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VIOLENT BEHAVIOR AND VIOLENT VICTIMIZATION IN GENERAL PSYCHIATRIC PATIENTS – PREVALENCE AND PREDICTION

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TO VINCENT, ISABELLE, JESSICA, AND OUR UNBORN BABY

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ABSTRACT

The intriguing question of how mental disorder and violence relate to each other has become an epic academic debate. During the last decades, there has been a change in direction of the debate on individuals with mental disorder, with a greater focus on violent victimization than violent behaviour towards others. Up until now, no Swedish study has investigated the frequency of violent behaviour among general psychiatric patients undergoing psychiatric treatment. Moreover, no Swedish study so far has investigated the relative risk of victimization in general psychiatric patients, in comparison to the general population. The aim of this dissertation was to investigate these issues and to validate the risk assessment method Classification of Violence Risk (COVR)™.

Method: In study I, general psychiatric patients were recruited from two public psychiatric hospitals in Stockholm County (n=390). The control group consisted of gender- and age-matched subjects recruited from an annual national survey of living conditions, (conducted by Statistics Sweden) (n=1170).

Studies II-IV consisted of prospective follow-ups on 331 patients. At baseline, clinical and socio-demographic variables were collected and a COVR assessment was conducted. Follow-up included telephone interviews with the patients and collaterals 10 and 20 weeks after baseline. Violent behaviour was self-reported and in addition, data was collected from a national criminal register.

Results: Twenty percent of the patients had been victimised during the year preceding inclusion. The relative rate of victimization was six times higher in patients compared to controls. Women appeared to be most vulnerable with a 10-fold risk increase (Study I).

The base rate of violent behaviour was 5.7% and a receiver operating curve analysis (ROC) showed that the area under the curve (AUC) for COVR was 0.77. The gender gap concerning violent behaviour among the general population was not replicated, since there was no significant gender difference with respect to violent acts 20 weeks after discharge. The predictive validity of the COVR software was comparable between females and males. There was an overlap between offenders and victims among psychiatric patients (Studies II-IV).

Conclusions: The risk of being subjected to violence is high among Swedish psychiatric patients. The findings are most pronounced for female patients. Research, clinicians and social policy should target the problem of victimization.

The base rate of violent behaviour towards others is relatively low among general psychiatric patients in Sweden. Therefore, prediction is difficult. Violent behaviour was uncommon in female as well as male patients and there were no gender differences. The COVR software could significantly predict violent behaviour and its validity was comparable to other risk assessment tools. COVR predicted violent behaviour with the same precision in both genders. The overlap between offenders and victims should be taken into account in both research and clinical settings.

LIST OF PUBLICATIONS

I. **Sturup J**, Sorman K, Lindqvist P & Kristiansson M. Violent victimization of psychiatric patients: A Swedish case-control study. Social Psychiatry and Psychiatric Epidemiology 2011;46:29-34.

II. **Sturup J**, Kristiansson M & Lindqvist P. Violent behavior by general psychiatric patients in Sweden – Validation of Classification of Violence Risk (COVR) software. Accepted in Psychiatry Research.

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LIST OF ABBREVIATIONS

AUC	Area under the curve
CAGE	Cut down, annoy, guilty, eye-opener
CI	Confidence interval
COVR	Classification of Violence Risk (software)
ICD	International Classification of Diseases
MacVRAS	MacArthur Violence Risk Assessment Study
OR	Odds ratio
ROC	Receiver operating characteristics
SBU	Swedish Council on Technology Assessment in Health Care
SD	Standard deviation
SIV	Schedule of Imagined Violence
ULF	Swedish Annual Survey of Living Conditions
WHO	World Health Organization

1 INTRODUCTION

The intriguing question as to how mental disorder and violence relate to each other has inspired an epic academic debate. One current trend is a shift in focus from violent behavior towards others to violent victimization of people with mental disorder. Although there is a minor to moderate heightened risk of people with mental disorder committing violent crimes, this violence represents only a fraction (3–5%) of all violent crimes committed in society (Swanson, 1994; Fazel & Grann, 2006). People with mental disorder are more likely to become violently victimized (e.g., Teplin et al., 2005) and their share of all victimization is probably higher than 3–5% (Meuleners et al., 2008).

The literature reports that more than fifty percent of the general population perceives people with mental disorder as dangerous (Schnittker, 2008; Grausgruber et al., 2009). Some studies report that this figure is increasing (Grausgruber et al., 2009). Despite the costly consequences of a hardening attitude towards the mentally ill, only a few studies have examined whether violence committed by people with mental disorder is an increasing problem or not. The majority report a decrease in the relative rate of violence committed by people with mental disorder (Taylor & Gunn, 1999; Simpson et al., 2004; Large et al., 2008). Moreover, some studies report that an increased risk among people with mental disorder is due to an overall increased risk of violence in the general population (Vevera et al., 1998; Wallace et al., 1998; Wallace et al., 2004; Putkonen et al., 2008). Yet, there is no Swedish study that reports on the frequency of violent behavior among general psychiatric patients in current treatment. Moreover, there are no studies from Sweden of victimization of such patients and of their relative risk of victimization compared to the general population.

2 BACKGROUND

2.1 VICTIMIZATION AMONG PEOPLE WITH MENTAL DISORDER

Adult violent victimization refers to physical violence against an adult. Violence towards people with mental disorders appears to be a neglected area in research as well as in clinical practice, in contrast to the well-researched link between mental disorder and violent behavior towards others. The literature reports a high rate of victimization in people with mental disorders (Choe et al., 2008; Maniglio, 2009; for an extended review of European studies, see Table 1). An important review of North American studies shows that the rate of victimization far exceeds the rate of violent behavior towards others among people with schizophrenia, mood disorders, and psychotic disorders. The study concludes that victimization of people with mental disorders should be of greater public health concern than their violent behavior towards others (Choe et al., 2008). A more recent review reports high victimization rates in Europe as well (Maniglio, 2009). The review applies a narrower search strategy (Khalifeh, 2009) and does not include studies on violent behavior towards others.

Table 1. Rates of violent victimization among people with mental disorder in clinical studies from Europe 1990 to 2010

Setting Author Year	N	% females	Design	Sample	Definition of victimization	Observation period	Rate of victimization	Victimization rate in the general population[1]
Italy Warner 1998	70	30%	Retrospective	Outpatients with schizophrenia and schizoaffective disorder	Assaulted	1 year before inclusion	11%	2.0%
Netherlands Bouman 2008	70	0%	Retrospective	Male outpatients with psychotic disorder and personality disorder	Victim of violence	1 year before inclusion	Males 20%	4.5%
Germany & Switzerland Priebe 1998	48	42%	Retrospective multisite	Outpatients with schizophrenia	Assault victim	1 year before interview	Overall 29% Germany 21% Switzerland 37%	Germany 3.6% Switzerland 3.0%
Sweden, Germany & Finland (Canada) Hodgins 2007	98	0%	Prospective follow up, multisite	Male inpatients with schizophrenia or schizoaffective disorder	Assaulted	6 months before inclusion	Males 18%	Sweden 3.6% Germany 3.6% Finland 4.6%

[1] Non-lethal violent victimization from the International Crime and Victimization Survey (ICVS) (van Wilsem, 2004)

Sweden Bengtsson-Tops 2005	1382	100%	Retrospective questionnaire	Female inpatients and outpatients with mental disorder	Sexual and physical violence	1 year before inclusion	Females 9%	3.6%
Italy Ruggeri 2001	183	62%	Naturalistic longitudinal	Inpatients with mental disorder	Victim of violence	1 year before inclusion	10%	2.0%
UK Taylor 1999	138	52%	Prospective follow-up	Inpatients and outpatients with psychosis	Assaulted	2 years after inclusion	11%	4.8%
UK & Germany Heinze 1997	134	42%	Retrospective multisite	Inpatients with paranoid schizophrenia	Victim of assault	1 year before inclusion	Overall 11% UK 8% Germany 13%	UK 4.8% Germany 3.6%
UK Gilvarry 1999	147	47%	Prospective follow-up	Inpatients with psychotic illness	Assaulted	2 years after inclusion	44%	4.8%
UK Dean 2007	632	44%	Retrospective cohort	Inpatients and outpatients with psychotic disorder	Beaten, assaulted, molested or otherwise victim of a violent crime	2 years after inclusion	Overall 23% Males 25% Females 21%	4.8%
Finland Honkonen 2004	670	46%	Prospective cohort	Inpatients with schizophrenia	Victim of a violent crime	3 years after discharge	Overall 6% Males 8% Females 2%	4.6%
UK Walsh 2003	691	42%	Retrospective	Inpatients and outpatients with psychotic disorder	Beaten, assaulted, molested or otherwise victim of a violent crime	1 year before inclusion	Overall 16% Males 18% Females 12%	4.8%
UK Hodgins 2007	205	41%	Retrospective cohort	Inpatients with severe mental illness	Victim of at least one aggressive act	6 months before inclusion	Overall 53% Males 57% Females 48%	4.8%
France, Germany & UK Schomerus 2007	1208	39%	Prospective follow up, multisite	Inpatients and outpatients with schizophrenia	Victim of a violent crime	6 months before and 2 years after inclusion	10%	France 4.3% Germany 3.6% UK 4.8%

In Table 1 the occurrence of violent victimization among 14 samples from Europe is presented, together with the occurrence of victimization among the general population from the International Crime and Victimization Survey (van Wilsem, 2004). The rate of victimization ranged from 2% to 44% among patients and from 2% to 4.8% in the general population. The studies on victimization were rather homogeneous, and all but two investigated victimization among severely ill patients.

More importantly, three controlled studies indicate that the risk for victimization is substantially higher in psychiatric patients than in the general population (Silver, 2002; Silver et al., 2005; Teplin et al., 2005). Using victimization data from 270

patients in the MacArthur Violence Risk Assessment Study (MacVRAS) and data from a sample of 477 controls recruited from the same neighborhoods, Silver (2002) showed that patients were twice as likely to be victimized compared to controls. A retrospective controlled study from the United States reports that people with severe mental illness have an eleven-fold increased risk of being violently victimized compared to the general population, controlling for gender, age, income, and race (Teplin et al., 2005). In a study on data from the Dunedin birth cohort study, Silver and colleagues (2005) examined the risk of victimization among people with mental disorder and victimization at age 21. The results showed that people with anxiety disorder were more often subjected to sexual victimization and that people with schizophrenia were more likely to be threatened and subjected to physical assault. The overall risk of being subjected to physical assault was three times higher in people with schizophrenia, compared to people without mental disorder.

Violent and sexual victimization towards people with major mental disorders have been linked to poor community functioning, homelessness, hallucinations, delusions, and low quality of life (Lam & Rosenheck, 1998; Read et al., 2003; Hodgins et al., 2009). Only three studies have examined the impact of treatment for the occurrence of victimization (Taylor et al., 1998; Hiday et al., 2002; Dean et al., 2007). The two studies from the UK found no significant reduction of victimization in an intensive treatment group compared to a standard treatment group (Taylor et al., 1998; Dean et al., 2007). The third study, from the United States, was based on people with severe mental illnesses and showed that patients who were discharged to outpatient mandatory treatment were significantly less likely to be victimized than patients who were discharged without such compulsory treatment (Hiday et al., 2002). In summary, not until recently has victimization been highlighted as a clinical problem that needs to be prevented, not only in general psychiatry but also in forensic psychiatry (Dean, 2008; Nedopil, 2009).

2.2 VIOLENT BEHAVIOR AND PEOPLE WITH MENTAL DISORDERS

Violent crimes committed by offenders with severe mental disorders comprise a minor part of all violent crimes in Sweden and elsewhere (Swanson, 1994; Fazel & Grann, 2006). However, epidemiological studies from the early 1990s and onwards have consistently shown that mental disorder is linked to an increased risk of criminal violence (Hodgins, 1998). Individuals suffering from a severe mental disorder are

overrepresented by a factor of 4–6 among those recorded for a violent crime, compared to the general population (Swanson et al., 1990; Lindqvist & Allebeck, 1990; Hodgins, 1992; Brennan et al., 2000). Such research findings have reinforced the traditional image of people with mental disorder as potential threats to the public. Yet, early observations that the increased risk may relate to concomitant substance abuse rather than the disorder itself (Swanson et al., 1990; Lindqvist & Allebeck, 1990) have not been fully acknowledged until more recently, when this association has been confirmed in a series of larger studies with appropriate comparison groups (Steadman et al., 1998; Elbogen & Johnson, 2009; Fazel et al., 2009a; Fazel et al., 2010a; Volavka & Swanson, 2010) and also summarized in a meta-analysis (Fazel et al., 2009b).

Violence can be defined in numerous ways to include everything from aggressive acts against property to homicide (Monahan & Steadman, 1994; Madden, 2007). In this thesis, unless otherwise noted, violence is defined in a clinical, not juridical, way, following Monahan and colleagues (2001), as:

> any acts that include battery that resulted in physical injury; sexual assaults; assaultive acts that involved the use of a weapon; or threats made with weapon in hand.

In an extensive prospective study from North America on the MacVRAS sample, the occurrence of violent behavior was compared between patients with mental disorder and their healthy neighbors. The results indicated that patients were no more likely to be violent, when controlling for socio-demographical variables and substance misuse (Steadman et al., 1998). Another prospective, population-based study from North America (Elbogen & Johnson, 2009) reports that severe mental disorder alone did not predict violent behavior during a follow-up period of three years. However, having a severe mental disorder and a comorbid dependence disorder did predict violent behavior. Violence towards others was associated with past violence, juvenile detention, physical abuse, age, gender, income, and victimization. These risk factors were more common in people with severe mental disorder than in individuals from the general population.

In a recent study from Sweden, the risk of being convicted of a violent crime was examined in people with schizophrenia in comparison to a matched sample (age,

gender, income, marital and immigration status) from the general population (Fazel et al., 2009a). Overall, the odds ratio (OR) of individuals with schizophrenia being convicted of a violent crime was 2.0; however, subanalyses with respect to substance abuse showed that the OR for individuals with schizophrenia but without substance abuse was 1.2 compared to the controls without substance misuse. The OR for individuals with schizophrenia and a substance use disorder was 4.4 compared to controls with comorbid substance abuse disorder. Similar results were later reproduced among individuals with bipolar disorder (Fazel et al., 2010a; Fazel et al., 2010b).

In Table 2 an overview of European clinical studies reporting violent behavior towards others by people with mental disorder is reported. The table shows that risk of violent behavior towards others in eight European studies is lowest in Finland (3%) (Honkonen et al., 2004); the highest risk (29%) is reported by Hodgins et al. (2007) in an all-male patient multisite study from Sweden, Germany, and Finland.

Table 2. Rates of violent behavior among people with mental disorder in clinical studies from Europe published 1990 to 2010

Setting Author Year	n	% females	Study design	Sample	Definition of violence	Observation period	Rate of violent behavior
UK Wright 2002	40	45%	Cross-sectional study	Inpatients and outpatients with mental illness	Being in a fight, hitting anyone, arson or threaten someone	6 months before admission	Overall 25% Males 41% Females 5%
Norway Roaldset 2010	381	45%	Prospective cohort	Inpatients with any mental disorder	Violent act according to MacVRAS[a]	12 months after discharge	5%
UK Scott 1998	92	17%	Retrospective cohort	Inpatients and outpatients with psychosis or dual diagnosis	Violent acts according to WHO life chart[b]	5 years before inclusion	5%
Germany Steinert 1999	138	44%	Retrospective cohort, review of medical records	Inpatients with first episode of schizophrenia	Violence against person according to MOAS[b]	During first hospitalisation	Overall 23% Males 32% Females 13%
Ireland Foley 2005	157	45%	Retrospective cohort	Inpatients and outpatients with first episode of psychosis	Violence against person according to MOAS[b]	1 week before referral	7%
Italy Colasanti 2008	267	37%	Retrospective cohort	Inpatients with mental disorder	Aggressions against others according to MOAS[b]	1 week before admission	18%
UK Doyle 2006	77	-	Retrospective cohort	Inpatients with mental disorder	Violent act according to MacVRAS[a]	24 weeks after discharge	22%

Norway Hartvig 2006	110	50%	Prospective follow-up	Inpatients with mental disorder	Physical violence	1 year after discharge	Overall 12% Males 12% Females 11%
UK Crebbin 2008	251	30%	Prospective cohort	Inpatients and outpatients with first episode of psychosis	Physical harm	1 year after first contact	12%
UK Killaspy	166	42%	Prospective randomised trial	Inpatients and outpatients with mental illness	Physical assault leading to victim requiring hospital treatment	1.5 years after inclusion	21%
Sweden, Finland & Germany (Canada) Hodgins	98	0%	Prospective cohort, multisite	Male inpatients with schizophrenia or schizoaffective disorder	Engaged in aggressive behavior according to MacVRAS[a]	2 years after discharge	Males 29%
UK Milton	166	47%	Prospective cohort	Inpatients and outpatients with first episode of psychosis	Violent act according to MacVRAS[a]	3 years after first contact with services	5%
Greece Ecounomou	51	51%	Prospective cohort	Outpatients with schizophrenia	Slapping or punching	4 years after inclusion	8%
UK Dean	632	44%	Retrospective cohort, multisite	Inpatients and outpatients with psychosis	Physical assault	2 years before inclusion	18%
UK Humphreys	253	42%	Retrospective cohort	Inpatients and outpatients with first episode of schizophrenia	Life threatening behavior	1 years before admission	19%
UK Dean	708	42%	Prospective randomised trial, multisite	Inpatients and outpatients with psychosis	Physical assault	2 years after inclusion	22%
Finland Honkonen	666	46%	Semi-prospective cohort	Inpatients with schizophrenia	Perpetration of a violent crime	3 years after discharge	Overall 3% Males 4% Females 1%
UK Hodgins	205	41%	Retrospective cohort	Inpatients with severe mental illness	Violent act according to MacVRAS[a]	6 months before admission	Overall 20% Males 22% Females 19%

[a] = MacArthur Violence Risk Assessment Study (Monahan et al., 2001); [b] = Modified Overt Aggression Scale (Kay et al, 1988); [c] = World Health Organization-chart (Susser et al, 1992)

In summary, recent epidemiological studies do not support earlier views that people with severe mental illnesses are disproportionately violent or more often convicted of violent crimes compared to the general population, when appropriate confounders are taken in account and when proper control groups are used (Steadman et al., 1998; Elbogen & Johnson, 2009; Fazel et al., 2009a; Fazel et al., 2010; Fazel et al., 2010b). These studies can inform clinicians where preventive measures can be taken. Still, clinical risk must be handled, both on a group level and also on an individual level (Gunn, 2006; Gunn & Taylor, 2007; Maden, 2007; Mullen, 2006; Mullen & Ogloff, 2007; Swanson, 2008; RCP, 2008).

2.3 RISK ASSESSMENTS

One part of a physician's assessment of a candidate for civil commitment (and involuntary psychiatric treatment) in Sweden is to consider the danger the patient poses to self or others. Although risk assessment of people with mental illness is standard in Sweden, as well as in many other countries, empirical data on the base rate and other core characteristics of non-institutional violent behavior by a non-forensic, clinical patient population are sparse. Rather, Swedish research on this topic has been dominated by large register studies using violent convictions after discharge as outcome (Lindqvist & Allebeck, 1990; Hodgins, 1992; Fazel et al., 2009a; Fazel et al., 2010), which only covers a fraction of all incidents of violent behavior. Most acts of violence are not recorded in a criminal register and individuals found in registers may not be current patients at the time of the criminal violent behavior.

It is essential to separate the use of risk assessment methods in legal, versus treatment, settings. A psychiatric report for the court is intended to deliver definitive, irreversible, and unambiguous answers, and the report will assist the court in deciding on the most appropriate sanction. Risk assessment in a treatment context is part of a dynamic intervention process, closely linked to therapeutic risk management and continuously reversible at any time. The assessment is to be used by the clinicians therapeutically, on a day-to-day basis as the clinical status of the patient changes, thereby providing the patient with better treatment and care. The assessment can instantly be used therapeutically, providing the patient with better treatment and care (Mullen & Ogloff, 2007), a notion conducive to the development of research, where the paradigm is shifting from "dangerousness" to "risk and need assessment" (Heilbrun, 1997).

The Swedish Council on Technology Assessment in Health Care (SBU) has published an extensive meta-analysis of studies concerning the evidence base for risk prediction in general psychiatry, as well as in forensic psychiatry (SBU, 2005). One of the conclusions of the comprehensive and authoritative Swedish review on violence risk assessment is that results from studies from other countries cannot automatically be translated into Swedish practice (SBU, 2005). Much research concerning risk for violence by mentally disordered people has revolved around the efficacy versus the efficiency of actuarial risk assessment instruments.

The conclusions of the review were

- The predictive accuracy of actuarial risk prediction is presently, at best, 70–75%.
- There is no evidence that existing risk assessment methods work for women.
- Risk assessments can predict the propensity of forensic and general psychiatric patients to commit acts of violence in the community for the next few years, but not days or weeks after discharge.
- The accuracy of the methods is not tested for different ethnic groups.

The report states that there is a want of

- Risk assessment procedures that catch dynamic and therapeutically accessible risk factors;
- Risk assessment procedures concerning females;
- Efficient short-term prediction of violence;
- Studies conducted in the Swedish culture/context; and
- Controlled comparative studies of different risk assessment methods.

The predictive validity of an assessment of future violent behavior is closely linked to the base rate of violence committed by the group to which the individual belongs (Douglas & Ogloff, 2003; Wollert, 2006). The base rate, in turn, depends on (a) the group composition, (b) the follow-up time, and (c) the nature of the violent behavior. Characteristics of the particular group are of crucial importance and a risk assessment method may be valid for one group but altogether invalid for another group with other features, such as gender and age distribution, criminal and mental history, social position, and access to professional services. The difference in base rates of violent behavior in different countries and in different populations within countries is thus one crucial factor to consider in decisions concerning best practice in risk assessment (Douglas & Ogloff, 2003; Munro, 2004; Doyle & Dolan, 2006).

The base rate is also defined by the duration of the observation period. The clinical perspective is usually hours, days, or, for outpatients, some months. Because of the cumulative effect of base rate, the longer the follow-up time, the better the predictive value. This poses an ethical dilemma: should a practitioner impose restrictions on patients, called for by an assessment that indicates that a violent act, of any kind, is

likely to occur within the next ten years? And even worse, the likelihood of that act is highest at the end of the 10-year period. In regular psychiatric practice, the responsible psychiatrist is mainly guided by the prognosis of the mental state and expected behavior up to the next team conference or the next consultation. An often cited study of violent acts in such a short, but clinically relevant, period reports a base rate of 4% violent acts in a sample of civilly committed psychiatric patients two weeks after discharge (Tardiff et al., 1997). The lower the base rate, the more difficult it is to produce a clinically useful instrument. Consequently, homicide is more difficult to predict than an act of minor physical violence (Munro, 2004).

2.4 CLASSIFICATION OF VIOLENCE RISK (COVR)™

The MacArthur study on violence and mental disorder is the largest and most comprehensive study ever done in the area of risk of violence and mental disorder. It is based on recording violent behavior by patients discharged from acute psychiatric care. A large range of factors were studied and outcome measurements of violence were triangulated, adding self-reports and reports of a collateral informant to data from official police and hospital records.

The MacArthur Violence Risk Assessment Study has developed the risk prediction instrument Classification of Violence Risk (COVR™) (Monahan et al., 2001; Monahan et al., 2005). The instrument is based on data from the, so far, largest prospective violence risk study of psychiatric patients. COVR is a software program with a tree-based prediction model involving numerous risk and protective factors, too many to handle manually (Monahan et al., 2005). Different factors are assessed for different patients and the program produces a series of questions, up to a maximum of 40, that emerge on the screen, depending on the patient's answer to the previous question. The software analyzes the responses, resulting in a risk calculation that categorizes the likelihood of future violent behavior into five risk groups, with an estimated risk ranging from 1% to 76%. This result can be expressed in several formats: category, frequency, and probability.[2] The inter-rater reliability of COVR has been reported to be good, 96.6% consistency between raters, and kappa 0.93 (Carl Tam, 2011).

[2] The COVR software is a registered product and the cost of the program is $320. The cost for each report produced after installation of the software is approximately $10 (January 2011).

The cross-validation of COVR has produced mixed results. In a first validation study, Monahan et al. (2005) concluded that COVR might be helpful for clinicians in making decisions about acute psychiatric patients. Snowden et al. (2009) concluded that the instrument could be used to predict institutional violence within the forensic mental health system in the United Kingdom. Two studies on general psychiatric patients, one from Canada (n=239) and one from Taiwan (n=167), showed that COVR could significantly predict violent behavior 20 weeks after discharge (McMaster, 2011; Carl Tam, 2011). However, another UK study claimed that the instrument could not significantly predict violent acts twenty weeks after discharge among general psychiatric patients (Doyle et al., 2010).

2.5 GENDER DIFFERENCES

Risk factors for violent behavior have mainly been validated in different populations of males. Therefore, it is reasonable to question the relevance of applying the same risk factors to females (Logan & Blackburn, 2009; Doyle et al., 2010). In 2009, 14,348 individuals were convicted of violent crimes in Sweden, of whom 1,741 were females (www.bra.se). This relative difference is the same even for more severe types of violent crimes, such as homicide. Hence, in Sweden, nine out of ten individuals convicted of a violent crime are males; the same figures have been found in the United States (Monahan, 1992). It has been questioned, however, whether this figure applies to all subpopulations in the community (Robbins et al., 2003; Skeem et al., 2005a). The gender gap seems to shrink when other measurements, such as self-reports, and a broader definition of violence, are taken into account. For example, a population-based study using interview data reported that 18% of the males in a national household sample had been violent five years before the interview. The corresponding figure for females was 6%, implying that there is one violent female for three violent males (Yang & Coid, 2007).

There are mixed and contradictory empirical results with respect to the gender gap in violent behavior within clinical samples of general psychiatric patients. Some findings suggest that the gender gap is marginal or non-existent (Lidz et al., 1993; Newhill et al., 1995; Hiday et al., 1998; Robbins et al., 2003; Hartvig et al., 2006; Doyle et al., 2010), while other results indicate a gender gap similar to that found in the general population (Link et al., 1992; Steinert et al. 1999; Coid et al., 2006; Roaldset et al., 2010).

There is greater consensus with respect to the lack of evidence for the validity of risk assessment methods among female psychiatric patients. Clinicians more often make valid predictions of violent behavior in male psychiatric patients than in female patients (Lidz et al., 1993; Elbogen et al., 2001; Skeem et al., 2005a; SBU, 2005). One study showed that a group of clinicians made equally poor predictions of violent behavior in females, regardless of the clinicians' professional background and gender (Skeem et al., 2005b). The reason behind this remains unknown, but it has been speculated that underestimation of violent behavior among female psychiatric patients could be one reason (Coontz et al., 1994; Robbins et al., 2003). At present, few guidelines exist to support clinicians conducting risk assessments on female patients and offenders. Also, very few risk assessment methods are constructed on female samples, or mixed-gender samples, and even fewer methods are validated for females.

2.6 VICTIM PERPETRATOR OVERLAP

As presented in Tables 1 and 2, European clinical surveys show that people with mental disorder are more likely to be subjected to victimization than to commit violent acts towards others. Only a few of the studies investigated violence and victimization in the same sample (Walsh et al., 2001; Honkonen et al., 2004; Hodgins et al., 2007). In summary, the findings from Table 1 and 2 are in line with a review of North American studies (Choe et al., 2008) that shows that violent victimization is a larger public health issue than violent behavior towards others, among individuals with mental disorder.

Since most studies have investigated violent behavior or victimization in different samples, it is difficult to establish whether there is an overlap of violent victimization and violent behavior, the so-called victim-perpetrator overlap (Klevens et al., 2002) in subgroups of psychiatric patients, or whether it applies to different groups of patients. As an exception, a study from the United States investigated the relationship between violent behavior and violent victimization among psychiatric patients in the same sample (Silver et al., in press). The results indicate that violent victimization and violent behavior towards others show substantial covariance even when controlling for demographic, social, and clinical factors. The study highlights the relevance of studying violent behavior towards others and victimization as two related phenomena.

2.7 AIMS

- To report the rate of violent victimization of psychiatric patients one year before base line interview
- To examine the relative rate of violent victimization in comparison to the general population
- To report the 20-week base rate of violent behavior in the community after contact with general psychiatric services
- To establish the validity of a violence risk assessment software program, Classification of Violence Risk (COVR), in a European setting
- To investigate the impact of gender on violent behavior and risk assessments among general psychiatric patients in Sweden
- To examine whether there is any overlap between patients who have been violent towards others and patients who have been victimized
- To examine whether victimization before inclusion is a risk factor for future violent behavior during follow-up

3 MATERIAL AND METHODS

3.1 DESIGN

This is a prospective follow-up study with telephone interviews of participants and collaterals 10 and 20 weeks after a baseline interview at hospital discharge, with additional follow-up data from the National Register for Criminal Convictions.

3.2 SETTING

The sampling was conducted at the two largest public psychiatric hospitals in Stockholm County (1.9 million inhabitants) serving 289,000 and 400,000 people, respectively. Both hospitals provide voluntary, as well as involuntary, care. Patients were recruited from the two general psychiatric wards at the first hospital and from seven general psychiatric wards at the second hospital (excluding a ward that chose to refrain from participation, as the staff thought patients would become unsettled by questions regarding violent behavior). Patients were also recruited from the emergency unit at the second hospital, which serves the entire Stockholm County. In Sweden, health care of any kind is provided at a low cost to the individual. The private sector in psychiatry was, at the time of the study, small and of marginal importance. Treatment of patients with dependency disorders is managed by a separate mental health service in Stockholm, although many dually diagnosed patients are still cared for in psychiatry.

3.3 SUBJECTS

3.3.1 Inclusion criteria

Inclusion criteria for the study were (a) age between 18 and 60 years, (b) returning home after an acute consultation or after admission at either of the two hospitals during office hours, (c) having a Swedish social security number (needed for access to records and national registers), (d) having a clinical ICD (International Classification of Diseases) diagnosis (WHO, 1992), and (e) capacity to pursue an interview in Swedish or English.

3.3.2 Eligible

Approximately 975 patients were eligible, 497 were approached (50%), and 390 agreed to participate (78% of all approached; Study I). Those who were not approached had been discharged at a time when the research assistant was occupied with other interviews or off duty.

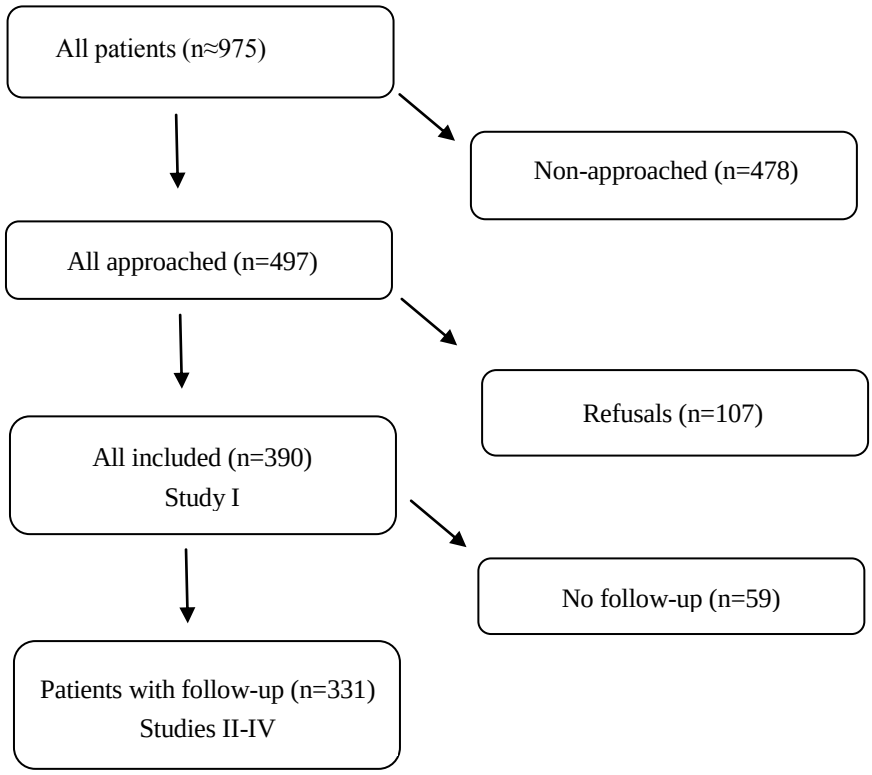

Figure 1. Flow chart on the recruiting process

3.3.3 Studies

Table 3. Description of participants in the four studies

Study	Sample	n	% of approached	% of participants
Study 1	All participants + 1170 controls	390	78%	100%
Study 2	All participants with follow-up	331	67%	85%
Study 3	All participants with follow-up	331	67%	85%
Study 4	All participants with follow-up	331	67%	85%

Study I is a retrospective study including all 390 participants, and a control group (n=1,170) recruited from the Annual Survey of Living Conditions (ULF), while the three subsequent studies are prospective, comprising 331 participants with follow-up (see Table 3 above).

3.3.4 Characteristics of participants, Study I – Victimization

The mean age of participants was 36.9 years, of whom 52% were females. The mean duration of hospitalization was 14.3 days for those who were admitted (67%). There were no significant differences between participants and refusals, except that patients with a diagnosis of a personality disorder were significantly more likely to participate compared to patients with other diagnoses.

Table 4. Socio-demographic and clinical characteristics of included patients and refusals[a]

	Cases (n = 390)	Refusals (n = 107)
Gender		
Female	203 (52%)	50 (47%)
Male	187 (48%)	57 (53%)
Mean age (SD)	36.6 (11.8)	36.9 (11.5)
Born in Sweden, n (%)	285 (73%)	*
Diagnosis, n (%)		
Mood disorder (F30-F39)	124 (32%)	27 (26%)
Psychosis (F20-F29)	76 (20%)	25 (23%)
Personality disorder (F60-F61)	55 (14%)	5 (5%)
Substance use disorders (F10-F19)[c]	22 (6%)	7 (6%)
Other (All other)	111 (28%)	43 (40%)
Admission, n (%)	272 (67%)	65 (61%)
Involuntary treatment, n (%)	105 (27%)	30 (28%)
Mean duration of hospitalization, days (SD)	17.2 (23.3)	14.3 (23.5)
Hospital, n (%)		
Hospital I	351 (90%)	96 (90%)
Hospital II	39 (10%)	11 (10%)

[a]=the table is adopted from Study I;,[c]=changed from dependency disorder; *=not known; SD = standard deviation

3.3.5 Comparison group, Study I – Victimization

The controls were selected from the ULF, by which Statistics Sweden (www.scb.se) conducts in-person interviews with a representative sample of 6,000 people from the general population. The attrition rate between 2003 and 2006 was 24%. The inclusion criteria of the subjects of the survey are the same as those of the cases, except that the survey includes people without a Swedish social security number. The survey covers many aspects of the participants' living conditions, including two specific questions pertaining to experiences of having been victimized. The controls were selected in a two-step procedure. First, all residents of Stockholm County, interviewed by the ULF survey in the period 2003 through 2006, were identified. Secondly, three controls per case, matched in terms of gender and age, were randomly drawn from this group, resulting in 1,170 controls.

3.3.6 Participants, Studies II–IV

Fifty-nine of the 390 participants could not be reached for follow-up interviews. Thus, there is follow-up data for 331 patients (67% of all approached; Studies II–IV), of whom 34 (10%) participated only in the 10-week follow-up and 23 (7%) only in the 20-week follow-up, while 274 (83%) gave interviews at both occasions. For 83 participants (25%), additional collateral follow-up data was retrieved. Data from the national register for criminal conviction was collected for all 331 patients.

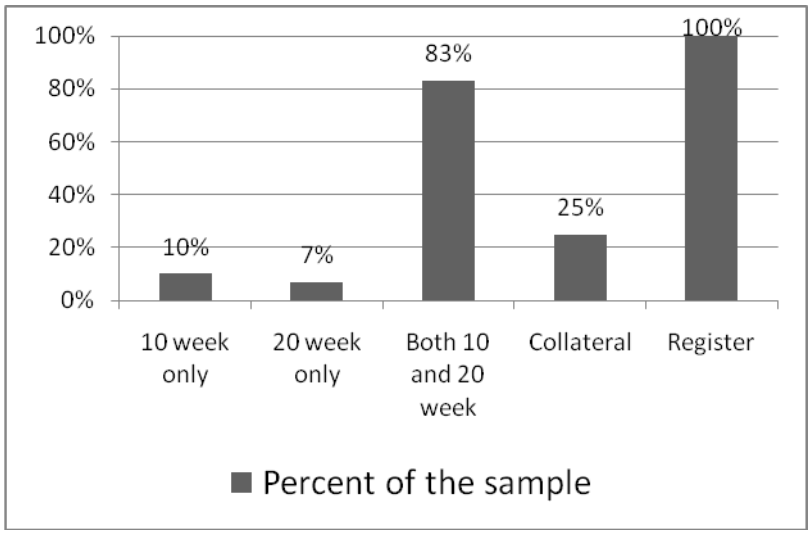

Figure 2. Percent of sample according to type of follow up

A comparison of the patients with and without any follow-up interview shows that those who were followed up had a significantly shorter time of hospitalization, were more often born in Sweden, and were less likely to have a diagnosis of psychosis. A detailed description of the 331 participants is presented in Table 2. They were, on average, in their late thirties, and just over half of the sample were female. One-fourth were born outside Sweden. Sixty-three percent were admitted, of whom one-fourth were civilly committed. The mean duration of the hospital stay was thirteen days. One third of the participants had a clinical diagnosis of mood disorder (ICD F30–F39) and one-fifth, of psychosis (ICD F20–F29).

Table 5. Socio-demographic and clinical characteristics of participants with follow-up and drop-outs

	Follow-up (n=331)	Drop-out (n=59)
Gender n (%)		
Female	174 (53%)	29 (49%)
Male	157 (47%)	30 (51%)
Age, mean (SD)	36.6 (12.0)	38.9 (10.6)
Admitted n (%)		
No	122 (37%)	17 (29%)
Yes	209 (63%)	42 (71%)
Days hospitalized, mean (SD)	12.6 (21.9)	21.9 (28.2)
Civilly committed n (%)		
No	246 (74%)	39 (66%)
Yes	85 (26%)	20 (34%)
Diagnosis n (%)		
Mood disorder (F30-F39)	109 (33%)	15 (26%)
Neurotic and stress-related disorders (F40-F49)	73 (22%)	13 (22%)
Psychosis (F20-F29)	58 (18%)	18 (30%)
Personality disorder (F60-F61)	49 (14%)	6 (10%)
Other (All other)	22 (7%)	5 (9%)
Substance use disorder (F10-F19)	20 (6%)	2 (3%)
Born in Sweden n (%)		
No	82 (25%)	23 (38%)
Yes	249 (75%)	36 (62%)
Risk group according to COVR n (%)		
Very low risk	191 (58%)	37 (63%)
Low risk	92 (28%)	13 (22%)
Average risk	37 (11%)	9 (15%)
High risk	7 (2%)	0 (0%)
Very high risk	4 (1%)	0 (0%)
Convicted of at least one violent crime during follow-up		
No	327 (99%)	57 (97%)
Yes	4 (1%)	2 (3%)

SD = standard deviation; COVR = Classification of Violent Risk

3.4 PROCEDURE

Patients were interviewed between January 10, 2007, and December 12, 2007, by two external research assistants. When hospital staff announced that a patient was to return home, the patient, after a determination of eligibility, was asked to participate. In order to minimize the risk that the study per se was affecting the clinical treatment and the dependent variable, the baseline interview was conducted after formal discharge but before the patient left the hospital building. The participants were assured that the information from the research interview would not be reported to the responsible clinician unless it concerned a threat towards a named person or a case of child mistreatment. The duration of the interview was 15–20 minutes and no compensation was offered to the participants. Patients were only recruited during office hours.

3.5 MEASURES

3.5.1 Baseline data

Data on gender, age, admission/not admission, duration of hospital stay, voluntary/ involuntary treatment, and diagnosis, were collected from medical case records and/or from the responsible clinician. We chose to use the clinical diagnosis rather than conduct a specific diagnostic research interview, since an extension of the research interview was likely to jeopardize the response rate and data quality.

The patient interview comprised questions concerning country of birth and income, followed by the COVR assessment. COVR is a software program with a tree-based prediction model. The software analyzes the responses, resulting in a risk calculation that categorizes the likelihood of future violent behavior into five risk groups, with an estimated risk to be violent 20 weeks after discharge ranging from 1% to 76%. This result can be expressed in several formats; category, frequency and/or probability:

Table 6. Description of the five risk groups in COVR

Category	Probability for violence	Frequency
Very low risk	1% (0-2%)	1 patient in 100 patients
Low risk	8% (5-11%)	8 patients in 100 patients
Average risk	26% (20-32%)	26 patients in 100 patients
High risk	56% (46-65%)	56 patients in 100 patients
Very high risk	76% (65-86%)	76 patients in 100 patients

Heavy drinking was assessed by the CAGE questionnaire (Mayfield et al., 1974). Victimization in childhood, level of anger (Novaco Anger Scale; Novaco, 1994) and violent thoughts (Schedule of Imagined Violence; SIV) were extracted from the COVR assessment. An individual was assessed as SIV+ if he or she answered affirmatively to having had at least one thought to harm others in the last two months (Grisso et al., 2000). The outcome variable in Study I, victimization, was measured by asking the patients the same two questions as posed to the controls in the ULF survey: "have you been subjected to violence resulting in visible injuries during the last twelve months?" and "have you been subjected to violence that required medical attention during the last twelve months?" The latter type of victimization is considered more severe than the former. Sexual violence is included, provided it left visible physical marks and/or required medical attention.

3.5.2 Follow-up data

At ten and twenty weeks after inclusion, the patients were interviewed by telephone. Twenty-five percent of the sample consented to an additional collateral telephone interview that included family members, friends, or medical staff. The interviews were conducted by professional interviewers from Statistics Sweden, specifically trained for this project, and chosen for their record of having previous clinical experience in psychiatry or criminal justice. The interviewers were blind to the information from the baseline assessment. Violent behavior was operationalized as in the MacArthur Violence Risk Assessment Study, that is, any battery with physical injury, use of a weapon, threats made with a weapon in hand, and/or any sexual assault (Monahan et al., 2001). Crimes in the criminal register that were defined as violent in this study were aggravated assault, assault, violence or threat to a public servant, and violently resisting arrest (there were no homicides, rapes, or other felonies recorded during the follow-up period for anyone in the sample). Violent behavior, coded dichotomously, was defined by a patient's and/or collateral's report of at least one violent act, or the patient having been convicted of violent crime during the follow-up period or having had their charges dropped.

The National Register for Criminal Convictions, administered by the Swedish National Council for Crime Prevention, was consulted to identify criminal violence by the participants. The register can, via the social security number unique to each citizen in Sweden, link a conviction to an individual. No information is erased even if an individual has emigrated or died. The dates of the commission of the criminal acts are recorded in the register and the search was conducted one year after the last follow-up interview, that is, when most identified criminal acts would have been legally processed and filed in the register. Swedish law does not use the legal concepts of accountability and "not fit to stand trial"; accordingly, an accused is either convicted or acquitted. People with a mental disorder who commit an offence may, however, under certain conditions have their charges dropped, which is recorded in the criminal register. Thus, the sources for determining the dependent variable, violent behavior, will be triangulated (Lidz & Mulvey, 1995; Douglas & Ogloff, 2003), which is important in studies examining incriminating behavior. Official records and self-reports can result in underreporting.

3.6 STATISTICAL ANALYSIS

3.6.1 Study I

All data were presented in terms of descriptive statistics, that is, mean and standard deviation for continuous data, and frequency and relative frequency for categorical data, together with the exact (binominal distribution) 95% confidence intervals (CI). Participants and refusals were compared using t-test for continuous data and chi-square for categorical data. Data were analyzed in SPSS version 16 checked for skewness. All tests were two-tailed and $p < 0.05$ was regarded as statistically significant. The crude odds ratios and the corresponding 95% CI of being violently victimized among the cases versus controls was computed by using Stata version 10.1.

3.6.2 Studies II-IV

The statistical analysis was computed in SPSS v. 17 for Windows. Data are presented in terms of descriptive statistics, that is, mean and standard deviation for continuous data, and frequency and relative frequency for categorical data. Participants and non-participants were compared using chi-square for categorical data (Fisher's exact test when appropriate) and t-test for continuous data. Mann-Whitney was used when continuous data were skewed. All tests were two-tailed and $p < 0.05$ was regarded as statistically significant.

To analyze the predictive validity of the COVR a receiver operating characteristic (ROC) analysis was conducted. The ROC is frequently used to assess the predictive validity of different prediction methods and has the major advantage that it is independent of base rate (Mossman, 1994). The ROC produces an effect size called the area under the curve (AUC), which is reported together with the 95% CI. The range of the AUC is 0 to 1, where 0 equals a perfect negative relationship, 0.5 equals chance, and 1 equals perfect positive prediction. The AUC can be interpreted as the relative frequency with which violent patients had higher scores on COVR than the non-violent patients (Urbaniok et al., 2008). It is argued that the ROC analysis should only be seen as one part of the validation process and that researchers all too often present figures and numbers that are difficult to follow (Munro, 2004).

The proportion of patients with violent behavior during the 20-week follow-up among the five risk groups, together with the 95% CI for a proportion, are presented, along with the OR, with 95% CI from a logistic regression. The COVR assessment was

treated as a categorical variable, and as the COVR assessment includes many risk factors, such as gender, age, comorbid substance abuse, and so on, no independent variables other than the COVR assessment were used in the logistic regression.

3.7 ETHICAL APPROVAL

Study I was approved by the Regional Ethics Committee in Stockholm, December 12, 2006 (Dnr 2008/86–32/5). Studies II, III and IV were approved by the same committee on February 6, 2006 (Dnr 2006/1231–31).

4 RESULTS

4.1 STUDY I – VICTIMIZATION

Twenty percent of the patients reported that they had been victimized in the year preceding the interview and half of them, 10% of the whole sample, to the degree that medical attention was needed. The corresponding figures for the controls were 4% and 1%, respectively. Victimization was slightly more prevalent, but not statistically significantly, among female rather than male patients, while the reverse was true among the controls. The odds of being victimized were 4.7 (CI 2.6–8.3) for male patients and 10.5 (CI 5.7–19.9) for female patients.

4.2 STUDIES II AND III

4.2.1 Allocation of patients into risk groups

Eighty-six percent (n=283) of the patients were classified by COVR as low or very low risk, 11% (n=37) were classified as average risk, and 3% (n=11) were in the two highest risk groups. The distribution of the sample can be seen in Figure 3 and compared to the distribution of the sample of the original COVR study from the United States (Monahan et al., 2001).

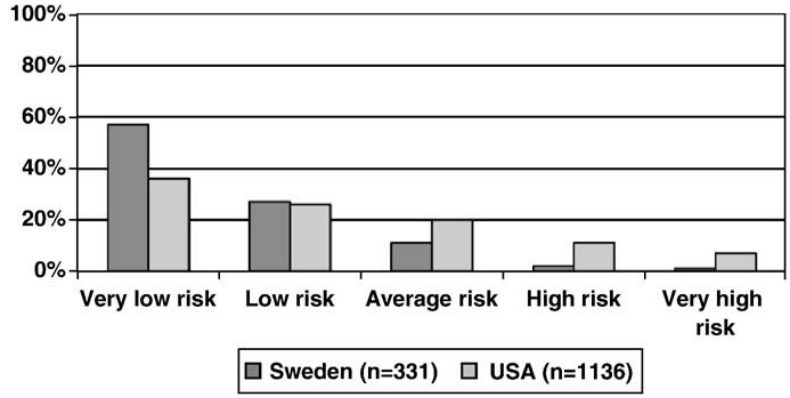

Figure 3. Distribution in risk groups according to COVR in this sample compared to the distribution of the original COVR study sample

4.2.2 Base rate of violent behavior

The self-reported base rate of violent behavior was 4.8% (n=16). Collateral information added one patient, giving a base rate of 5.2%. The criminal register added yet another two patients, for a total of 19 patients, giving a final base rate of 5.7%. The rate of violent behavior was similar among females and males, 6.4% and 5.1%, respectively. Four of the 19 patients (three were males) had committed a violent crime during the

follow-up period. Thus, the other 15 patients had committed an act of violence that was not recorded in the criminal register.

4.2.3 COVR

The share of patients who committed any violent act during the follow-up was 2% (n=4) in the very low risk group, 4% (n=4) in the low risk group, 19% (n=7) in the average risk group, 29% (n=2) in the high risk group and 50% (n=2) in the very high risk group. Figure 4 shows the rates of violent behavior in the different risk groups, according to COVR.

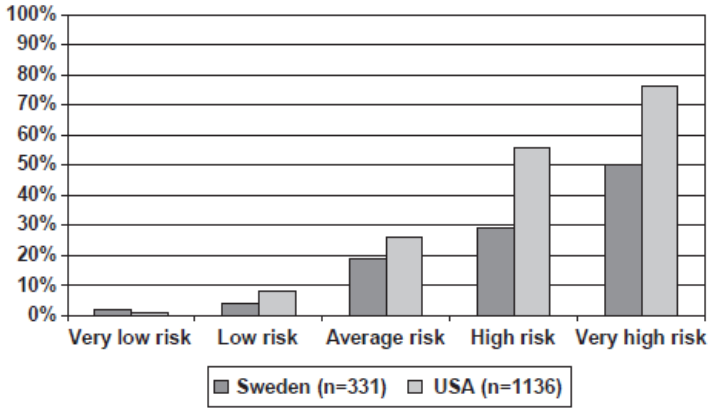

Figure 4. Percent violent patients in each risk group of this study and of the original COVR study from the USA

A ROC analysis shows that the AUC is 0.77 ($p < 0.001$) (SE 0.06) with the 95% CI of 0.65 to 0.90 (Figure 5). A logistic regression analysis reveals that the risk of violent behavior was 47 times higher in the very high risk group compared to the very low risk group, although the 95% CI was wide. The predictive validity of COVR looking solely at violent convictions (n=4) was 0.80 ($p < 0.05$).

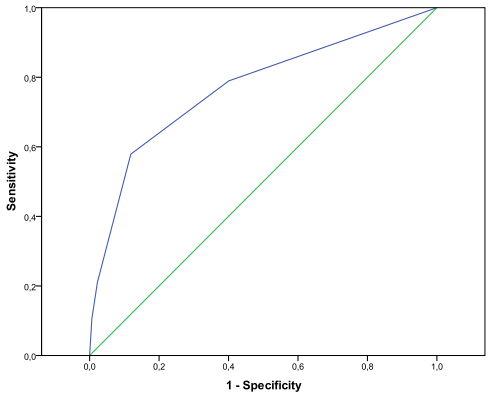

Figure 5. Plotted AUC curve from ROC-analysis

The proportion of violent patients in the male average risk group was 8%, while the corresponding figure for females was 46%. The females in the average risk group had also been more violent compared to the estimated high risk group. The AUC was 0.78 (CI 0.60–0.96; $p < 0.01$) for female patients and 0.76 (CI 0.59–0.93; $p < 0.05$) for male patients.

4.3 STUDY IV

4.3.1 Victim-perpetrator overlap

The base rate of victimization during follow-up was considerably higher compared to violent behavior towards others; 61 of the 331 patients (18%) had been victimized. Of those, 37 females (61%) and 24 males (39%).

Forty patients (12%) had both been victimized and had acted violently towards another person during the 1.5-year observation period, 68 patients (20%) had been victimized only, 33 patients (10%) had been violent only, and 190 patients (57%) had neither been violent nor victimized ($x^2 = 20.9$, $p < 0.001$). The figures were significant for both males and females.

4.3.2 Victimization as predictor of violent behavior

Of the 331 patients, 107 had been victimized within one year preceding the baseline interview (32%). The base rate of violent behavior during follow-up for the 107 victimized patients was 9%, and the corresponding figure for the 224 non-victimized patients was 4% ($x^2 = 3.8$, $p < 0.05$).

5 DISCUSSION

5.1 GENERAL DISCUSSION

5.1.1 Victimization

The first main finding is that one in five general psychiatric patients had been victimized within one year prior to study inclusion. The rate is comparable to other European studies (Table 1). The differences in corresponding rates may relate to differences in methodology and definition of victimization. It is likely that socio-geographic factors, comorbidity, and possibly, severity of the psychiatric disorder also play a role. The second main finding is that psychiatric patients were six times more likely to be subjected to victimization compared to the general population. This finding is in line with the results of four other controlled studies from New Zealand and the United States (Silver, 2000; Silver et al. 2005, Teplin et al., 2005). Two of these studies report a 2–4 times higher risk (Silver, 2000; Silver et al., 2005), while one study shows an eleven-fold increase of risk (Teplin et al., 2005). Figure 6 presents information from two controlled studies, reporting OR and 95% CI, in relation to the present study. The results of the present study reinforce the notion that victimization is a larger public health issue than violent behavior towards others, among general psychiatric patients.

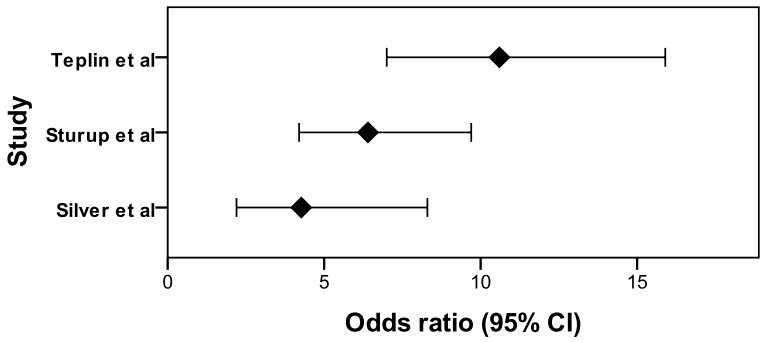

Figure 6. Odds ratio and 95% CI for victimization in individuals with mental disorder compared to controls in this study and two additional studies

There is less international consensus concerning the third main finding, that is, that female patients are more likely to be subjected to violent victimization, particularly more severe types of violence (Khalifeh & Dean, 2010). Some studies report that male patients are more often violently victimized (Honkonen et al., 2004; Silver, 2000; Walsh et al., 2003), some that there are no gender differences (Dean et al., 2007; Goodman et al., 2001; Schomerus et al., 2007; Hiday et al., 2001), and some that

female patients more often are victimized (Brunette & Drake, 1997; Chapple et al., 2004). The only other study besides this one that separates the odds ratio of victimization in relation to gender is a retrospective study from the United States on 936 individuals with severe mental illness (Teplin et al., 2005). The study shows that the relative risk of being subjected to violent victimization was 9 for males and 19 for females, compared to matched controls.

The study has implications on both clinical and community levels. The results suggest a need to question the widespread perception of psychiatric patients as perpetrators rather than victims of others' violence. Many jurisdictions have statutory obligations for mental health professionals to identify dangerousness among their patients. There are no laws, instructions, or professional guidelines to identify victimized patients. As shown here, there is a need for further research and training of professionals in this respect.

It is most likely that violation of people with psychiatric problems exacerbates symptoms and social stress, which counteracts and reduces the effects of otherwise proper treatment and care. Thus, evidence-based mental health services that pay attention to the problem of victimization may not only prevent victimization and violence towards others but also improve the long-term outcome of psychiatric disorders. Research has shown meager support for the benefits of screening procedures for victimized patients; however, there is also little evidence against screening procedures as well (Howard et al., 2010), and clinicians should probably take victimization experiences into account in their routine practice.

5.1.2 Violent behavior

One of twenty patients (5.7 percent) had committed an act of violence during the 20-week follow-up. This rate is considerably lower rate than those reported from three other European studies with similar samples and follow-up periods (Walsh et al., 2001; Hodgins et al., 2007; Dolan et al., 2010), but twice as high compared to a Finnish report with a considerably longer follow-up period (Honkonen et al., 2004). A Norwegian study shows that 12% of a cohort of general psychiatric patients had committed an act of physical violence, defined more broadly than in this study, during a period of one year in the community (Hartvig et al., 2006). The study that is most similar to the present study, with regard to setting, methodology, outcome measure, and subjects, is a

Norwegian study on the risk assessment instrument V-Risk-10. That study used an observation period twice as long as that of this study and reports a five percent rate of violent acts towards others (Roaldset et al., in press). With respect to the rates of violent behavior in the studies presented in Table 2, this Swedish study has seemingly targeted a group of general psychiatric patients who, from an international perspective, demonstrate a relatively low risk of violent behavior, at least in the shorter (and clinically more relevant), perspective.

5.1.3 COVR

There was a striking difference between the present study and the original study from the United States, with respect to distribution of patients in risk categories. In this Swedish study, few patients were estimated to be in the highest risk groups compared to the American sample (Figure 3). This divergence may relate to the fact that COVR was developed in the United States, and therefore, not adjusted to identify true high risk patients in a European context. The distribution of risk categories was similar between the genders, although somewhat more female patients were classified into the very low risk group and a few male patients were classified into the average risk group. In a Canadian study (McMaster, 2011), the rates of patients assigned to different risk groups were similar to the original study from the United States. Other international studies have shown considerably lower percentages of general psychiatric patients within the high risk groups according to COVR (Doyle et al., 2010; Carl Tam, 2011).

Another study from the United Kingdom on violence after discharge among general psychiatric patients did not confirm the validity of COVR, reporting a non-significant AUC of 0.58 (Doyle & Dolan, 2006; Doyle et al., 2010). This contradicts the results in the present study, where COVR demonstrates better effect sizes in both genders. In line with the current study, the methodology in the UK study was very similar to that of the original MacVRAS study. There were some differences that may have affected the differences in outcome between the three studies. In the present study and in the validation study from the United States, one-fifth of the patients had psychosis, whereas over 40% of the patients in the UK study were ascribed such a diagnosis. Another difference concerns the base rate of violence. In the present study there was a relatively low base rate of 5.7%, in comparison to 23.7% (Doyle & Dolan, 2006) in the UK study and 22.9% (Monahan et al., 2005) in the original from the United States. The effect sizes of COVR were similar compared to the UK findings (Snowden et al.,

2009). That study examined the predictive validity of COVR to predict physical violence by forensic inpatients. The fact that correlations, and effect sizes, were comparable between Snowden et al. (2009) and this Swedish study strengthen the predictive validity of COVR in different types of samples. Other studies have also showed that COVR can significantly predict future violent behavior within a group of general psychiatric patients (Carl Tam, 2011; McMaster, 2011).

COVR predicts violent behavior in this study with the same precision in females as in males. It can also predict violent behavior better than chance in both male and female patients. These findings contradict previous conclusions that prediction of female violent behavior is less valid compared to prediction of male violent behavior (Lidz et al., 1993; Elbogen et al., 2001; Skeem et al., 2005; SBU, 2005). This underscores the benefits of using both females and males when constructing violence risk assessment methods. Recent later studies have demonstrated comparable effect sizes among female and male general psychiatric patients (Nicholls et al., 2004; Roaldset et al., 2010), female and male forensic psychiatric patients (Yang et al., 2010), and female and male prisoners (Coid et al., 2009; Smith et al., 2009).

5.1.4 Victim perpetrator overlap

There are no clear specific characteristics that can be ascribed to all individuals that have committed violent acts or who have been violently victimized in the group of psychiatric patient. Rather, findings from the present study do support the idea of an overall victim-perpetrator overlap even within the group of psychiatric patients. Silver et al (in press) reports that 5% of their study sample had been victimized and violent during follow up. Even with shorter follow up periods, 10 weeks and in this study 20 weeks, the base rate of victimization and of violent behavior was considerable higher. The authors report a victim-perpetrator overlap, which was statistical significant. Our study confirms their findings, even though the base rates were lower in this study, but still statistically significant.

There are different opinions concerning the issue of victimization. Some argue that the mentally disordered are victims and not perpetrators (Eisenberger, 2005). On the other hand, studies on the view on psychiatric patients report that the patients are often viewed as dangerous in the media (Coverdale et al, 2002) and by the general population (Angermeyer & Dietrich, 2006). The results of the present study, as well as the study

by Silver and colleges, suggest that both perspectives should be considered. Rather than viewing psychiatric patients as *either* victims *or* perpetrators, the victim-perpetrator overlap ought to be taken into account in future research, and when research findings are communicated with journalists and the general population.

Victimization has been reported to have negative impact on community functioning among psychiatric patients (Hodgins et al, 2009). In this study some factors, violent behavior one year preceding inclusion, victimization one year preceding inclusion and anger was associated with both victimization and violent behavior towards others. The fact that victimization and violent behavior share important risk factors is confirmed by a new American study (Silver et al, in press). However, factors such as young age, personality disorder and violent thoughts, significantly predicted violent behavior only, while victimization in childhood significantly predicted victimization.

The main targeted risk factor, victimization in the near future, was, in this study, a significant predictor of violent behavior post discharge This has been found in different samples in epidemiological studies before. Elbogen and Johnson (2009) report victimization in the last year as a significant predictor of violent behavior among the total sample in their American large scale study. HCR-20 (Webster et al., 1997), the most widely used risk assessment method does not take prior victimization into account as a risk factor. However, in the coming revised version 3 the factor has been incorporated (Douglas et al, in preparation). There are no clear specific characteristics that can be ascribed to all individuals who have committed violent acts or who have been violently victimized in the group of psychiatric patients. Rather, findings from the present study do support the idea of an overall victim-perpetrator overlap, even within the group of psychiatric patients. Silver et al. (in press) report that 5% of their study sample had been victimized and violent during follow-up. Even with shorter follow-up periods—10 weeks, and in this study 20 weeks—the base rate of victimization and of violent behavior was considerably higher. The authors report a victim-perpetrator overlap, which was statistically significant. Our study confirms their findings, even though the base rates were lower in this study, but still statistically significant.

5.2 METHODOLOGICAL CONSIDERATIONS

5.2.1 Study I - Victimization

Recall bias is a potential problem in a study of this kind, although self-reporting is considered a better measurement of victimization among psychiatric patients than police records or other records (Goodman et al., 1999; Kooyman et al., 2007). Yet, the relative rate may be inflated, since it is likely that an ongoing therapeutic contact with a psychiatric hospital facilitates the full acknowledgment of having been victimized, whereas, in contrast, the interviews of the controls were unrelated to a therapeutic setting.

There are at least four possible selection biases of the present study. First and foremost, patients were more disadvantaged than the controls in terms of income. The patient group had a somewhat higher rate of individuals born outside Sweden, compared to the control group. Secondly, the ULF survey targets residents with an address or a telephone number, which reduced the likelihood of homeless, incarcerated, or otherwise socially isolated subjects being included. Both these biases will tend to inflate the odds ratio, since socially marginalized groups are more vulnerable to victimization. A third bias, however, works in the opposite direction. In contrast to patients included in the present study, participants in the ULF survey are not required to have a Swedish social security number, which allowed immigrants without residence permits, or poor and socially marginalized people, to enter the study and become overrepresented in the control group. A fourth bias, and possibly the most important one, relates to the fact that patients may have been admitted to hospital *due to* current victimization. Having been subjected to physical violence is likely to destabilize the psychiatric condition and promote the need to seek professional advice, even though this might not be communicated to the clinicians. Furthermore, emergency responders might decide to transport an assaulted person to hospital for a physical and/or psychiatric checkup.

5.2.2 Studies II, III and IV

5.2.2.1 Internal validity

The internal validity of the findings is improved by the similar clinical conditions in which the baseline interviews were conducted and the use of experienced follow-up interviewers, who were blind to the results of the baseline assessment. Further, the baseline risk assessment was conducted after the patients were formally discharged.

This means that the patients did not risk any change of the clinical management of their case due to the information that they disclosed in the research interview.

On the other hand, a correct risk assessment, indicating, for example, a high risk person, may have been invalidated by a clinician who had come to the same conclusion offering the patient a sound intervention. Thus, it is a shortcoming that we did not control for the clinicians' risk assessment estimates of risk, and whether there were any specific violence prevention measures offered to the patient.

The exact relationship between clinical risk factors and violent outcome is not known. Most HCR-20 research studies on civil psychiatric patients report the clinical scale to be the less predictive of community violence, compared to the historical and risk scales (e.g. Nicholls et al., 2004). A case from the study can illustrate this methodological dilemma. A middle-aged male with an autism spectrum disorder was voluntarily hospitalized due to violent thoughts, including a plan to kill his boss. After a short observation period he was discharged. He consented to participate in the study and was assessed to be at high risk of violent behavior according to COVR. The community mental health team was alarmed by the anamnesis. They consulted a forensic psychologist to conduct a violence risk assessment, which was followed by close monitoring, extensive treatment, and other violence prevention measures. The patient reported no violent incidents during follow-up and was not charged for any crime. In this case, the COVR assessment was correct in a clinical aspect, but incorrect from a methodological, scientific point of view.

Refusals and dropouts are a problem for the internal validity of any study (Rothman, 2002; Cotter et al., 2005; Wolke et al., 2009), not the least in longitudinal studies based on consent by the participants, as in this study. The refusal rate was 22%, which is equal to similar studies. We did not identify any significant predictor of refusal, although having a personality disorder was a significant predictor to participate in the study. More males than females refused to participate. A limitation of the study is that the information regarding refusals is sparse (Table 4 illustrates this point). Moreover, we were unable to gather information on the outcome measure to compare refusals and participants.

Significant predictors of dropout were having a psychotic disorder and being born in Sweden. Dropouts also had significantly longer periods of hospitalization. Males were more likely to drop out compared to females, although this was not statistically significant. Since all participants agreed to allow a search of their possible presence in criminal records, we could compare the follow-ups with the dropouts, concerning violent offences in the national register for violent convictions. Four of the 331 patients (1.2%) with follow-up were recorded for a violent crime and two of the 59 dropouts (3.3%) were convicted of a violent crime, which is a non-significant difference. The validity of our findings is increased by (a) the use of actual interviews with the patients (b) blinding of the follow-up interviewers to the results in the baseline assessments, and (c) trichotomizing of the measurement of violent behavior, using official registers, self-reporting, and collateral interviews.

5.2.2.2 Ecological validity

We chose to use the clinical diagnosis rather than conduct a specific diagnostic research interview, since an extension of the research interview was likely to jeopardize the response rate and data quality. This limitation is valid for substance use diagnosis, as well, since we chose to use the CAGE questions and clinical diagnosis to establish diagnosis. This is a limitation when comparing the results to those of studies based on research diagnosis. The use of clinical diagnosis increases the generalizability to clinical conditions in Sweden; psychiatrists in acute settings do not have time for deep diagnostic interviews. However, this limitation is mainly true for new and/or unknown patients without a documented psychiatric history.

The confidential "fire-wall", where no personal information from the patients was forwarded to the responsible clinician, renders the results ambiguous. On the one hand, it may have encouraged the patients to reveal problematic and incriminating thoughts and behavior to the research assistants, which improves the accuracy of the violence risk assessment. On the other hand, since these patients may not disclose such information in a clinical setting, the "real world prediction" would suffer from adequate information. The risk prediction of any instrument would thus suffer from a reduced predictive validity, and consequently, reduce its clinical usefulness.

5.2.2.3 External validity

There are a few selection biases that may have affected the external validity of the study. First, the patients were recruited from an urban area, in fact, the largest city in Sweden. Clinical experience suggests that psychiatric patients who live in rural areas with higher social control are better looked after by the mental health services, with a subsequent lower risk for violent behavior. This may lower the external validity. Second, the patients were only recruited during office hours. Patients who come to a psychiatric emergency room at night differ from those who come during office hours. They have more often co-occurring substance abuse disorders and other social problems, such as homelessness. Therefore, both the victimization rate and the rate of violence towards others may be higher than that of the non-admitted patients. However, most severely ill and vulnerable patients tend to be admitted. Discharge from the wards during night hours is very rare. Therefore, this bias is probably true only for non-admitted patients and not for the admitted patients.

Another selection bias that may have affected the rate of violent behavior is that patients may be in contact with the mental health services because of violent behavior. Previous violent behavior is one of the best predictors of future violent behavior, and if patients with a history of violence do have more contact with the mental health services, violent patients may be oversampled in this project. Another factor that may have inflated the base rate of violent behavior is that the sample was hospital based, which implies that subjects were in a negative phase of life, which may relate to the occurrence of violence.

5.2.2.4 Observation bias in outcome measure

Outcome measures in forensic psychiatry, in particular violent behavior, have been discussed intensely (Mulvey & Lidz, 1993; Monahan & Steadman, 1994; Monahan et al., 2001; Douglas & Ogloff, 2005; Kooyman et al., 2007; Chambers et al., 2009). Using the same definition and measures of an outcome increases the possibility to generalize between studies and settings (Rothman, 2002; Chambers et al., 2009). Regarding the outcome variable in the present study, violent behavior towards others, the problem is under-reporting (Monahan et al., 2001; Douglas & Ogloff, 2005). The MacVRAS constructed a tool to assess violent behavior (Monahan et al., 2001) that is used frequently in research (e.g., Hodgins et al., 2009; Doyle et al., 2010) and in the present study. The measurement of violent behavior was trichotomized with self-

reports, collaterals (25% of the sample), and official registers, and consequently, any observational bias in the outcome measure is of less concern for this study.

5.2.2.5 The use of ROC analysis

ROC analysis is regarded as the state of the art technique to validate violence risk assessment methods. However, AUC as an effect size may be interpreted too optimistically, and an AUC of 0.77 can be considered to be modest accuracy (Sjöstedt & Grann, 2002). This would imply that the predictive validity of COVR in a Swedish context is neither better nor worse than any other risk assessment method, regardless of type (clinical, structured, or actuarial) (SBU, 2005; Farrington et al., 2008; Coid et al., 2009).

There is, however, a problematic issue regarding the use of ROC. As ROC is a pair-wise comparison, it may reach perfect prediction, even though the prediction at group level is not perfect (Urbaniouk et al., 2007). ROC comparisons do not take the estimated risk (how many patients in a group who *should* become violent according to the assessment) into account. Rather, it works by comparing two groups with and without violent behavior, in relation to each other. Thus, if no patients are violent in a fictive low risk group with an *estimated* risk of 25% to commit violence, and all patients are violent in a fictive high risk group with an *estimated* risk of 75% to commit violence, this will result in a perfect AUC. In other words, the estimations are not correct on a group level. If there were 100 patients in each group, 50 patients out of 200 would be misclassified, and yet, the ROC analysis would result in a perfect AUC. With respect to this drawback, the percentages of violent patients within different risk groups were reported and additional analyses were computed, such as logistic regression (see Study II).

6 CONCLUSIONS

- Although the rate of victimization appears to be low in Sweden compared to other countries, the risk is high for Swedish psychiatric patients to be subjected to violence. The findings are most pronounced for female patients. Research, clinicians, and social policy should target the problem of victimization. Such efforts may even reduce the extent of the lesser problem of violent behavior by the mentally disordered.

- Clinicians in psychiatry and forensic psychiatry who do not routinely ask patients questions about prior victimization should probably start asking them, when conducting risk assessments. Doing so may not only reveal risk for violent behavior towards others, but also risk for the patient to be victimized again, which on a group and individual level may be related to violent behavior and other unwanted outcomes.

- The base rate of violent behavior is relatively low in Sweden and prediction is therefore difficult. Violent behavior was uncommon in female as well as male patients, and violence risk assessment and management should target both genders.

- The predictive validity of COVR software is comparable to other risk assessment tools and could significantly predict violent behavior in both genders.

- There is an overlap between offenders and victims among general psychiatric patients in Sweden and no clear specific characteristics can be ascribed to all individuals who have committed violent acts or who have been violently victimized. This overlap should be taken in account in both research and clinical settings.

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8 SVENSKT ABSTRACT

Den svårbesvarade frågan hur psykisk störning och våld relaterar till varandra har lett till en omfattande akademisk debatt. Inriktningen på debatten har skiftat från att fokusera på våldsbeteende mot andra till utsatthet för våld (viktimisering) bland individer med psykisk störning. Trots detta har inga svenska studier hittills undersökt frekvensen av våldshandlingar bland allmänpsykiatriska patienter som har genomgått psykiatrisk behandling. Det har inte heller funnits några studier som rapporterat utsatthet för våld bland patienter eller undersökt patienternas relativa risk att utsättas för våld i relation till övriga befolkningen. Syftet med avhandlingen var att undersöka detta samt att validera riskbedömningsinstrumentet Classification of Violence Risk (COVR)™.

Metod: I studie I rekryterades allmänpsykiatriska patienter från två kliniker i Stockholms län (n=390). Kontrollgruppen utgjordes av köns- och åldersmatchade personer från övriga befolkningen som rekryterades från Undersökningarna om levnadsförhållanden (ULF) (n=1170). Studie II-IV innefattade en prospektiv uppföljning av 331 patienter. Vid inklusion skedde en insamling av kliniska och sociodemografiska data och en COVR-skattning genomfördes. Uppföljningarna innefattade telefonintervjuer med patienterna och en anhörig, 10 och 20 veckor efter inklusion. Våldsbeteende var dels självrapporterat och dels insamlat via Lagföringsregistret vid Brottsförebyggande rådet (BRÅ).

Resultat: Tjugo procent av patienterna hade varit utsatta för våld någon gång året innan inklusion. Den relativa risken var sex gånger högre i relation till kontrollerna. Kvinnliga patienter hade en mer uttalad relativ risk med en tiofaldig ökning.

Bastalet för våldsbeteende var 5.7% och en receiver operating curve-analys (ROC) visade att area under the curve (AUC) för riskbedömningsinstrumentet COVR var 0.77. Skillnaden i våldsbeteende mellan könen från övriga populationen kunde inte replikeras då inga signifikanta skillnader återfanns i våldsbeteende 20 veckor efter inklusion. Den prediktiva validiteten för COVR var jämförbar mellan könen. Resultaten visade en överlappning mellan de patienter som utsattes för våld och de som utsatte andra för våld.

Slutsats: Risken att utsättas för våld bland psykiatriska patienter är hög. Risken var avsevärt högre än risken att utsättas för våld i normalbefolkningen. Detta fynd var mer uttalat för kvinnliga patienter. För att kunna förebygga utsatthet för våld är det viktigt att forskare, kliniker och beslutsfattare är medvetna om den förhöjda risken för viktimisering i gruppen psykiatriska patienter.

Förekomsten av våldshandlingar är relativt låg bland psykiatriska patienter och prediktion är därför svårt. I den aktuella studien var våldsbeteende ovanligt, både bland manliga och kvinnliga patienter och det var inga signifikanta skillnader mellan könen. Riskbedömningsinstrumentet COVR kunde signifikant predicera våldsbeteende och den prediktiva validiteten var jämförbar med andra riskbedömningsinstrument COVR kunde predicera våldsbeteende för kvinnliga och manliga patienter med samma precision. Överlappningen mellan de patienter som begår våldsbeteende och utsätts för våld skall beaktas, både kliniskt och inom framtida forskning.

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