distress is widely used. For example, it is estimated that among patients with SUDs between 30 and 50% suffer from a psychiatric disorder [13]. Other studies have shown that 30–40% of people with alcohol related disorders and 40–50% of people with other SUDs also have a psychiatric disorder [14–17]. In particular, patients with SUDs admitted to in-patient treatment showed even higher levels of mental distress [11, 18, 19]. Overall, a SUD combined with a comorbid psychiatric disorder can have negative impacts on different aspects of patient conditions and functions [20].

Although SUDs are often difficult to cure, treatment methods are currently available to stabilize patients, reduce harm, and improve comorbidity. These effects can increase life expectancy and quality of life [21]. Traditionally, the goal of SUD treatment has been to achieve total abstinence, or at least reduced substance use. In general, reductions in substance use have been associated with improved outcomes of comorbid disorders [22]. For a treatment to be perceived as attractive and relevant to individuals with SUDs, it must provide worthwhile and rewarding experiences, in terms of reducing mental distress. Hence, treatments must benefit the patient's perspective. To promote patient experiences of improvements, treatment services must be attentive to patient needs in the psychiatric domain, and monitor changes in clinically relevant outcomes throughout the course of treatment and following treatment [23]. There is consensus that patients with SUDs that have not responded to less intensive treatment efforts and whose SUDs' poses an ongoing threat to their physical and mental health may require in-patient treatment [24]. Although in-patients are likely to experience reduced symptoms of mental distress, due to the controlled environment, little is known about the stability of symptoms over time, following discharge. Hence, positive improvements

in mental distress that occur during treatment may not necessarily persist after discharge.

Voluntary admittance is the first choice and major gateway for treatment, but in the SUD field, voluntary admittance may not meet the expected positive outcomes, and patients may continue with detrimental patterns of substance use. In those circumstances, measures are available in many countries, including Norway, for applying compulsory in-patient drug treatment based on the medical needs of the patient, as opposed to resorting to legal means to coerce treatment through the criminal justice system.

The Norwegian Municipal Health Care Act (NMHCA) sanctions involuntary interventions for adult patients with SUDs in Norway [25]. The Act covers an option for retention (up to 3 months), when the health of the patient is seriously at risk, due to extensive, prolonged substance use, and when voluntary efforts have proven insufficient.

Literature reviews regarding compulsory treatment have generally concluded that research on the efficacy is inconsistent and inconclusive [26–29]. This is in part because these literature reviews do not always distinguish between different forms of compulsory treatment in conducting their analyses of outcomes. Most of the research and evidence on the effectiveness of compulsory treatment relates to offenders who are coerced and referred via the criminal justice system [30]. Among countries with a distribution of welfare through the state and in favor of using the civil law, Sweden has provided some relevant research in the field of patients with SUDs compulsory admitted to treatment. For example, Gerdner and Berglund concluded that patients compulsory admitted to SUD treatment have higher retention rates in treatment programs and aftercare, compared to VA patients. CA patients showed global outcomes that were as good as, or even better than those of VA patients [31]. Generally, for patients with SUDs and co-occurring psychiatric disorders admitted to treatment, it is particularly important to examine the outcomes at some point after the initial treatment episode has ended given that treatment effects may not have been retained during the follow-up phase [32]. There is a scarcity of follow-up studies that include both measures of substance abuse and mental distress for patients with SUDs [33]. Among patients with SUDs that underwent compulsory admission (CA), most studies examined treatment completion, reductions in substance use and less frequently, improvements in psychological symptoms [34–36]. Thus, a knowledge gap exists.

This study aims to: (1) describe the level of mental distress among a cohort of SUD patients; (2) examine the change in mental distress during the observation period

by voluntary and compulsory treatment status; (3) analyze factors associated with change in mental distress at 6-month follow-up.

Methods

Settings and procedures

The Norwegian Social Services Act of 1993 allowed compulsory admissions to the hospital for persons with severe and life-threatening substance use. In 2012, this law was replaced by the NMHCA, §10.2, sanctions involuntary interventions for adult patients with SUDs [25]. In this manuscript, we followed a similar methodology to one used previously [37]. Recruitment for this prospective study continued consecutively between January 2009 and May 2011 from three different publicly funded treatment centres in the south-eastern part of Norway. The treatment wards had multidisciplinary staffs, including psychiatrists, psychologists, social workers, occupational therapists, specialized nurses, and other trained staff. The centres offered treatment for patients with a primary SUD, often combined with mental disorders. Treatment included assessment of somatic and mental health along with pharmacotherapy, cognitive milieu therapy, and individual motivation enhancement. Before study inclusion, the patients were detoxified, verified by negative urine tests for alcohol, opioids, central stimulants (amphetamines, methamphetamines, and cocaine), benzodiazepines, and cannabis to establish baseline values not influenced by withdrawal symptoms.

No formalized aftercare service was provided by the wards, but aftercare plans for individuals were made in collaboration with primary care services in the local municipalities; e.g., appointments with social services. Follow-up interviews were performed 6 months after discharge from the hospitals and took place between July 2009 and December 2011. Because patients came from all over the country (particularly the CA group), the project staff attempted to contact all patients directly by phone, mail, or post. In some cases, patients were found to be in prison or in inpatient treatment institutions and arrangements were made to meet them there, which included extensive travelling for the data collection team as all the interviews were conducted face to face.

Participants

A total of 326 patients consecutively admitted to substance use disorder and psychiatry wards were identified as potentially relevant for this study. Participants were eligible when they were >18 years of age, had a SUD, could understand Norwegian, and were admitted at least 3 weeks prior to study inclusion, which allowed them sufficient time for detoxification and stabilization before providing informed consent. We verified whether the

patients were detoxified, by negative urine tests for alcohol, opioids, central stimulants (amphetamines, methamphetamines, and cocaine), benzodiazepines, and cannabis; thus, we were able to establish baseline values that were not influenced by withdrawal symptoms. According to the inclusion criteria, 228 were eligible, but 26 patients refused to participate. Of the 202 patients enrolled at baseline (65 CA and 137 VA), 123 (61%) were followed-up at 6 months.

Because of limitations in funding and the large geographical uptake area, CA patients were prioritized for follow-up (82% CA patients versus 59% VA patients were included) because the CA patients were less represented in the sample at baseline. Thus, the higher loss to follow-up in the VA group was mainly due to administrative and logistic reasons. Beyond this, the attrition analysis showed no other differences between those who were and were not included at follow-up in terms of demographic data, severity scores, or length of stay in the initial treatment episode.

Instruments and measure

The Mini International Neuropsychiatric Interview, version 5.0, was conducted at baseline to assess SUD and other psychiatric diagnosis [38]. For statistical purposes, psychiatric diagnoses were categorized as Axis I (symptom disorders) and Axis II (personality disorders). Common Axis I disorders include anxiety and mood disorders, attention deficit disorders, schizophrenia and other psychotic disorders.

To assess demographics and severity of substance use variables, the most commonly used measure within addiction treatment research was used: The European Addiction Severity Index (EuropASI) [39, 40]. The EuropASI is a structured interview performed by trained and certified staff. The same questionnaire was used at follow-up. Drug and alcohol use in the 30 days preceding the follow-up interview were evaluated to determine whether the patients were abstinent or not. Additionally, time in a controlled environment as defined by the EuropASI as days in jail or SUD treatment in the 30 days before follow-up was used to assess differences in engagement with aftercare services. As a proxy for severe mental distress, we assessed whether patients had ever had suicidal attempts in their lifetime. Mental distress in general was measured with the Symptom Checklist-90-R (SCL-90-R) [41], a widely used inventory used clinically in Scandinavia to monitor psychological distress both before and after treatment [42–44]. Additionally, the SCL-90-R has been tested in a Norwegian population sample [45]. The SCL-90-R has 90 items rated on a five-point Likert-type scale, ranging from “not at all” (0) to “extremely” (4), and includes nine subscales (somatization, obsessive-compulsive, depression, anxiety,

hostility, interpersonal sensitivity, phobic anxiety, paranoid ideation, and psychoticism). The present study uses the Global Severity Index (GSI), which is the average rating of all 90 items. GSI is often used as an overall index of distress in studies of substance dependent samples [46]; the higher the score, the greater the distress [47]. A score of GSI > 1 is considered to be a pathological score. Changes in mental distress were computed by subtracting the GSI determined at follow-up from the GSI determined at admission, hereafter called the 'GSI change'. Thus, a 'positive score change' refers to an improved mental distress. For this study, we chose to include only the participants that provided complete dataset on the outcome variable, mental distress.

Analysis and statistical methods

Descriptive statistics were used to elaborate baseline characteristics. To examine the change in psychiatric distress between discharge and the 6-month follow-up, we used the paired sample *t*-test, for both CA and VA groups. Linear regression was used to examine predictors of changes in psychiatric distress, from baseline to the 6-month follow-up. Preliminary bivariate analyses were first undertaken. Variables with seemingly little influence on the dependent variable (*p*-value > 0.20) were not included in the multiple regression (adjusted model), as recommended by Altman [48]. We also controlled for gender and age. The final multiple regression model used simultaneous entry of variables (the "enter" method). Results are presented as unstandardized beta coefficients with 95% confidence intervals (CIs). *P*-values < 0.05 were considered statistically significant. Analyses were performed with SPSS 21.0 Software (SPSS Inc., Chicago, IL, USA).

Results

At baseline, the 202 participants had a mean age of 30 years, and 34% were women (Table 1). Among these, 32% (*N* = 65) had undergone CA and 68% (*N* = 137) were VA. All patients met the ICD-10 criteria for SUDs; the majority had a drug use disorder (83%). Use of an injected drug 6 months prior to hospitalization was reported by 54% of participants. The mean SCL-90 GSI for our cohort, at baseline, was 1.2, which is 0.2 above the pathological cut off used as a general measure of psychopathology at the group level. In our cohort, 56% of patients had scores above the pathological cut-off. The burden of mental distress was higher in the VA group than in the CA group, mean difference (MD) = 0.34, *t*(95) = 2.34, *p* < 0.02, CI: 0.053-0.632, but distress improved at similar magnitudes between groups during treatment (Fig. 1). At the end of treatment, the majority of patients (67%) had reduced their mental distress scores to below the clinical cut-off for pathology. Of the

Table 1 Baseline socio-demographic variables for patients with SUDs

Variables	All patients, <i>N</i> = 202	Follow-up sample, <i>N</i> = 123
Mean age, years	30.0 (±8.9)	30.4 (±9.8)
Female	68 (34)	47 (39)
Education, years	10.8 (±1.9)	10.8 (±2.1) ^a
Relationship status, single	136 (69) ^b	84 (69) ^c
Main SUD diagnosis		
Alcohol use disorder (AUD) or AUD + concurrent drug use disorders	34 (17)	20 (16)
Drug use disorder	168 (83)	103 (84)
Psychiatric diagnosis		
Axis I disorders	117 (60)	71 (58)
Axis II disorders	9 (4.5)	4 (3)
Axis I and II disorders	24 (12)	16 (13)
Only SUD diagnosis	52 (26)	32 (26)
Severity scores		
Injection use	105 (54) ^d	71 (60) ^e
Duration of most problematic substance use, years	11.1 (±7.6)	11.6 (±7.6) ^f
Time in treatment, days	57 (26)	58 (26)
Suicidal attempts – lifetime prevalence	94 (49) ^g	60 (51) ^h
Compulsory admission	65 (32)	51 (42)
SCL-90-R GSI, mean (SD)	1.2 (±0.70) ⁱ	1.2 (±0.74) ^j

Values represent the numbers of patients (%) or mean (±SD); in some cases, the total number of patients changed, as follows: ^a*N* = 117; ^b *N* = 198; ^c *N* = 121; ^d *N* = 195; ^e *N* = 119; ^f *N* = 117; ^g *N* = 191; ^h *N* = 117; ⁱ *N* = 197; ^j *N* = 120

123 patients followed-up at 6-months, 97 (35 in the CA group and 62 in the VA group) had rated their mental distress at all three time points (at admission, discharge, and the 6-month follow-up); these were included in the follow-up analyses. An attrition analysis showed no other differences between those who completed the SCL-90-R interview and those who did not, in terms of demographic data, severity scores, or levels of mental distress.

At the 6-month follow-up, the mental distress in the CA group had deteriorated to a level similar to that observed before treatment. In contrast, the VA group retained the improvement achieved during treatment throughout the follow-up (Fig. 1). The negative development in mental distress in the CA group seemed to arise mainly from increases in the following subscales: somatization (MD = 0.37, *t*(34) = -3.17, *p* = 0.003), obsessive-compulsive symptoms (MD = 0.26, *t*(34) = -2.91, *p* = 0.006), interpersonal sensitivity (MD = 0.23, *t*(34) = -2.16, *p* = 0.038), depression (MD = 0.33, *t*(34) = -3.13, *p* = 0.004), and paranoia (MD = 0.4, *t*(34) = -3.01, *p* = 0.005) (Fig. 2). For the sample as a whole, there was an overall decrease in mental distress from admission to follow-up

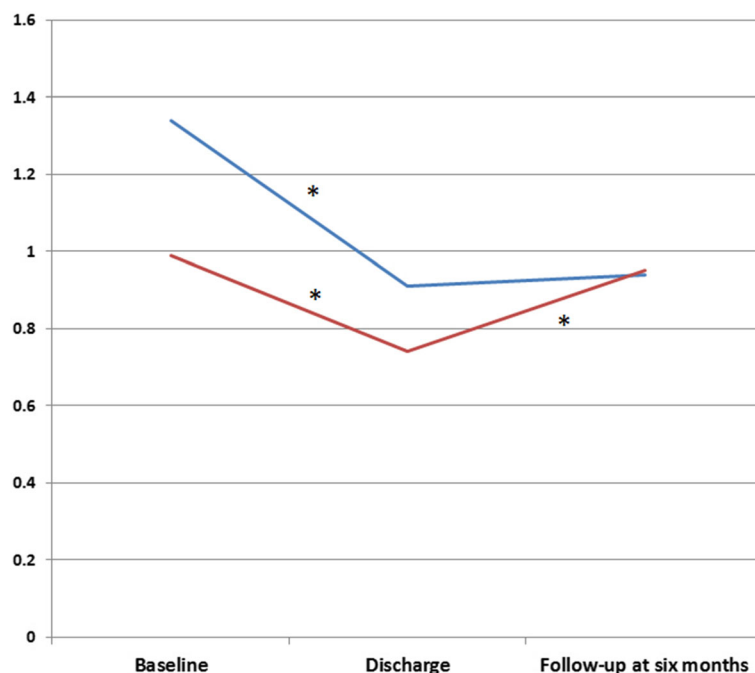


Fig. 1 Changes in mental distress from baseline to 6-month follow-up in patients treated for substance use disorders. Notes: T1 = baseline, T2 = discharge, T3 = follow-up at 6 months. Red line: changes in mental distress in voluntary admission group. Blue line: changes in mental distress in compulsory admission group. Mental distress was measured with the Global Score Index (GSI) of the Symptoms Checklist (SCL-90-R). * *P* value <0.01

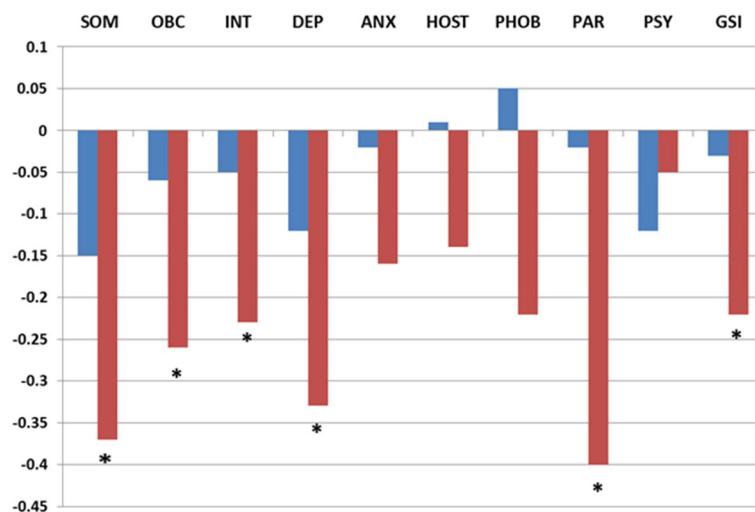


Fig. 2 Changes in mental distress domains³ from discharge to the 6-month follow-up in patients treated for SUDs⁵. Notes: Red: the voluntary admission group; blue: the compulsory admission group. **p* < 0.05 (paired *t*-test). ³Mental domains are subscores that correspond to the nine dimensions of the Symptoms Checklist (SCL-90-R). ⁵ Changes in mental distress were computed by subtracting the GSI determined at follow-up from the GSI determined at discharge; a 'positive score change' refers to an improvement in mental distress Abbreviations: SUD = substance use disorder, SOM = somatization, OBS = obsessive-compulsion, INT = interpersonal sensitivity, DEPR = depression, ANX = anxiety, HOST = hostility, PHOB = phobic anxiety, PARA = paranoid ideation, PSY = psychoticism, GSI = global score index

(MD = 0.26, $t(96) = 3.45$, $p < 0.001$, CI: 0.112-0.416). The main contribution came from the progress achieved in the VA group (Fig. 1).

Preliminary bivariate regression analysis showed that there were no strong association (p -value > 0.2) between partnerships, education, injection use the last 6 months, days in controlled environment, and changes in GSI from baseline to follow-up. These variables were not retained in multiple regression analysis. We found that only abstinence was a significant predictor for changes in GSI in the final adjusted model ($\beta = 0.26$, 95% CI 0.06–0.51; Table 2). Descriptively, 41% of the sample (40 of 97 patients) reported abstinence at follow-up; those that reported non-abstinence had only a minimal GSI improvement (0.04); in contrast, those that reported abstinence had a considerable GSI improvement of 0.58.

Discussion

In the present study, the majority of in-patients with SUDs had mental distress levels above the clinical cut-off at baseline, but they improved during treatment. At the 6-month follow-up, the level of mental distress in the CA group returned to the level observed prior to treatment, but the VA group retained the improvement achieved with treatment. A multiple linear analysis identified active drug use as the only variable that could predict increased levels of mental distress at follow-up.

At baseline, the levels of mental distress were higher among patients in the VA group than among those in the CA group. However, the markedly elevated mental distress levels we observed among all patients with SUDs at admission confirmed findings from previous studies that showed that patients with SUDs experienced high level of mental distress compared to the general population [11]. This observation was also reported in a study

that included patients legally coerced into treatment; moreover, patients in the coerced group had higher substance use severity and less mental distress than patients in the VA group, similar to our findings [34]. The high level of mental distress among patients in the VA group might have been an important motivating factor for voluntarily seeking treatment, as suggested in previous studies [49, 50]. Our findings indicated that compulsory treatment was primarily applied due to the severity of substance use, and not because of the severity of psychiatric symptoms. This finding appeared to be consistent with the NMHCA, a special law that governs treatment for patients with severe or life-threatening SUD conditions.

Our study showed that, after discharge, patients in the CA and VA groups followed divergent trajectories of mental distress. The VA group maintained reduced mental distress at the 6-month follow-up; this outcome was more positive than the outcomes previously reported in comparable studies [51]. In contrast, the CA group showed increases in depression, obsessive-compulsive symptoms, paranoia, somatization, and interpersonal sensitivity. This outcome appeared to have resulted from a relapse to drug use on a group level. This could suggest that those who sought treatment voluntarily may have been motivated and ready to make changes in substance use whereas those who were compulsorily admitted may not to the same extent have seen their drug use as a problem or were not ready to consider reducing use. This might highlight the need for extra supports to build motivation toward change within the CA group (both during the inpatient stay and as part of aftercare).

Patients that used injected drugs exhibited higher rates of mental distress, consistent with previous findings [52]. This finding suggested that the severity of a SUD was related to the level of mental distress. A previous paper reported improved 6-month follow-up SUD outcomes of the present study (frequency of substance use, injection use, and overdoses), but improved outcomes were reported significantly more frequently in the VA than in the CA group (e.g., 61% versus 37% reported reduction in the frequency of the preferred substance) [37]. The present paper elaborate on these findings; patients that remained abstinent were more likely to show lower levels of mental distress than patients that relapsed at 6 month follow-up. In accordance with other studies [53, 54], our findings implied that patients that actively used drugs were less likely to retain the improvement in mental distress achieved with treatment; this finding highlighted the complex nature of mental distress in patients with SUDs. Epidemiological studies on the general population have shown that there are bi-directional influences between SUDs and psychiatric

Table 2 Predictors of changes in mental distress in patients with SUDs at follow-up ($N = 97$)^a

Predictor	Beta (95% CI) ^b	P-value
Socio-demographic variables		
Gender (female)	0.10 (-0.22/0.340)	0.561
Age, years	-0.01 (-0.04/0.01)	0.248
Compulsory admission	-0.28 (-0.60/0.05)	0.100
Duration of most problematic substance use, years	0.02 (-0.01/0.05)	0.110
Follow-up variables		
Abstinence in the last 30 days of follow-up	0.49 (0.18/0.80)	0.002

^a Mental distress was measured with the Global Score Index (GSI) of the Symptoms Checklist (SCL-90-R). Changes in mental distress were computed by subtracting the GSI determined at follow-up from the GSI determined at admission; a 'positive score change' refers to an improvement in mental distress

^b Unstandardized beta coefficient with 95% Confidence Interval (CI) and $R^2 = 0.1$, derived from a multiple linear regression with simultaneous entry of variables (the "enter" method)

comorbidity; these two conditions negatively influence each other [15].

In light of the limited formalized care after discharge, it is possible that the inpatient-period alone was insufficient to establish long-term abstinence. Considering that the models for case management share the same core elements: assessment, planning, linkage and monitoring [55, 56], it may be worth noticing that an alternative may include specifically designed approaches for CA patients based on the assumption that they may be ambivalent about change such as for example enhanced use of motivational interview in the monitoring phase.

A continuum of care that included after-discharge care was previously demonstrated to be supportive in retaining improvements up to follow-up among patients that underwent CA [56].

Our findings suggested that both providers and programs should be available to provide assessments and management of co-existing psychological problems. This initiative should be built into the care period after discharge. Stand-alone interventions should not be considered adequate treatment for individuals with severe SUDs [57].

In the acute phase of CA treatment, the main goal is to provide life-saving treatment; however, in the longer term, the aim is to reduce drug use and increase the motivation for further treatment, preferably voluntary treatment, which can lead to long-term recovery [58]. The NMHCA does seem to fulfil its aim of reaching patients with severe SUDs. To obtain maximum long-term benefits for patients that undergo CA, the in-patient treatment should be more integrated into the broader treatment system. Accordingly, from our standpoint, a key factor for achieving maximum benefit is to achieve better coordination between the various care services; and in our case, this factor is particularly important during the transition to care after discharge. For example, this can be achieved by a case management-based approach [59].

Methodological considerations

The strength of this study was its prospective design, which allowed the examination of psychiatric distress over time; i.e., the 6 months following discharge from SUD treatment. However, caution should be taken in generalizing these findings, because there was a high attrition rate at follow-up. In addition, this study was based on self-reported data. Although the dataset is largely representative of hospitalized SUD populations in Norway, some data, particularly the outcomes in the CA group, may vary considerably across settings and regions with different laws regarding compulsory SUD treatment outside of Norway. Although longitudinal studies like this can enhance causal inference it cannot eliminate

competing explanations and, as a result, does not establish a causal relationship.

Conclusions

This study profiled the mental distress in two types of patients treated for SUDs. One type of patient was admitted voluntarily. These patients had high levels of mental distress at baseline, which improved during treatment; moreover, this improvement was maintained at the 6-month follow-up. The other type of patient underwent compulsory treatment. These patients had lower mental distress than the patients voluntarily admitted, but they also showed improvements with treatment; however, in the CA group, the levels of mental distress had returned to baseline at the 6-month follow-up.

Our study found that active substance use was the sole predictive factor of negative change in mental distress in patients with SUDs at the 6-month follow-up visit. This finding highlighted the importance of abstinence as a treatment goal for individuals with severe SUDs, also in order to maintain mental health stability.

This study also highlighted the need to employ a broader range of after-discharge interventions to prevent relapses and accompanying increases in mental distress for patients that undergo CA. In addition to the formalized treatment options available, clinicians may recommend that patients seek abstinence-supportive help, for example, from peer-based groups [60], to maintain improvements in mental distress achieved during treatment.

Abbreviations

CA: Compulsory admitted; CI: Confidence intervals; EuropASI: European addiction severity index; ICD-10: International classification of diseases and related health problems; NMHCA: Norwegian municipal health care act; OR: Odd ratio; SUD: Substance use disorders; VA: Voluntarily admitted

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Availability of data and materials

The data used in this study forms the basis of a still ongoing PhD study which will be finalized in 2018. According to current Norwegian regulations and practice, the data will be anonymized 31.12.18 and will then be deposited to the publicly available data repository of the Norwegian Centre for Research Data.

Authors' contributions

ARP participated in designing the study and interpreting results; in addition, ARP performed the analysis and drafted the manuscript. AO participated in designing the study, collecting data, interpreting results, and drafting the manuscript. JKV participated in designing the study, performing the analysis, interpreting results, and drafting the manuscript. ØK and TC participated in designing the study, interpreting results, and drafting the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

The study participants have given written approval for non-identifiable study data to be published in summary form.

Ethics approval and consent to participate

The study was approved by The Regional Committee for Research Ethics in Norway (08/206d, 2008/2900, 12.09.2015) and by the Privacy Issues Unit, Norwegian Social Science Data Services (NSD no. 18782). Written informed consent was obtained from all study participants.

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References

- Stinson FS, Grant BF, Dawson DA, Ruan WJ, Huang B, Saha T. Comorbidity between DSM-IV alcohol and specific drug use disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Drug Alcohol Depend.* 2005;80(1):105–16.
- Flynn PM, Brown BS. Co-occurring disorders in substance abuse treatment: Issues and prospects. *J Subst Abuse Treat.* 2008;34(1):36–47.
- Hall W, Teesson M, Lynskey M, Degenhardt L. The 12-month prevalence of substance use and ICD-10 substance use disorders in Australian adults: Findings from the National Survey of Mental Health and Well-Being. *Addiction.* 1999;94(10):1541–50.
- Hunt GE, Bergen J, Bashir M. Medication compliance and comorbid substance abuse in schizophrenia: Impact on community survival 4 years after a relapse. *Schizophr Res.* 2002;54(3):253–64.
- Scott H, Johnson S, Menezes P, Thornicroft G, Marshall J, Bindman J, Bebbington P, Kuipers E. Substance misuse and risk of aggression and offending among the severely mentally ill. *Br J Psychiatry.* 1998;172(APR):345–50.
- Appleby L, Shaw J, Amos T, McDonnell R, Harris C, McCann K, Kiernan K, Davies S, Bickley H, Parsons R. Suicide within 12 months of contact with mental health services: National clinical survey. *Br Med J.* 1999;318(7193):1235–9.
- Schafer I, Eiroa-Orosa FJ, Verthein U, Dilg C, Haasen C, Reimer J. Effects of psychiatric comorbidity on treatment outcome in patients undergoing diamorphine or methadone maintenance treatment. *Psychopathology.* 2010;43(2):88–95.
- Opsal A, Clausen T, Kristensen O, Elvik I, Joa I, Larsen TK. Involuntary hospitalization of first-episode psychosis with substance abuse during a 2-year follow-up. *Acta Psychiatr Scand.* 2011;124(3):198–204.
- Mills KL, Deady M, Teesson M, Sannibale C, Proudfoot H, Burns L, Mattick R. Guidelines on the management of co-occurring mental health conditions in alcohol and other drug treatment settings: How useful are they? *Mental Health Substance Use: Dual Diagnosis.* 2012;5(2):160–72.
- Dickey B, Azeni H. Persons with dual diagnoses of substance abuse and major mental illness: Their excess costs of psychiatric care. *Am J Public Health.* 1996;86(7):973–7.
- Landheim AS, Bakken K, Vaglum P. Impact of comorbid psychiatric disorders on the outcome of substance abusers: A six year prospective follow-up in two Norwegian counties. *BMC Psychiatry.* 2006;6(no pagination):44.
- Olsen LR, Mortensen EL, Bech P. Mental distress in the Danish general population. *Acta Psychiatr Scand.* 2006;113(6):477–84.
- Olsson TM, Fridell M. Women with comorbid substance dependence and psychiatric disorders in Sweden: a longitudinal study of hospital care utilization and costs. *BMC Health Serv Res.* 2015;15(1):224.
- Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005;62(6):617–27.
- Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, de Girolamo G, Graaf R, Demeyttenaere K, Gasquet I, et al. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl.* 2004;2004(420):21–7.
- Jane-Llopis E, Jané-Llopis E, Matytsina I, Jané-Llopis E, Matytsina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug and alcohol review.* 2006;25(6):515–36.
- Kessler RC, Nelson CB, McGonagle KA, Edlund MJ, Frank RG, Leaf PJ. The epidemiology of co-occurring addictive and mental disorders: implications for prevention and service utilization. *Am J Orthopsychiatry.* 1996;66(1):17.
- Hoxmark E, Benum V, Friborg O, Wynn R. Reduction in mental distress among substance users receiving inpatient treatment. *Intl Journal of Mental Health Syst.* 2010;4(no pagination):30.
- Wynn R. Prior psychotic episodes among patients in a substance abuse clinic. *J Substance Use.* 2007;12(2):127–32.
- Hattenschwiler J, Ruesch P, Modestin J. Comparison of four groups of substance-abusing in-patients with different psychiatric comorbidity. *Acta Psychiatr Scand.* 2001;104(1):59–65.
- Pasareanu AR, Opsal A, Vederhus JK, Kristensen O, Clausen T. Quality of life improved following in-patient substance use disorder treatment. *Health Quality Life Outcomes.* 2015;13:35.
- Kaskutas LA, Borkman TJ, Laudet A, Ritter LA, Witbrodt J, Subbaraman MS, Stunz A, Bond J. Elements that define recovery: the experiential perspective. *Journal of Studies Alcohol Drugs.* 2014;75(6):999–1010.
- McLellan A, McKay JR, Forman R, Cacciola J, Kemp J. Reconsidering the evaluation of addiction treatment: From retrospective follow-up to concurrent recovery monitoring. *Addiction.* 2005;100(4):447–58.
- Kleber HD, Weiss R, Anton Jr R, George T, Greenfield S, Kosten T, O'Brien C, Rounsaville B, Strain E, Ziedonis D. Treatment of patients with substance use disorders. *Am J Psychiatr.* 2007;164(4):0_3.
- Ministry of Health and Care Services (MHCS). The Norwegian Public Health Act. In. Edited by MHCS; 2011.
- Urbanoski KA. Coerced addiction treatment: Client perspectives and the implications of their neglect. *Harm Reduction J.* 2010;7:13.
- Broadstock M, Brinson D, Weston A, Collaboration HSA. The effectiveness of compulsory, residential treatment of chronic alcohol or drug addiction in non-offenders: a systematic review of the literature: Health Services Assessment Collaboration (HSAC), University of Canterbury; 2008.
- Wild TC. Social control and coercion in addiction treatment: towards evidence-based policy and practice. *Addiction.* 2006;101(1):40–9.
- Stevens A, Berto D, Heckmann W, Kersch V, Oeuvery K, van Ooyen M, Steffan E, Uchtenhagen A. Quasi-compulsory treatment of drug dependent offenders: An international literature review. *Subst Use Misuse.* 2005;40(3):269–83.
- Brecht ML, Greenwell L, Von Mayrhauser C, Anglin MD. Two-year outcomes of treatment for methamphetamine use. *J Psychoactive Drugs.* 2006;38 Suppl 3:415–26.
- Gerdner A, Berglund M. Compulsory care of substance misuse-effect and quality; in Governments Task Force on Substance Misuse, Knowledge, Care. In. Edited by Affairs MoHaS. Stockholm; 2011: 653–770
- Rawson RA, Huber A, McCann M, Shoptaw S, Farabee D, Reiber C, Ling W. A comparison of contingency management and cognitive-behavioral approaches during methadone maintenance treatment for cocaine dependence. *Arch Gen Psychiatry.* 2002;59(9):817–24.
- Wickizer TM, Campbell K, Krupski A, Stark K. Employment outcomes among AFDC recipients treated for substance abuse in Washington State. *Milbank Q.* 2000;78(4):585–608.
- Copeland J, Maxwell JC. Cannabis treatment outcomes among legally coerced and non-coerced adults. *BMC Public Health.* 2007;7:111.
- Kline A. Profiles of criminal-justice clients in drug treatment: implications for intervention. *Addict Behav.* 1997;22(2):263–8.
- Kelly JF, Finney JW, Moos R. Substance use disorder patients who are mandated to treatment: characteristics, treatment process, and 1- and 5-year outcomes. *J Subst Abuse Treat.* 2005;28(3):213–23.
- Pasareanu AR, Vederhus J-K, Opsal A, Kristensen Ø, Clausen T. Improved drug-use patterns at 6 months post-discharge from inpatient substance use disorder treatment: results from compulsorily and voluntarily admitted patients. *BMC Health Serv Res.* 2016;16(1):291.
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry.* 1998;59:22–33.

39. Kokkevi A, Hartgers C. EuropASI: European adaptation of a multidimensional assessment instrument for drug and alcohol dependence. *Eur Addict Res*. 1995;1:208–10.
40. McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, Pettinati H, Argeriou M. The Fifth Edition of the Addiction Severity Index. *J Subst Abuse Treat*. 1992;9(3):199–213.
41. Derogatis LR, Lipman RS. SCL-90: An outpatient psychiatric rating scale, preliminary report. *Psychol Bull*. 1973;9(1):13–28.
42. Haver B. The DSM-III diagnosis of alcohol use disorders in women: Findings from a follow-up study of 44 female alcoholics. *Acta Psychiatr Scand*. 1986;73 Suppl 328:22–30.
43. Barth K, Nielsen G, Havik OE, Haver B, Molstad E, Rogge H, Skatun M, Noklebye Heiberg A, Ursin H. Assessment for three different forms of short-term dynamic psychotherapy. Findings from the Bergen Project. *Psychother Psychosom*. 1988;49(3-4):153–9.
44. Mehlum L, Friis S, Irion T, Johns S, Karterud S, Vaglum P, Vaglum S. Personality disorders 2-5 years after treatment: A prospective follow-up study. *Acta Psychiatr Scand*. 1991;84(1):72–7.
45. Vassend O, Lian L, Andersen HT. Norske versjoner av NEO-Personality Inventory, Symptom Checklist 90 Revised og Giessen Subjective Complaints List. Del I. *Tidsskrift for Norsk Psykologforening*. 1992;29(12):1150–60.
46. Fridell M, Hesse M. Psychiatric severity and mortality in substance abusers: A 15-year follow-up of drug users. *Addict Behav*. 2006;31(4):559–65.
47. Derogatis LR. Administration, scoring & procedures manual-II for the R (revised) version and other instruments of the psychopathology rating scale series. In: *Clinic Psychometric Research*. edn. Towson; 1983.
48. Altman DG. *Practical statistics for medical research*. London: Chapman & Hall/CRC; 1991.
49. Mojtabei R. Use of specialty substance abuse and mental health services in adults with substance use disorders in the community. *Drug Alcohol Depend*. 2005;78(3):345–54.
50. Marlowe DB, Kirby KC, Merikle EP, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychol Addict Behav*. 2001;15(2):97–108.
51. Bakken K, Landheim AS, Vaglum P. Axis I and II disorders as long-term predictors of mental distress: A six-year prospective follow-up of substance-dependent patients. *BMC Psychiatry*. 2007;7:29.
52. Kidorf M, King VL, Peirce J, Burke C, Kolodner K, Brooner RK. Psychiatric distress, risk behavior, and treatment enrollment among syringe exchange participants. *Addict Behav*. 2010;35(5):499–503.
53. Ritsher JB, McKellar JD, Finney JW, Otilingam PG, Moos RH. Psychiatric comorbidity, continuing care and mutual help as predictors of five-year remission from substance use disorders. *J Stud Alcohol*. 2002;63(6):709–15.
54. Tomasson K, Vaglum P. Psychiatric co-morbidity and aftercare among alcoholics: a prospective study of a nationwide representative sample. *Addiction*. 1998;93(3):423–31.
55. Siegal HA, Rapp RC, Li L, Saha P, Kirk KD. The role of case management in retaining clients in substance abuse treatment: An exploratory analysis. *J Drug Issues*. 1997;27(4):821–32.
56. Lindahl ML, Berglund M, Tonnesen H. Case management in aftercare of involuntarily committed patients with substance abuse. A randomized trial. *Nordic J Psychiatry*. 2013;67(3):197–203.
57. Clausen T. Coherent long-term treatment approaches—superior in the treatment of opioid dependence. *Addiction*. 2015;110(6):1006–7.
58. Lundeberg IR, Mjåland K, Søvig KH. *Tvang i rusfeltet - Regelverk, praksis og erfaringer med tvang*: Gyldendal Juridisk; 2014.
59. Hesse M, Vanderplasschen W, Rapp R, Broekaert E, Fridell M. Case management for persons with substance use disorders. *Cochrane Library*. 2007;4: Art. No.: CD006265. doi: <http://creativecommons.org/licenses/by/4.0/>.
60. Vederhus JK, Timko C, Kristensen O, Hjemdahl B, Clausen T. Motivational intervention to enhance post-detoxification 12-Step group affiliation: a randomized controlled trial. *Addiction*. 2014;109(5):766–73.

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Quality of life improved following in-patient substance use disorder treatment

Adrian R Pasareanu^{1*}, Anne Opsal^{1,2}, John-Kåre Vederhus¹, Øistein Kristensen¹ and Thomas Clausen^{1,3}

Abstract

Background: Quality of life (QoL) is increasingly recognized as central to the broad construct of recovery in patients with substance use disorders (SUD). However, few longitudinal studies have evaluated changes in QoL after SUD treatment and included patients with SUD that were compulsorily hospitalized. This study aimed to describe QoL among in-patients admitted either voluntarily or compulsorily to hospitalization and to examine patterns and predictors of QoL at admission and at 6 months post treatment.

Methods: This prospective study followed 202 hospitalized patients with SUD that were admitted voluntarily (N=137) or compulsorily (N=65). A generic QoL questionnaire (QoL-5) was used to assess QoL domains. Regression analysis was conducted to identify associations with QoL at baseline and to examine predictors of change in QoL at a 6-month follow-up.

Results: The majority of patients had seriously impaired QoL. Low QoL at baseline was associated with a high psychiatric symptom burden. Fifty-eight percent of patients experienced a positive QoL change at follow-up. Although the improvement in QoL was significant, it was considered modest (a mean 0.06 improvement in QoL-5 scores at follow-up; 95% confidence interval: 0.03 - 0.09; $p < 0.001$). Patients admitted voluntarily and compulsorily showed QoL improvements of similar magnitude. Female gender was associated with a large, clinically relevant improvement in QoL at follow-up.

Conclusions: In-patient SUD treatment improved QoL at six month follow-up. These findings showed that QoL measurements were useful for providing evidence of therapeutic benefit in the SUD field.

Keywords: Quality of life, Substance use disorder treatment, Compulsory hospitalization, Treatment outcomes

Introduction

The concept of quality of life (QoL) is used in medicine for measuring a patient's subjective view of overall well-being. It serves as a complementary perspective to a traditional disease-specific perspective. The most promising use of the QoL concept is as an outcome measure in clinical trials [1] and health services research [2]. This broad evaluation is particularly useful in the context of chronic disorders, where it is often possible to improve patient living conditions, though a complete absence of symptoms may be out of reach [3]. With the recognition that measures of disease status alone are insufficient to describe the burden of illness in chronic and severe

disorders, clinical research has rapidly employed QoL as an integral outcome variable [4].

Substance use disorder (SUD) is often considered a chronic, relapsing disease that is typically associated with psychiatric, somatic, and social comorbidities, in addition to a shortened life expectancy [5]. Traditionally, addiction treatment has focused on abstinence from substances; however, this "narrow" aim for treatment efficiency has recently been criticized. Increasingly, the addiction field is recognizing the importance of focusing on other positive treatment outcomes and recovery [6,7]. Recovery has been generally considered a period of time characterized by an enduring reduction in substance use, improved personal health, and improved social function. Thus, QoL is also relevant to SUD, because it is a construct that incorporates the individual's subjective view of a range of clinical, functional, and personal variables [8].

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Although SUD is difficult to cure, effective treatments are currently available to stabilize patients and reduce harm, thereby increasing life expectancy and QoL [9]. Chronic illnesses have been treated for indeterminate periods, and treatment effects are typically evaluated during the course of those treatments [7]. Monitoring the outcome with specific measures of recovery can produce more efficient, clinically relevant, accountable evaluations. Applying this methodology to the SUD field has given rise to expectations of similar accuracy in evaluating outcomes. Moreover, it has been suggested that these outcomes should be collected and reported immediately and regularly by clinicians from the beginning of addiction treatment sessions, to support evaluations of recovery progress and decision-making with regard to continuing care [7]. Currently, there is evidence that QoL will improve as a function of treatment and recovery in patients with SUD [10-12]. Emerging changes in the SUD treatment field will require the incorporation of QoL indices in treatment development and research [13].

Despite relatively little research that focuses on QoL among the SUD population, it has been shown that QoL is consistently low among individuals with SUD that actively seek treatment compared to individuals without SUD or those with chronic psychiatric conditions [14]. However, few longitudinal studies exist; thus, it remains unknown whether this trend will continue to be positive through a follow-up stage. This question requires following patients for extended periods of time [15]. In Norway, it is also particularly important to evaluate outcomes for patients that were compulsorily admitted to a hospital. Despite 20 years of practice under a "Compulsory Treatment Act", little is known about the outcomes of these patients. The Norwegian Municipal Health Care Act, § 10.2 (NMHCA) sanctions involuntary interventions for non-psychotic adult patients with SUDs [16]. The Act covers an option for retention (up to three months), when the health of the patient is seriously at risk due to extensive, prolonged substance use and voluntary efforts have proven insufficient. The formal decision for compulsory hospitalization is made by the County Committees, a local board of social welfare, consisting of legal experts and laypersons. The specialist health service must take care of these patients in increasing numbers, although both the criteria for compulsory hospitalization and for what further treatment should be offered are ill defined in the law-texts [17].

Aims

The aim of this study was to describe QoL in a cohort of inpatients admitted to voluntary or compulsory hospitalization for SUD, typically with comorbid psychiatric disorders. Additionally, we aimed to examine

changes in QoL at 6 months post treatment, and identify predictors of those changes.

Methods

Setting and procedures

This prospective study followed patients with SUD that were voluntarily and compulsorily hospitalized. The patients were recruited from three different publicly funded treatment centers in the southeastern part of Norway. The centers were located in Kristiansand, Tønsberg, and Oslo. The treatment wards had multidisciplinary staffs, including psychiatrists, psychologists, social workers, occupational therapists, specialized nurses, and other trained staff. The centers offered treatment for patients with primary SUD, often combined with mental disorders (except psychosis). The patient population was drawn mainly from urban and suburban areas.

In Norway, patients with SUD that are compulsorily admitted (CA) and voluntarily admitted (VA) to care are often treated in a single, gender-mixed ward. In the acute phase, the main target for the retention of the CA patients is to provide life-saving treatment; over the long term, the aim is to motivate them to enter voluntary treatment [18]. Treatment included assessments of somatic and mental health. Treatment also included pharmacotherapy; cognitive milieu therapy; and individual motivation enhancement, rather than isolating the patients.

Recruitment for the study continued consecutively from January 1, 2009 to May 31, 2011. The criteria for inclusion were as follows: substance use disorder, age ≥ 18 years, understanding/speaking the Norwegian language, and admitted at least 3 weeks prior to study inclusion allowing them enough time for stabilization. Before study inclusion, the patients were either detoxified, which was verified by negative urine tests for alcohol, opioids, central stimulants (amphetamines, methamphetamines, and cocaine), benzodiazepines, and cannabis; or they spent a minimum of 14 days in detoxification to establish baseline values not influenced by withdrawal symptoms. Patients with cognitive disabilities were excluded when they could not understand the questionnaires. Because pregnant patients with SUD were treated in special wards, they were not included in this study. Follow-up interviews were performed 6 months after discharge from the hospital, and took place in July 2009 through December 2011.

Participants

A total of 326 patients were identified as potentially relevant for this study, but only 228 were eligible, due to various reasons, including insufficient mental capacity, a short stay, or logistical issues. Twenty six refused to participate. Thus, 202 patients were enrolled in the study. Among these, 65 were CA and 137 were VA. The follow-up

was conducted at 6 months after discharge from treatment and 123 patients were reached at follow-up (61%). Significantly more CA patients were included at follow-up (82% versus 59%). This was due to financial constraints in the study and the large geographical uptake area. As patients came from all over the country, it was deemed necessary to prioritize to reach the CA patients nationwide, as compulsory admission was a variable of particular interest for this study. Thus, the higher loss to follow-up in the VA group had administrative and logistic reasons. An attrition analysis showed that there were no differences between those who dropped out and those who were reached at follow-up on demographic data, severity scores or length of stay.

Instruments and measures

The Mini International Neuropsychiatric Interview (MINI), version 5.0, was conducted at baseline to confirm the SUD diagnosis [19]. In the analysis, SUD diagnosis was dichotomized to alcohol use disorder or drug use disorder. Those with both alcohol and drug use disorder were coded as alcohol use disorder. Demographics were recorded. Substance use variables were assessed based on the European Addiction Severity Index (EuropASI), a structured interview designed for both clinical and research purposes [20].

Psychiatric symptom burdens were measured with the Symptom Checklist-90-R (SCL-90-R), which contains 90 items, and measures 9 primary symptom dimensions that provides an overview of a patient's symptoms and their intensity. Each of the 90 items is rated on a five-point Likert-type scale, ranging from "not at all" (0) to "extremely" (4): higher values indicate greater symptom severity during the past week. The Global Symptom Index (GSI) score in SCL-90-R was used to assess the level of general psychological distress [21]. A cut-off score of GSI>1 was used as a general measure of psychopathology [22].

Quality of life was measured with the QoL-5, a generic QoL instrument intended to measure satisfaction with life in general; i.e., it is not disease-specific. Generic instruments are preferred in diseases with multidimensional consequences, like SUD [23]. QoL-5 is based on the integrative theory of the QoL concept [24] and consists of five subjective QoL statements; two questions about health, physical and mental; two questions about the quality of the relationship with important others (partner and friends); and one question about existential QoL, i.e., the relationship with oneself. Responses were based on 5-step ordinal scales that varied from 1=very good to 5=very bad. The raw scores were transposed into a decimal scale, where 1 = 0.9 (the highest/best score) and 5 = 0.1 (the lowest/worse score) [25]. Mean scores for health, relationships, and existential QoL aspects were calculated, and the total QoL score was

calculated as the mean of these three scores. When the patient did not have a partner, the relationship subscore was calculated based on one question. Normative data from a general population sample showed a mean QoL score of 0.69 [26]. The cut-off score for a markedly low QoL was suggested to be a score below 0.55, and an extremely low QoL score was < 0.4 [27]. Changes in QoL were computed by subtracting the QoL determined at admission from the QoL determined at follow up, hereafter called the 'QoL-5 score change'. Thus, a 'positive score change' refers to an improved QoL. A 0.2 or higher score improvement was considered to be a large, clinically important improvement; other improvements were considered moderate (≥ 0.1 score), small (≥ 0.05 score), or very small (< 0.05) [23,28].

Treatment variables

Two treatment variables were evaluated in the analyses: the number of days in treatment and the type of admission to the hospital: voluntary or compulsory.

Follow up variables

The same variables that were used at baseline were measured again at the 6-month follow up. Additionally, the EuropASI was used to measure patient substance use patterns or abstinence and the number of days spent in a controlled environment/treatment during the 30 days preceding the interview.

Missing data

Seven of the 202 participants did not provide QoL-scores at intake (Table 1). Of the 123 patients reached at follow-up, one did not provide QoL data. However, due to missing QoL-scores at intake, only 118 had QoL-scores at both intake and follow-up, which the longitudinal results are based on.

Ethics

The study was approved by The Regional Committee for Research Ethics in Norway (REK 08/206d, 2008/2900, 09/2413) and by the Privacy Issues Unit, Norwegian Social Science Data Services (NSD no. 18782). Written informed consent was obtained from all study participants.

Analysis and statistical methods

Continuous variables are reported as means and standard deviations (SD). Categorical variables are reported as frequencies. Linear regression was performed to explore factors that were associated with QoL at baseline. Results are presented as β -values with 95% confidence intervals (95% CI). To examine predictors of QoL score changes, logistic regression was performed. The QoL-5 score change was dichotomized into groups of high and low score changes, with a cutoff value of ≥ 0.2

Table 1 Baseline socio-demographic variables, quality of life, and mental stress scores for patients with substance use disorder

Variables	Number of patients, N (%) or mean (SD)
Total number of patients, N	202
Mean age, years	30.0 (8.9)
Female gender	68 (34)
Education, years	10.8 (1.9)
Relationship status, single (N=198)	136 (69)
Main diagnosis	
Alcohol use disorder	16 (8)
Both alcohol & drug use disorder	18 (9)
Drug use disorder	168 (83)
Severity scores	
Injection use ^a (N=195)	105 (54)
Duration of most problematic substance use, years	11.1 (7.6)
Global Score Index (SCL-90R – GSI) ^b	1.2 (0.69)
Treatment variables	
Time in treatment, days	57 (26)
Compulsorily admitted	65 (32)
Quality of life (QoL-5 score) (N=195)	0.50 (0.16)

^aFor the 6 months prior to admission.

^bSCL-90-R – GSI: Symptom Check List-90-revised, Global Symptom Index.

(i.e., a large and clinically relevant QoL change). From bivariate analysis, variables with a p-value < 0.2 were included in the multivariate analysis [29]. Results are presented as the odds ratio (OR) with 95% CI. P-values < 0.05 were considered statistically significant. Analyses were performed with SPSS 18.0 Software (SPSS Inc., Chicago, IL, USA).

Results

The 202 participants had a mean age of 30 years and 34% were females (Table 1). All patients met the ICD-10 criteria for SUD; the majority had a drug use disorder (83%). For 56% of participants, the mean GSI score (based on SCL-90) was above the cutoff value for psychiatric pathology.

QoL at baseline

The QoL at baseline was low for a majority of patients; 59% had a QoL-5 score below 0.55 and 34% had an extremely low QoL (<0.40, Figure 1). In a linear regression model, psychiatric symptom distress (SCL90 - GSI) was the only factor significantly associated with QoL (Table 2). The SCL90 - GSI explained 39% of the variance in QoL. Thus, a high psychiatric symptom burden was associated with a low QoL at baseline. We did not find a significant association between substance use severity indices and

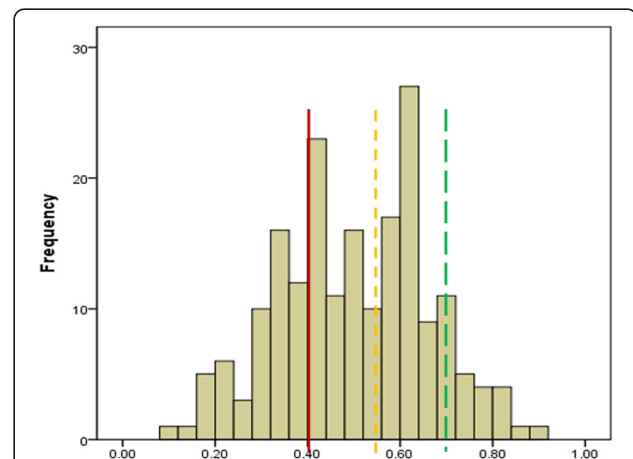


Figure 1 Distribution of Quality of Life scores (QoL-5) at baseline (N=195). The mean QoL-5 was 0.69 in normative data from a general population sample (green line); a value < 0.55 (yellow line) is considered a markedly reduced QoL; a value < 0.4 (red line) is considered a severely reduced QoL.

QoL, and there were no evidence for a difference in QoL scores between the CA and VA groups (Table 2).

QoL at follow up 6 months after discharge from hospital

After 6 months, 58% of patients showed a positive change in QoL score. Improvements in QoL were classified as large (≥ 0.20) in 31 patients (26%); moderate (0.10 – 0.19) in 23 patients (19%); small in 8 patients (7%); and very small in 7 patients (6%). Forty-nine patients (42%) showed either no change or deterioration in QoL. The mean QoL-5 score change showed a significant, though modest, positive improvement of 0.06 (95% CI = 0.03 – 0.09, $t=3.8$,

Table 2 Linear regression analysis shows the effect of independent variables on quality of life at baseline in patients with substance use disorder (SUD), N=195 patients^a

Variable	B (95% CI)	P ^b	R ^{2c}
Age	-0.01 (0.00/0.00)	0.553	
Female gender	-0.03 (-0.08/0.02)	0.268	
Education (years)	-0.01 (-0.02/0.05)	0.238	
Relationship status, single	0.01 (-0.04/0.06)	0.823	
Main SUD diagnosis	-0.02 (-0.08/0.04)	0.532	
Severity Scores			
Injection use	0.11 (-0.38/0.06)	0.671	
Years of using most problematic substance	0.00 (0.00/0.00)	0.942	
Global Score Index: SCL-90R - GSI	-0.15 (-0.18/-0.12)	<0.001	39%
Compulsory hospitalization	0.02 (-0.03/0.07)	0.413	

^aSeven patients had missing QoL scores at intake.

^bP-value obtained from bivariate linear regression. Only one independent variable had P-value < 0.20 in bivariate analyses.

^cR²= squared correlation coefficient in order to obtain a measure of explained variance.

$p < 0.001$, paired samples t-test) for the group as a whole. When analyzed separately the CA group showed a 0.05 mean QoL score improvement (95 % CI = 0.00 – 0.10, $p = 0.055$), which was of similar magnitude to that observed in the VA group (0.07, 95% CI = 0.03 – 0.11, $p = 0.001$).

A logistic regression analysis was performed with a large QoL change (≥ 0.2) as the dependent variable (Table 3). The data offered no evidence for a difference between the CA and VA group in the bivariate analysis, the CA group had an OR 1.28 (95% CI = 0.56 – 2.94). The multivariate analysis only retained gender (females) as a predictor, with an OR of 2.64 (95% CI = 1.12 - 6.22, $p = 0.026$).

Discussion

The majority of patients with SUD that were hospitalized had a seriously impaired QoL. A low QoL at baseline was associated with a high psychiatric symptom burden. At follow-up, the mean QoL score change showed a significant, though modest, positive improvement. Patients admitted either voluntarily or compulsorily had QoL improvements of similar magnitude. Female gender was associated with a clinically relevant improvement in QoL at follow-up.

In this study, we measured QoL with a generic instrument, the QoL-5, in hospitalized patients with SUD. The results showed a seriously impaired QoL at baseline. This finding corroborates previous available evidence, which showed that the QoL was consistently low among individuals with SUD that were actively seeking treatment,

compared to the general population or individuals with other chronic health conditions [14]. Patients with SUD have observed QoL scores as low as or lower than those of patients with other chronic diseases and significantly lower than those of patients awaiting cardiac surgery [11,30].

We found that the psychiatric symptom burden correlated with the perceived QoL. This was somewhat expected, because mental function scores on QoL-scales were previously shown to be remarkably low for patients with SUD that were entering treatment, and on average, they were comparable to those found for patients with clinically-diagnosed depression [30]. Additionally, most patients with SUD that sought help also exhibited comorbid symptom disorders and/or personality disorders [31-33]. Somewhat unexpectedly, we found no association between the substance use severity indices and QoL. In a previous, large meta-analysis, the severity of dependence was the most powerful predictor of a low QoL [14]. The most unexpected finding was that the QoL scores were not different between the VA and CA groups. The NMHCA presupposes that the most serious cases would be those typically selected for compulsory treatment. Our findings implied that the selection of patients for compulsory hospitalization may not depend entirely on the severity factors; thus, other variables might be at play in the selection of these patients (e.g., an intervention by relatives that can put pressure on the social services to act) [34].

Table 3 Predictors of Quality of Life change^a from baseline to follow-up, N=118 patients

Parameter	Bivariate analysis OR (95% CI)	P-value ^b	Multivariate analysis OR (95% CI)	P-value ^c
Age	1.00 (0.96 – 1.05)	0.862	–	
Female gender	2.92 (1.12 – 6.71)	0.013	2.64 (1.12 - 6.22)	0.026
Education (years)	1.12 (0.92 – 1.37)	0.269	–	
Relationship status, single	1.14 (0.43 – 2.80)	0.778	–	
Main diagnosis	0.93 (0.33 – 2.60)	0.891	–	
Severity scores				
Injection use	0.70 (0.31 – 1.53)	0.344	–	
Years of using most problematic substance	1.0 (0.96 – 1.01)	0.737	–	
Global Score Index: SCL-90R - GSI	1.72 (0.97 – 3.04)	0.064	1.52 (0.85-2.70)	0.157
Treatment variables				
Days in treatment	1.01 (0.10 – 1.02)	0.334	–	
Compulsory treatment	1.28 (0.56 – 2.94)	0.554	–	
Follow-up variables				
Abstinence at follow-up	1.51 (0.63 – 3.66)	0.356	–	
Time in a controlled environment (days) ^d	1.03 (0.98 1.03)	0.86	–	

^aThe dependent variable was a dichotomized QoL-5 score change, with a cut-off value of ≥ 0.2 (i.e., a large and clinically relevant QoL change).

^bP-value obtained from bivariate logistic regression.

^cP-value obtained from multivariable logistic regression; multivariable analysis included variables with p-values < 0.20 in bivariate analyses.

^dTime in controlled environment last 30 days before follow-up interview.

A literature search on compulsory hospitalization, though studies were quite limited, showed a tendency for improvement in the QoL following SUD treatment [35-37]. Our findings showed no evidence for a difference in QoL improvements between the CA and VA groups at the six-month follow-up. This similarity may be explained by the practice that the treatment for most patients in the CA group was integrated with that of the VA group as soon as possible. Other countries, like Sweden, use special institutions for patients hospitalized by CA, and they are not integrated with patients hospitalized by VA [38]. The quality of treatment is a crucial factor. Structured, integrated, and long-term treatment provide superior benefit to a "holding" strategy [38].

Compulsory hospitalization of patients with SUD is a controversial practice, both ethically and therapeutically. Many therapists in Norway point out that coercion reduces the patient's control, freedom, and self-determination, and it threatens their autonomy. Therefore, the practice of CA requires strict regulations and documentation of positive outcomes. From an utilitarian perspective, it is necessary to weigh the pros and cons (i.e., the benefits and emotional costs for the patient) associated with this coercion [39]. Coercion should only be used when the pros outweigh, to some extent, the cons. This study has provided some preliminary evidence pointing towards beneficial outcomes also for compulsory treatment, which would be useful in an ethical debate with an utilitarian perspective.

At follow-up, we found that females showed larger improvements in QoL than males. All three wards included in the present study conducted a gender-mixed treatment program. Currently, in Norway, approximately 70% of patients in SUD treatment are men. Recently, woman-specific treatment has been advocated to improve outcomes for women [40,41]. Our findings indicated that the mixed-gender treatment provided greater improvements in QoL for women than for men.

In a review, Gerdner and Berglund point out that American studies show better outcome for CA than VA patients owing to better retention in treatment [38]. Swedish studies found no difference between these two groups. Similarly, we did not find a correlation between days in treatment and QoL outcome in our study.

Given the low QoL among patients with SUD that seek treatment, one would intuitively expect an association between reduced SUD symptoms and QoL improvement, and conversely that QoL would deteriorate among patients that relapsed [11]. Thus, it was unexpected in the present study to find that abstinence at follow-up was not a predictor for large improvements in QoL. However, the literature have reported mixed findings; some studies provided evidence that QoL improved with abstinence [42,43], but others found that there is not necessarily a link between the two [43,44]. For

example, there was no correlation between a reduction in substance use and general life satisfaction among dually-diagnosed patients three years after assertive community treatment [44]. Those findings implied that improved QoL may not rely upon abstinence alone. In addition to reduced substance use, one should also focus on a broad range of factors that may underlie patient evaluation of QoL; most notably, important areas of recovery, like employment, housing, and means of social support; e.g., via mutual aid groups [45].

Methodological considerations

This study had some limitations that should be considered when interpreting the results. There was a high attrition rate. However, the attrition analysis showed that there were no differences between those who dropped out and those who were included at follow-up with one exception; a larger proportion of CA patients was reached at follow-up. The higher drop-out in the VA group was due to administrative/logistic reasons. Thus, we do not believe that this has biased or reduced the generalizability of our findings. The follow-up rate of the CA group was quite respectable because this group was prioritized and the sample size was considered large enough for the performed regression analyses [46]. As the sample size and thus, power was smaller in the sample at follow-up than at baseline, these findings should be interpreted with caution. Self-reported information obtained from a QoL questionnaire poses a challenge in assessing experiences of the disease in a patient that was hospitalized by CA. Patients hospitalized by VA may generally be expected to be more cooperative than those hospitalized by CA. However, in this study, patients hospitalized by CA were not approached until they had "settled" down and had remained for some weeks in the wards; thus, they were considered competent for consent in participating in the study. It is not ethical to randomize to voluntary treatment patients that are deemed in need for compulsory treatment. Conversely; patients that are not deemed in need for compulsory treatment should not be randomized to a CA group. Thus, there were no random allocations of the participants in this study.

The study strengths were that this was, to our knowledge, the first study in Norway to assess clinical outcomes in patients hospitalized by CA. This study also reported longitudinal data.

Conclusion

We showed that specialized SUD treatment improved QoL for patients with SUD. Our results also showed that females benefited more than males from a gender-mixed treatment paradigm. Our findings pointed to the usefulness of QoL measurements as evidence of therapeutic benefit in the recovery process in the SUD field.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

ARP participated in designing the study and interpreting results; in addition, ARP performed the analysis, and drafted the manuscript. AO participated in designing the study, collecting data, interpreting results and drafted the manuscript. JKV participated in designing the study, performing the analysis, interpreting results and drafted the manuscript. ØK and TC participated in designing the study, interpreting results, and drafting the manuscript. All authors read and approved the final manuscript.

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References

- Schipper H, Clinch JJ. Quality of Life Studies: Definitions and Conceptual Issues. In: Spilker B, editor. *Quality of Life and Pharmacoeconomics in Clinical Trials*. Philadelphia: Lippincott-Raven Publishers; 1996. p. 11–23.
- Oliver J, Huxley P, Bridges K, Mohamad H. *Quality of Life and Mental Health Services*. London: Taylor & Francis/Routledge; 1996.
- Wood-Dauphinee S. Assessing quality of life in clinical research: from where have we come and where are we going? *J Clin Epidemiol*. 1999;52:335–63.
- Muldoon M, Barger S, Flory JD. What are quality of life measurements measuring? *BMJ*. 1998;316:542–5.
- McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, et al. The fifth edition of the addiction severity index. *J Subst Abuse Treat*. 1992;9:199–213.
- Venner KL. Course of recovery from alcoholism. *Alcohol Clin Exp Res*. 2006;30:1079–90.
- McLellan A, McKay JR, Forman R, Cacciola J, Kemp J. Reconsidering the evaluation of addiction treatment: From retrospective follow-up to concurrent recovery monitoring. *Addiction*. 2005;100:447–58.
- Bonomi AE, Patrick DL, Bushnell DM, Martin M. Validation of the United States' version of the World Health Organization Quality of Life (WHOQOL) instrument. *J Clin Epidemiol*. 2000;53:1–12.
- Van den Brink W, Haasen C. Evidenced-based treatment of opioid-dependent patients. *Can J Psychiatry*. 2006;51:635–46.
- McNeese-Smith DK, Wickman M, Nyamathi A, Kehoe P, Earvolino-Ramirez M, Robertson S. Gender and ethnicity group differences among substance abuse treatment clients insured under managed care. *J Addict Nurs*. 2009;20:185–202.
- Laudet AB, Becker JB, White WL. Don't wanna go through that madness no more: quality of life satisfaction as predictor of sustained remission from illicit drug misuse. *Subst Use Misuse*. 2009;44:227–52.
- Raisch DW, Campbell HM, Garnand DA, Jones MA, Sather MS, Naik R, et al. Health-related quality of life changes associated with buprenorphine treatment for opioid dependence. *Qual Life Res*. 2012;21:1177–83.
- Laudet AB. The case for considering quality of life in addiction research and clinical practice. *Addict Sci Clin Pract*. 2011;6:44–55.
- Donovan D, Mattson M, Cisler R, Longabaugh R, Zweben A. Quality of life as an outcome measure in alcoholism treatment research. *J Stud Alcohol Suppl*. 2005;15:119–39.
- Gonzales R, Ang A, Marinelli-Casey P, Glik DC, Iguchi MY, Rawson RA. Health-related quality of life trajectories of methamphetamine-dependent individuals as a function of treatment completion and continued care over a 1-year period. *J Subst Abuse Treat*. 2009;37:353–61.
- Ministry of Health and Care Services (MHCS). *The Municipal Health Care Act*. Oslo: MHCS; 2011.
- Lundeberg IR, Mjåland K, Søvig KH. *Tvang i rusfeltet - Regelverk, praksis og erfaringer med tvang*. Oslo: Gyldendal Juridisk; 2014.
- Opsal A, Kristensen O, Larsen TK, Syversen G, Rudshaug EBA, Gerdner A. Factors associated with involuntary admissions among patients with substance use disorders and comorbidity: a cross-sectional study. *BMC Health Serv Res*. 2013;13:57.
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59:22–33.
- Kokkevi A, Hartgers, C. EuroPAS. European adaptation of a multidimensional assessment instrument for drug and alcohol dependence. *Eur Addict Res*. 1995;1(4):208–210.
- Derogatis LR. *SCL-90-R: Administration, Scoring And Procedures Manual for the R (evised) version and other Instruments of the Psychopathology Rating Scale Series*. Towson, MD: Clinical Psychometric Research; 1986.
- Derogatis LR, Lipman RS, Covi L. SCL-90: An outpatient psychiatric rating scale, preliminary report. *Psychopharmacol Bull*. 1973;9(1):13–28.
- Lindholt JS, Ventegodt S, Henneberg EW. Development and validation of QoL5 for clinical databases. A short, global and generic questionnaire based on an integrated theory of the quality of life. *Eur J Surg*. 2002;168:107–13.
- Ventegodt S, Merrick J, Andersen NJ. Quality of life theory I. The IQOL theory: an integrative theory of the global quality of life concept. *TheScientificWorldJOURNAL*. 2003;3:1030–40.
- Ventegodt S, Merrick J, Andersen NJ. Measurement of quality of life II. From the philosophy of life to science. *TheScientificWorldJOURNAL*. 2003;3:962–71.
- Lindholt JS. Mean QoL5 scores for Danish population. 2010.
- Ventegodt S. QoL-5 - cut off Scores for Markedly and Severely Reduced QoL. 2010.
- Ventegodt S, Merrick J, Andersen NJ. Editorial: a new method for generic measuring of the global quality of life. *TheScientificWorldJOURNAL*. 2003;3:946–9.
- Altman DG. *Practical Statistics for Medical Research*. London: Chapman & Hall/CRC; 1991.
- Smith KW, Larson MJ. Quality of life assessments by adult substance abusers receiving publicly funded treatment in Massachusetts. *Am J Drug Alcohol Abuse*. 2003;29:323–35.
- Kessler RC. Impact of substance abuse on the diagnosis, course, and treatment of mood disorders: the epidemiology of dual diagnosis. *Biol Psychiatry*. 2004;56:730–7.
- Bakken K, Landheim AS, Vaglum P. Axis I and II disorders as long-term predictors of mental distress: A six-year prospective follow-up of substance-dependent patients. *BMC Psychiatry*. 2007;7:29.
- Ellingstad TP, Sobell LC, Sobell MB, Planthara P. Drug treatment outcome methodology 1993–1997: Strengths, weaknesses, and a comparison to the alcohol field. *Addict Behav*. 2002;27:319–30.
- Lundeberg IR, Mjåland K, Grenser for tvang. Om sosialtjenestens rolle i bruk av tvang overfor rusmiddelmissbrukere [The limits of coercion. The role of the social services in use of coercion against substance addicts]. Bergen: Rokkansenteret; 2009.
- Liu T, Li L, Zhao M, Hao W. A comparative study of the quality of life in heroin dependent patients. *Chin J Clin Psychol*. 1998;6:85–7.
- Pollard JM. Effects of differing types of perceived coercion on participants in jail diversion programs. *Diss Abstr Int B Sci Eng*. 2007;67:5419.
- Freeman K. Health and well-being outcomes for drug-dependent offenders on the NSW Drug Court programme. *Drug Alcohol Rev*. 2003;22:409–16.
- Gerdner A, Berglund M. *Compulsory Care for Substance Misuse – Effect and Quality*; in *Misuse, Knowledge and Care-Research Appendix of the Government Task Force on Substance Misuse SOU 2011:6*. Stockholm: Ministry of Health and Social Affairs; 2009. p. 653–770.
- Torbjorn T. *Coercive Care: Ethics of Choice in Health & Medicine*. London: Routledge; 2002.
- Kringlen E, Torgersen S, Cramer V. A Norwegian psychiatric epidemiological study. *Am J Psychiatry*. 2001;158:1091–8.
- Duckert F, Lossius K, Ravnal E, Sandvik B. *Kvinner og Alkohol (Women and alcohol)*. Oslo: Universitetsforlaget; 2008.
- Kraemer KL, Maisto SA, Conigliaro J, McNeil M, Gordon AJ, Kelley ME. Decreased alcohol consumption in outpatient drinkers is associated with improved quality of life and fewer alcohol-related consequences. *J Gen Intern Med*. 2002;17:382–6.
- Villeneuve PJ, Challacombe L, Strike CJ, Myers T, Fischer B, Shore R. Change in health-related quality of life of opiate users in low-threshold methadone programs. *J Subst Use*. 2006;11:137–49.

44. McHugo GJ, Drake RE, Whitley R, Bond GR, Campbell K, Rapp CA, et al. Fidelity outcomes in the national Implementing Evidence-based Practices project. *Psychiatr Serv.* 2007;58:1279–84.
45. Vederhus JK, Timko C, Kristensen O, Hjemdahl B, Clausen T. Motivational intervention to enhance post-detoxification 12-Step group affiliation: A randomized controlled trial. *Addiction.* 2014;109:766–73.
46. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. Boston: Pearson Education Inc.; 2001.

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