

Who experiences coercion?

Risk factors for seclusion and restraint in psychiatric inpatients

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Preface

In my clinical internship for my bachelor studies, I spent three months on an acute psychiatric ward, witnessing the challenges of emergency care as well as the use and consequences of coercive measures with my own eyes. I also spoke to patients and staff, whose often frustrating and distressing experiences remain with me until today. It was striking to me that the topic of coercive interventions, which seemed so prominent on the ward, had not been mentioned in my studies at all - although clinical psychologists working on inpatient wards will certainly be confronted with coercion and play an important role in designing care in a humane and recovery-oriented manner. This realisation motivated me to join the Charité working group for social psychiatry and care research in Berlin for this master thesis, which was developed after noticing that findings on determining factors of coercion and the use of such practices are scarce.

I am very grateful for this opportunity and have learnt a lot about the challenges of inpatient care as well as the experiences that patients are faced with, and sincerely hope that I can continue to contribute to improving the situation in the long term – in research or in practice. I want to thank the research group, in particular my thesis supervisor at Utrecht University, Rolf Kleber, as well as Celine Cole and Angelika Vandamme, for all their helpful and thoughtful advice and questions throughout the project, for the regular meetings, which I always left full of motivation, for their interest in my ideas, and their continued support.

Abstract

Seclusion and restraint are practices which are frequently used in inpatient psychiatric treatment and have well documented negative consequences for affected patients. They can also be seen as indicators of health care quality and mental health stigma in society. Yet, they are seldomly studied empirically. The aim of this study was to contribute to the prevention of coercive measures and respective interventions with data on the use of seclusion and restraint in a large acute psychiatric sample (N=1556) from Germany. For this purpose, patient-level clinical, sociodemographic, and admission-related predictors of seclusion and restraint were collected from medical records and analysed in order to identify the patient groups most at risk.

Consistent with the hypotheses, involuntary admission to the hospital, indication of an acute manic or psychotic episode, and physical or verbal aggression against persons or objects were significant predictors for seclusion or restraint during inpatient treatment. Further, younger patient age, acute intoxication at time of admission, and limited or no communication ability in German were significantly associated with the use of coercive measures. On the other hand, contrary to hypotheses, male gender, whether a patient was known to the wards at time of admission, and interactions between diagnoses and aggression or intoxication were not significantly associated with a higher risk for restraint or seclusion.

These results both support and broaden existing findings on predictors from international literature. They indicate that coercion is not applied at random but instead affects certain vulnerable groups, which should be protected better with the help of clinical psychologists. Clinical and policy-relevant recommendations as well as implications of the findings for future comprehensive research are discussed.

Keywords: coercion, seclusion, restraint, psychiatry, prevention, coercive measures, mental health care, predictors, human rights

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Introduction

Mental healthcare, especially in ‘Western’ countries, has entered public discourse and is researched in detail. However, a measure which remains understudied (Flammer et al., 2013) and slow to change despite efforts (Steinert et al., 2014) is coercion. To provide details on this overtly controversial practice, this study examines characteristics of patients and the admission situation that are associated with seclusion and restraint in an acute psychiatric sample.

Definition and prevalence of coercive practices

The term ‘coercion’ describes a range of formal or informal practices across different settings and countries. Such practices are most often applied to address perceived danger to self or others due to a mental health condition or to provide an intervention that a person is not willing to accept. Formal coercion includes compulsory treatment, such as involuntary admission, the forced administration of psychotropic medication, locking a person into a room (‘seclusion’), or controlling their physical movement, e. g. by holding them (‘manual restraint’), using physical devices (‘mechanical restraint’) or psychotropic drugs (‘chemical restraint’) (McLaughlin et al., 2016). Furthermore, informal coercion such as threatening a patient with seclusion or restraint is used. Such coercive measures (CM) are widely used in inpatient treatment (Steinert et al., 2010). In Germany, studies suggest that CM are used on all psychiatric wards and that approximately 10–20% of patients receive at least one CM – defined as seclusion and mechanical restraint – during inpatient treatment (Flammer et al., 2013). Across Europe, between 21% and 59% of psychiatric inpatients experience CM (Kalisova et al., 2014).

Consequences of coercive practices

Until today, CM are not only used in emergency situations to prevent harm to self or others, but also justified by arguing that they are therapeutic. Laukkanen and colleagues (2019), for example, mention in a review of studies on staff attitudes that particularly seclusion is often seen as calming measure. However, Chieze et al. (2019) suggest that studies

provide little evidence for therapeutic or protective effects of CM. In contrast, a range of adverse consequences for affected patients and administering staff were shown.

For patients, being subjected to CM is a highly distressing experience, partly due to the associated loss of control (Moran et al., 2009). Affected patients frequently experience coercion as unhelpful or punishment, and report helplessness or anxiety (Chieze et al., 2019). Experiencing CM also lowers treatment satisfaction and can even trigger post-traumatic stress symptoms (Frueh et al., 2005; Fugger et al., 2016). Individuals who have experienced traumatic events are especially vulnerable for both mental disorders and CM. For these patients, coercion can cause a revival of previous traumatisation (Georgieva et al., 2012). Experiencing CM has further been associated with lower long-term engagement with mental health services as it undermines therapeutic relationships, discourages trust in the care system, and dissuades affected persons from seeking help in the future (Jaeger et al., 2013). Staff members also frequently experience administering CM as distressing and contradictory to their role as caregivers (Theodoridou et al., 2012), and report frustration, helplessness, or guilt (Laukkanen et al., 2019).

Research and practical efforts to reduce coercion

Although some practitioners see CM as inevitable in dealing with dangerous or disturbing behaviour (e. g. Sharfstein, 2008), CM are mostly considered as problematic and sharply criticised (Sashidharan & Saraceno, 2017). Criticism is not only voiced because they carry the risk of damaging consequences, but also because CM are a human rights concern. Such practices can be seen as violating rights to liberty, autonomy, and freedom from inhumane or degrading treatment, among others (UN General Assembly, 2007). There is considerable agreement that they are overused both in advanced and developing care systems (Mahomed et al., 2018), although legal regulations and clinical guidelines consider them measures of last resort (Steinert & Hirsch, 2018).

Hence, reducing the use of coercion in mental health care is becoming a prominent policy issue (Steinert et al., 2014). In a recent World Psychiatric Association position statement and call to action (Rodrigues et al., 2020), the implementation of alternatives to

coercion is named as urgent need and as essential to improving care quality. Burgeoning interest can also be observed in interventions to reduce coercion in psychiatric treatment, such as the *Weddinger Modell*. It was implemented in 2010 at the Department of Psychiatry of the Charité at St. Hedwig Hospital (PUK SHK) in Berlin. It is an innovative psychiatric care model focusing on patient participation, recovery, and prevention of CM (Mahler et al., 2014). A recent study by Czernin et al. (2020) indicated that after its introduction, the frequency of CM could be significantly reduced.

Patient-level factors associated with coercive measures

To inform interventions, identifying patients who are at risk is meaningful (Happell & Koehn, 2010). Various determinants such as interactions between patients and staff, staff attitudes towards coercion, and ward resources certainly are influential (Gooding et al., 2018). However, data on patient characteristics associated with CM are a crucial starting point to increase staff awareness and tailor prevention to those at risk (Huckshorn, 2004). This also applies to clinical psychologists, who should be aware of the reality of their patients' experiences on wards and can contribute to the prevention of CM. This includes knowing about the frequency, antecedents, and consequences of CM – also to better support patients in dealing with these adverse experiences, e. g. through debriefing. This helps to secure the therapeutic relationship and enables patients to regain a sense of control (Vandamme et al., 2019).

While Sailas and Fenton (2000) conclude from a review that the characteristics of patients who experience CM differ widely between studies, more recent studies have found that predictors seem comparable across 'Western' countries, despite methodological differences (Kalisova et al., 2014). These predictors can be divided into admission-related, sociodemographic, and clinical details and are often extracted from patient records. The present work follows the same methodology by analysing medical records of patients admitted through the emergency room (ER) at PUK SHK, as empirical, large-scale research in this area is scarce. Therefore, the clinically most promising variables that could be extracted from records were chosen. In the following section, the most prominent findings and open questions

from previous international research on the predictors in this study will be introduced.

Admission-related details

Aggression. The indication of physical or verbal aggression as reason for referral to the ER has proven to be a stable predictor for coercion (Cole et al., 2020; Husum et al., 2010). This could be due to a continuation of aggression after admission (Steinert & Hirsch, 2018). Also, staff could be primed to intervene with more coercion to prevent harm of self or others in patients who showed aggressive behaviour prior to admission. This study shall include both physical and verbal aggression, as the latter is scarcely examined.

Involuntary admission. The same conclusion can be drawn for involuntary admission to inpatient treatment, which in itself is a form of coercion but has also been shown to lead to an increased risk for further CM. According to European data (Kalisova et al., 2014), almost 40% of involuntarily admitted patients receive CM. This is possibly due to patients' aversion towards psychiatric admission which could have led to involuntary admission. Involuntarily admitted patients are more often perceived as uncooperative by staff members, which leads to more conflicts and challenges the prevention of CM (Georgieva et al., 2012). Also, legal regulations state that in order to be admitted involuntarily, individuals must pose a substantial danger to themselves or others, which means that involuntarily admitted patients more often exhibit challenging behaviour leading to CM.

Acute Intoxication. At time of admission, acute alcohol or drug intoxication can also play a significant role in the exhibition of aggressive behaviour and therefore lead to CM (Mahler et al., 2019; Verboket et al., 2019). Further, patients intoxicated with multiple substances can frequently need continuous supervision due to health risks or disorientation (Tournebize et al., 2017), leading to seclusion.

Previous admissions. A variable which has seldomly been included in research on predictors for CM but may be relevant is whether a patient is known to the ward at time of admission. Individuals that are unknown to a ward might have a higher risk for CM since they have not yet had the possibility to build trusting relationships with ward staff which can foster de-escalation (Mahler et al., 2014). Staff may also be better able to anticipate patient behaviour and the effects of de-escalating, non-coercive interventions in known patients

(Keski-Valkama et al., 2010).

Sociodemographic details

Age and gender. In many studies, younger (Beghi et al., 2013) and male patients (Kalisova et al., 2014) were found to be at increased risk of CM, although articles on these two predictors do not always show consistent results (Cole et al., 2020; Keski-Valkama et al., 2010). These two predictors should thus be examined further.

Language ability. No results can be found with regard to the influence of communication ability on the frequency of CM. Since de-escalation and building a trusting relationship rely heavily on verbal communication, however, a lower oral proficiency in the language primarily spoken by staff could induce staff to intervene with more coercion (Beghi et al., 2013; Flammer et al., 2013). To shed light on whether language proficiency in German is associated with CM, it shall be included in this study.

Clinical details

Patient diagnoses. Diagnoses are frequently researched predictors. In one of the first reviews on the subject, diagnosis of a psychotic disorder could not consistently be shown to lead to more CM (Sailas & Fenton, 2000). Later work, however, suggests that patients diagnosed with psychosis are coerced more often (Beghi et al., 2013; Kalisova et al., 2014), potentially due to sensitivity to over-stimulation as well as high levels of positive symptoms (e. g. hallucinations) and hostility. Each of these factors could lead to more aggression. Initial studies further point out that patients with mania have one of the highest risks for CM (Flammer et al., 2013), perhaps due to the characteristic symptoms of hyperactivity, impulsivity or fragmented behaviour.

Interactions. In addition to the previously mentioned isolated variables, interactions between several risk factors should receive more attention (Flammer et al., 2013). As previous studies have sometimes not found a significant association of main diagnoses alone (Cole et al., 2020), it can be assumed from clinical observation that CM may be predicted better by the interaction of clinical symptoms with challenging behaviour, in particular aggression or intoxication. Such interactions may be more suitable to capture risk since ‘psychosis’

encompasses a range of different symptoms. Initial studies suggest that psychosis, for example, is associated with a higher risk for aggression especially in patients with comorbid substance abuse (Witt et al., 2013).

Research question and hypotheses

To broaden knowledge on patient characteristics associated with CM on psychiatric wards (particularly in Germany) and direct more attention to the use of coercion, this study seeks to answer the following research question:

Which patient characteristics increase the risk of experiencing at least one CM (seclusion or restraint) in individuals admitted to inpatient psychiatric treatment through the ER?

Drawing on the findings described above, it is hypothesised that:

1. A higher risk of being subjected to at least one intervention of seclusion or restraint is found in patients who
 - (a) Showed aggression against persons or objects (threatening or physical assault) prior to admission
 - (b) Have been admitted to treatment involuntarily
 - (c) Were acutely intoxicated at time of admission
 - (d) Are unknown to the ward
 - (e) Are younger
 - (f) Are male
 - (g) Have limited or no communication ability in German
 - (h) Were in a manic episode at time of treatment
 - (i) Were in a psychotic episode at time of treatment
2. Psychosis and aggression against persons or objects interact in increasing the risk to experience at least one CM.
3. Psychosis and acute intoxication interact in increasing the risk to experience at least one CM.
4. Mania and aggression against persons or objects interact in increasing the risk to

experience at least one CM.

5. Mania and acute intoxication interact in increasing the risk to experience at least one CM.

The design of this study is based on recent work by Cole et al. (2020) at PUK SHK. The current study aims to examine whether the predictors for CM found by them in a 2018 sample are valid in a different sample. It also expands previous findings by 1) analysing scarcely included predictors such as mania, 2) including interactional effects of predictors, and 3) including more sociodemographic variables, such as language ability. The results of this study can inform interventions to prevent the use of freedom-restricting measures.

The remainder of this text will be structured as follows: Firstly, the design and method of data collection will be described, after which the data analysis procedure and the characteristics of the sample will be reported. Following the presentation of the results, the discussion will focus on the value of the findings in light of previous research, the strengths and limitations of the study and its implications for practice and further research.

Method

Design and data collection

To test the hypotheses, a comparative, cross-sectional study was carried out at PUK SHK. The urban districts that make up its catchment area comprise approximately 485 000 inhabitants (Amt für Statistik Berlin-Brandenburg, 2020). PUK SHK provides treatment on three general psychiatric wards and one substance abuse ward, all of which were included in this study.

As data source, the computerised documentation system (ORBIS KIS) was chosen because due to legal obligations, data on CM are expected to be highly accurate (Jaeger et al., 2011). This type of data also allows to examine a large sample. To obtain individual-level data, records of all patients admitted to inpatient psychiatric treatment at PUK SHK in 2019 via the ER were examined and coded by the author. The sample thus consists of the entire population of patients admitted through the ER in 2019 at PUK SHK. Admission via the ER and inpatient treatment were chosen as these modes of admission and treatment are settings in

which coercion is most often used in Germany. The records contained information which was routinely collected during admission and treatment to register demographic and clinical details, and the occurrence of CM. To create the dataset, a codebook (see Appendix A) was developed based on the study by Cole and colleagues (2020). To ensure reliability and validity, the codebook and its application were discussed and revised with the thesis supervisors.

Ethical approval was obtained from FERB at Utrecht University on 5 November 2020. The appropriate authorities at PUK SHK granted separate research permission.

Definitions of coercive measures

In the data, the following conceptualisations of CM were applied:

Involuntary admission was defined through (1) provisional detentions, (2) detentions initiated by patients' legal guardians, followed by court order according to the German Civil Code (Bürgerliches Gesetzbuch (BGB)) or (3) detentions by court order according to the Mental Health Law of the State of Berlin (Berlin PsychKG).

Seclusion was defined as involuntarily bringing a patient into a designated isolation room where they are alone and able to move freely but unable to leave due to a locked door. During isolation, patients were observed every 10 to 15 minutes through a window.

Restraint refers to mechanical restraint, i. e. using special fixation straps to restrict a patient's freedom of movement by fixating them to a bed. According to hospital guidelines, patients had to be continuously supervised 1:1 during this measure.

Data analysis

For bivariate comparisons between patients with and without CM, Chi-squared analyses were used for all categorial or dichotomous sociodemographic, clinical and admission-related variables (see table 2 and 3 for an overview). For the continuous variables age and treatment length, independent sample t-tests were conducted.

To identify the unique predictive power of the independent variables and interactions, multivariate logistic regression analyses with use of any CM as dichotomous dependent

variable¹ and the predictors listed in Table 4 were conducted. These included fixed effects for the four wards to control for any unobserved differences in the use of CM, since between-ward variance was substantial in previous studies (Husum et al., 2010). All assumptions were tested a priori to verify there was no violation. The calculations were performed in R 3.6.1.

Results

Sample characteristics

Sociodemographic characteristics

In 2019, 1091 patients were admitted through the ER at PUK SHK, accounting for 1556 cases due to repeated admissions – 24% of all patients were admitted multiple times (up to 14 times during the study period). The average length of stay was 19 days ($SD = 30.7$), ranging from less than one up to 354 days. The patients' age ranged from 18 to 96 years with a mean age of 41.5 ($SD = 14.2$), and most individuals (63%) identified as male. In 62% of cases, patients were unemployed or job-seeking during treatment. Most commonly, patients were living alone (38%), however, in a substantial number of cases (17%), patients were homeless (see Table 2).

Most patients had a German nationality (84%) and spoke German perfectly (88%). In accordance with the percentage of inhabitants with a migration history in the hospital catchment areas (Amt für Statistik Berlin-Brandenburg, 2020), 48% of patients had a first- or second-generation migration background.

Clinical and admission-related details

Most patients were referred by police (31%) or presented alone (30%). In total, 23% were admitted to treatment involuntarily. The most common reason for referral were general

¹ The choice not to conduct separate analyses for the two types of CM was made in order to identify general predictors for both seclusion and restraint to obtain more generalisable results that can be more easily used in clinical practice. In separate logistic regression models for the two types, including the same predictors as in the main analyses, the results (see Appendix D) also revealed only few differences between risk factors for seclusion and restraint. In practice, the choice of measure often is an individual decision or due to resource constraints (e. g. restraint is used when no seclusion room is available (Kalisova et al., 2014)) rather than based on systematic evidence or patient characteristics. Thus, significant associations of predictors with certain types of CM would be difficult to interpret, also with regard to interventions which should aim to reduce coercion irrespective of type.

mental health problems such as psychosis or substance use problems ($n = 581$; 37%), followed by suicidal thoughts or self-harm ($n = 349$; 22%) or suicide attempts ($n = 83$; 5%). Physical aggression against persons ($n = 128$; 8%) or objects ($n = 60$; 4%), as well as verbal aggression ($n = 109$; 7%) were also common reasons for referral. In 164 cases (11%), patients were referred because they were in a state of disorganisation, helplessness or confusion, and the remaining cases were admitted due to self-endangerment ($n = 78$; 5%) or exhibitionism ($n = 10$; 1%).

The most common main diagnoses were psychotic ($n = 483$; 31%; F2 diagnoses according to ICD-10 (World Health Organization, 2016)) and substance use disorders ($n = 572$; 37%; F1). Mania or bipolar disorders were main diagnoses in 109 cases (7%; F30-F31), however, the number of patients in an acute manic episode at time of admission was slightly higher ($n = 150$; 10%).¹ Similarly, the number of patients in an acute psychotic episode regardless of main diagnosis was 704 (45%). Depression was recorded in 100 cases (6%; F32-F39), anxiety, dissociative or somatoform disorders were indicated in 83 cases (5%; F4), intellectual disabilities in 36 cases (2%; F7), and personality disorders in 126 cases (8%; F6). In 50 cases, the main diagnosis was an organic disorder (3%; F0).

Further, at time of admission, 30% of patients were acutely intoxicated, most often with alcohol ($n = 268$; 58%) or multiple substances ($n = 165$; 36%). Most patients (70%), however, were capable or willing of psychiatric exploration at admission.

Use of coercive measures

In total, 17% of all cases experienced at least one CM (see Table 1). Seclusion was the most prevalent measure and was used in 15% of all cases for a total median duration of 720 minutes per case, while restraint was used in 9% of all cases and for a median duration of 20 minutes. The median cumulative duration of CM in cases in which they were applied was 14 hours ($SD = 3.0$), it however ranged from 5 minutes to 22 days. Accounting for patients with multiple admissions, each patient received a mean number of 2.9 CM ($SD = 3.0$).

Table 1*Frequency and duration of coercive measures*

Type	Cases		Median duration in minutes	Mean number of CM per patient
	n	%		
Any CM	261	16.8	840	2.9 ± 3.0
Seclusion	231	14.9	720	2.2 ± 2.2
Restraint	143	9.2	20	1.7 ± 1.4
No CM	1295	83.2	-	-

Bivariate comparisons between coerced and non-coerced patients

The results of the bivariate tests as well as characteristics of all cases with and without CM are displayed in Table 2 and 3 (see Appendix B for full Chi-squared results).

With regard to sociodemographic variables, younger patients were subjected to coercion more often ($t(1089) = -4.22; p < .001$). In the group who experienced CM, patients were also more often unemployed or retired, had limited or no communication ability in German and a migration history, or were homeless.

Table 2
Sociodemographic case characteristics

Variable	Overall (<i>n</i> = 1556)		no CM (<i>n</i> = 1295)		CM (<i>n</i> = 261)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Sociodemographic						
Gender						
Female	573	36.8	483	37.3	90	34.5
Male	983	63.2	812	62.7	171	65.5
Age (M±SD)	41.5 ± 14.2		42.4 ± 14.4		37.2 ± 12.7	
Job status ^a						
Employed	257	17.1	226	17.9	31	12.8
In education	81	5.4	65	5.2	16	6.6
Jobless/Jobseeking	927	61.7	755	60.0	172	70.8
Retired	238	15.8	214	17.0	24	9.9
Living situation ^a						
Alone	582	38.3	485	38.2	97	40.0
Assisted living	176	11.5	147	11.6	28	11.2
Shared flat	466	30.6	394	31.0	71	28.5
Homeless	262	17.1	212	16.7	48	19.3
Retirement/Refugee home	38	2.4	32	2.5	5	2.0
Communication in German ^a						
Perfect	1380	88.8	1175	90.8	205	78.5
Limited	96	6.2	66	5.1	30	11.5
Not possible	79	5.1	53	4.1	26	10.0
Migration background ^a	742	48.1	586	45.6	156	59.5

Note. Chi-square tests of significance were conducted for all variables, t-tests for age and treatment length. Variables that differ on a $p < .05$ significance level between coerced and non-coerced patients are marked in bold.

^aData were missing for some patients.

With regard to clinical variables, cases with coercion were significantly more often experiencing psychotic or manic episodes. They further spent significantly more days in treatment than cases who did not experience CM ($t(1553) = 6.1$; $p < .001$). Finally, admission-related variables also differed significantly as in the CM group, psychiatric exploration in the admission situation was more often limited or not possible, and patients were significantly more often involuntarily admitted and accompanied by police. Also, cases in the CM group were more often indicated to show physical or verbal aggression against persons or objects prior to admission and were more often acutely intoxicated.

Table 3
Admission-related and clinical case characteristics

Variable	Overall (n = 1556)		no CM (n = 1295)		CM (n = 261)	
	n	%	n	%	n	%
Admission-related						
Involuntary admission	363	23.2	164	12.7	195	74.7
Aggression	297	19.0	133	10.3	163	62.4
Acute intoxication	462	29.6	362	28.0	99	37.9
Known ^a	868	56.2	722	55.7	146	55.9
Communication at admission ^a						
Capable of exploration	1084	69.7	988	76.4	96	36.8
Exploration limited	337	21.7	242	18.7	95	36.4
Not possible	134	8.6	64	5.0	70	26.8
Referral to emergency room						
Police	483	31.0	290	22.4	193	74.0
Alone	473	30.4	459	35.4	14	5.4
Emergency services	371	23.8	337	26.0	34	13.0
Family/Friends	216	13.9	198	15.3	18	6.9
Legal guardian	13	0.8	11	0.9	2	0.8
Clinical						
Psychosis	704	45.1	533	41.1	168	64.4
Mania	150	9.6	87	6.7	63	24.1
Days in treatment (M±SD)	19±30.7		16.4 ± 26.1		29.0 ± 46.0	

Note. Chi-square tests were conducted for all variables, t-tests for age and treatment length. Variables that differ on a $p < .05$ significance level between coerced and non-coerced patients are marked in bold.

^aData were missing for some patients.

Multivariate associations between patient characteristics and the use of coercive measures

To test the hypotheses, two logistic regressions were conducted, one model containing all predictors and one adding interaction terms (see Table 4 for all b-values and SEs). In line with the hypotheses, younger age, acute intoxication, involuntary admission, psychosis, mania and limited or no communication ability in German were all significant predictors of any type of CM. Judging by Odds Ratios, the most influential predictors were involuntary admission (OR = 9.70 in the full model, 95% CI [6.68, 14.21]), mania (OR = 6.18, 95% CI [3.00, 12.39]), and physical or verbal aggression prior to admission (OR = 7.42, 95% CI [3.99, 13.88]).

Being unknown and gender did not significantly increase or decrease the risk for CM².

² It was explored whether among those who experienced CM, known patients were subjected to CM for a shorter duration, potentially due to higher trust and cooperation with staff. This was tested for statistical significance

Table 4
Logistic regression for risk of any coercive measure

Variable	Models	
	(1)	(2)
Male gender	−0.38 (0.20)	−0.37 (0.21)
Age	−0.02*** (0.01)	−0.02** (0.01)
Acute intoxication	0.52* (0.20)	0.68* (0.27)
Known	−0.03 (0.19)	−0.02 (0.19)
Involuntary admission	2.24*** (0.20)	2.27*** (0.20)
Aggression	1.71*** (0.20)	2.00*** (0.29)
Psychotic episode	0.48** (0.21)	0.57* (0.32)
Manic episode	0.91** (0.31)	1.82*** (0.39)
Communication in German (<i>Ref.</i> : Perfect)		
Limited	0.73* (0.39)	0.77* (0.40)
Not possible	1.18*** (0.32)	1.20*** (0.33)
Interactions		
Psychosis*Aggression		−0.06 (0.39)
Psychosis*Intoxication		−0.10 (0.41)
Mania*Aggression		−1.39** (0.51)
Mania*Intoxication		−0.73 (0.58)
Intercept	−2.09*** (0.38)	−2.30*** (0.40)
n	1556	1556
Log Likelihood	−427.37	−421.70
Akaike Inf. Crit.	882.74	879.41

Note. Clustered standard errors and ward-FEs included.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

with linear regression analyses, using the same specifications as in table 4. The dependent variable was the cumulative duration of CM in minutes. Contrary to assumptions, however, known patients had a longer overall duration of CM, reaching marginal significance ($b = 210.93$; $p < 0.1$). The full regression results can be found in Appendix B.

Contrary to expectations, the interaction terms of the diagnoses of psychosis and mania and intoxication or aggression were not significantly associated with CM. In the case of mania and aggression, the interaction term was even associated with a significantly lower risk of CM.

Exploratory analyses

Following up on the descriptive finding that many patients were jobless or had a migration background, it was tested whether the effects of clinical or admission-related predictors were confounded by sociodemographic variables. Therefore, three logistic regression models were used. The first included all sociodemographic, the second all clinical and admission-related variables, and the third contained both variable types. The dichotomous dependent variable was the use of CM. Similar to all other analyses, all models included ward fixed effects³.

In the first model, only younger patient age, limited or no communication ability in German, and a jobless/job-seeking status were significantly associated with CM. However, the effects of job status diminished in the full model, while all admission-related and clinical effects remained stable (see Table 5). This indicates that the effect of clinical predictors was not confounded by patients' sociodemographic characteristics. Still, the results point to more complex interactions between the variable types.

³ Unobserved ward differences were explored by looking at the estimated *b*- and *p*-values for the four wards that were included as fixed effects in the multivariate models reported in table 4. It showed that controlling for sociodemographic, clinical and admission-related variables, two of the general psychiatric wards administered significantly less CM than the substance abuse ward ($b = -0.71$; $p < .05$ and $b = -0.70$; $p < .05$, respectively). Also, on the third general psychiatric ward, CM were used less often than on the substance ward, reaching marginal significance ($b = -0.49$; $p < .1$).

Table 5

Logistic regression for risk of any coercive measure, including all sociodemographic predictors

Variable	Models		
	Social	Clinical	Full
Male gender	0.00 (0.16)		-0.31 (0.21)
Age	-0.02*** (0.01)		-0.03*** (0.01)
Job status (<i>Ref.</i> : Employed)			
Jobless/job-seeking	0.46* (0.23)		-0.06 (0.31)
In education	0.24 (0.36)		0.33 (0.44)
Retired	0.47 (0.33)		0.64 (0.44)
Migration background	0.29 (0.16)		0.13 (0.22)
Communication in German (<i>Ref.</i> : Perfect)			
Limited	0.81** (0.26)		0.79 (0.41)
Not possible	0.92*** (0.28)		1.25*** (0.36)
Psychotic episode		0.48* (0.20)	0.43* (0.22)
Manic episode		0.77* (0.31)	0.94** (0.32)
Acute intoxication		0.52** (0.19)	0.46** (0.21)
Known		-0.18 (0.18)	-0.06 (0.20)
Involuntary Admission		2.32*** (0.20)	2.30*** (0.20)
Aggression		1.65*** (0.20)	1.67*** (0.21)
Intercept	-1.30*** (0.38)	-3.11*** (0.22)	-2.04*** (0.52)
n	1556	1556	1556
Log Likelihood	-624.13	-442.97	-400.86
Akaike Inf. Crit.	1,274.27	905.94	839.72

Note. Clustered standard errors and ward-FEs included.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Discussion

The aim of this study was to contribute to the prevention of CM with data from a large acute psychiatric sample. Therefore, clinical, sociodemographic and admission-related predictors of seclusion and restraint were analysed to identify the most vulnerable patient groups. In the following, the most prominent findings are discussed in the context of previous research, and practical and research implications are presented.

Predictors of coercive measures, and possible explanations of findings

Notably, the number of individuals diagnosed with psychotic disorders was high, and a third of patients were acutely intoxicated at admission. Further, the number of homeless or jobless patients in the sample was considerably higher than in the general German population (Destatis, 2019). This indicates that many inpatients at PUK SHK live in socioeconomically deprived circumstances. These patients also were more often subjected to CM. However, according to the exploratory findings on the types of predictors, this is partly caused by mental health problems rather than by socioeconomic variables per se. Overall, it was found that consistent with other data from Germany (Steinert et al., 2014), CM were used in 17% of cases.

Admission-related predictors

Contrary to the hypothesis, whether a patient was **known** to the hospital did not decrease the risk for CM. This could be explained by the definition of the variable ‘known’, which meant that a patient had been treated at PUK SHK in 2015 to 2019. This variable thus could have been defined too broadly and ‘known’ patients could have encountered unknown staff since junior doctors only stay for up to two years. Instead, what could have been captured could be patients with multiple admissions and thus a more severe clinical presentation. The exploratory finding that known patients had a longer overall duration of CM is in line with this interpretation. In one previous study, multiple admissions were also associated with more CM (Knutzen et al., 2014).

The remaining admission-related results aligned with the hypotheses. The findings that

aggression against persons or objects prior to admission and **involuntary admission** were significantly associated with the use of CM further are in line with most international studies (Beghi et al., 2013; Cole et al., 2020). While many studies focus on physical aggression, in this study, both physical as well as verbal aggression were included and were significantly associated with the use of CM. Similarly, the results of this study with regard to the predictive value of **acute intoxication** align with previous findings (Andersen & Nielsen, 2016). This might be explained by higher rates of physical aggression in intoxicated patients, who often do not benefit from verbal de-escalation during admission (Verboket et al., 2019).

Sociodemographic predictors

Although several international studies report an increased risk of coercion in **male** patients (Kalisova et al., 2014; Knutzen et al., 2014), similar to the study by Cole and colleagues (2020) at PUK SHK, patients' gender could not be identified as a predictor, against the hypothesis. This suggests that as proposed by Husum and colleagues (2010), patients' clinical presentation or situational factors might be more influential than gender alone, in line with the finding that admission-related characteristics were most strongly associated with CM.

The significant effect of **younger age**, however, fits findings from the UK (Bowers et al., 2014), Germany (Cole et al., 2020), and Denmark (Knutzen et al., 2014) and the hypothesis. From clinical observation, it is known that younger patients who have manifested a disorder for the first time sometimes show higher anxiety and resistance with regard to developing psychological symptoms. Similarly, they can experience the inpatient setting as more distressing and unpredictable, which can lead to more situations in which CM are used. This explanation should be examined empirically, since other studies also found inconclusive results regarding a potential age effect (Keski-Valkama et al., 2010).

As hypothesised, limited or no **language ability** in German was shown to significantly relate to the use of CM. To the best of my knowledge, communication ability has not been included in any study on CM yet, even though it can be assumed that communication plays an important role in the prevention of coercion. The process of verbally calming down acutely agitated patients may be complicated by language barriers (Norredam et al., 2010). The variable could also have captured patients' first-generation migration background more

accurately than the broader 'migration background' variable and thus indicate that CM were used more often due to discriminatory or stereotyping practices (Steinhäuser et al., 2015). The effect could, however, also be explained by patients' more severe clinical presentation due to different help-seeking behaviour. Refugee patients, for example, tend to seek help when they are in emergency situations rather than in early phases of mental problems (Gesundheitsministerkonferenz der Länder, 2007).

Clinical predictors

Both acute **manic and psychotic episodes** have been described as a challenge in the clinical setting with limited space and staffing since both disorders are associated with aggressiveness and can thus lead to more CM (Curtis et al., 2016). In this study, both hypotheses about their role as predictors were confirmed. The finding that mania was a significant predictor is in line with the few previous studies where it was included (Bowers et al., 2014). Generally, conflicting findings exist regarding a higher use of CM in patients in an acute psychotic episode (Cole et al., 2020; Kalisova et al., 2014), potentially due to the different forms of delusions which do not always lead to aggression or self-endangerment (Witt et al., 2013). This study, however, supports the frequent suggestion that many of the patients experiencing CM are suffering from psychotic disorders (Beghi et al., 2013; Janssen et al., 2012).

Contrary to hypotheses, all **interactions** between diagnoses and intoxication or aggression showed no significant association with CM, with exception of the significant negative effect of mania combined with aggression. While mania was observed to increase the risk for coercion in isolation from other variables, this significant negative effect of the interaction with aggression is surprising but could be explained from clinical observation. At PUK SHK, patients who showed aggression prior to admission and are in a manic episode are often admitted to a single instead of a shared room to prevent sensory overstimulation and conflicts. Similarly, psychosis, in interaction with aggression and intoxication, could lead to preventive de-escalating measures. Such speculative interpretations should be examined empirically, as interactions have scarcely been included in studies.

Coercive measures – a significant phenomenon in mental healthcare

Despite growing awareness for the ethical and health-related challenges of CM, this study shows that CM still are an ubiquitous phenomenon in mental healthcare. More and more people, often admitted through the ER (Puffer et al., 2012), are treated in psychiatric facilities worldwide, and rates of involuntary admission are rising in some European countries (Care Quality Commission, 2016).

The different forms of coercion can be seen as relicts of the institutional origins of psychiatry in custodial asylums, which episodically escalated in excessive violence against people with mental health problems, e. g. during the Nazi regime. By some, CM are considered “the oldest problem of psychiatric institutions” (Steinert et al., 2014, p. 1). Critical psychiatrists like Tomas Szasz (2007) even understand coercion as defining feature of psychiatry, which was designed to incarcerate ‘socially abnormal’ people. Consequently, coercion is a normative issue. It is subject to changing public opinions and can be seen as indicator of health care quality and mental health stigma in society (which creates the perception that CM are necessary for public safety (Rodrigues et al., 2020)). Against this background, the lack of theoretical explanations for the use of coercion in many research papers is striking. Clinical research should instead incorporate more explanatory perspectives, e. g. through theory on power relations and interpersonal conflict (Middleton, 2016). This is crucial as psychologists can contribute to the prevention of CM in a more targeted way when the reasons for their use are conceptualised more clearly. Thus, this topic needs increased research and practical efforts with an explanatory and preventive rather than a descriptive focus.

Strengths and limitations of this study

Its practical and clinical relevance should be considered a strength of this study. In addition, a strength lies in the inclusion of more sociodemographic characteristics such as language ability. The multivariate analysis, including ward differences, which are substantial but often not considered, also sets this work apart. Further, the study relies on a large sample (N = 1556, including all patients irrespective of whether they experienced CM). This allows to

examine predictors in a sample representative of the cases admitted to inpatient treatment at PUK SHK.

On the other hand, it is unclear whether the results are representative of other hospitals since the data were obtained from an urban population and a single hospital which has already implemented preventive measures. The variation in the use of CM in previous studies suggests that the results should be interpreted with caution when it comes to their generalisation, since resources, cultural attitudes, and different definitions of CM as well as different methodological choices might play a significant role (De Jong et al., 2016).

This thesis also cannot capture the topic in its complexity. Firstly, the data are subject to biases since possibly relevant information might have been omitted in the records written by different staff with varying comprehensiveness and the coding was done by the author only. Further, although predictors are important in directing attention to the most vulnerable groups, they most likely are not what triggers coercion alone. CM should rather be conceptualised as determined by an interplay of patient and admission characteristics, staff attitudes towards coercion, ward characteristics such as staff-to-patient ratio, and wider regulations (Husum et al., 2010). Some studies even indicate that hospitals have characteristic CM rates that are independent of patient demographics but rather reflective of the way in which challenging behaviour is handled as well as practical reasons such as the availability of such measures (Bowers et al., 2014). The ward differences independent of patient composition found in this study could point in the same direction and should be examined more closely.

Implications for further research

Future research should examine explanations and empirical evidence for the novel findings of this study, e. g. the non-significant interactions. Particularly, this should include the respective reasons for the use of CM, such as aggression on the ward. This study only recorded the reason for referral which might become less explanatory for CM the longer patients stay on the ward. Secondly, other potentially influential variables could not be included, such as the severity of disorders (Kalisova et al., 2014).

Quantitative work on coercion also cannot entirely capture interpersonal and informal

mechanisms that lead to CM. Instead, future studies should go beyond the insights that can be gathered from records and combine them with qualitative methods to explore the social and interactional microcosms in which coercion is used as well as staff and patient perspectives on CM. This could aid the development of theoretical frameworks to explain coercion.

Particularly, affected patients should be able to share their knowledge and experiences in more participatory research and intervention development practices to prevent CM (Russo & Beresford, 2015).

Implications for policy and clinical practice

The findings indicate that coercion is not applied at random but that certain groups of patients in certain admission situations are more vulnerable. Research on predictors thus creates more awareness for such patterns and aids the development of guidelines to prevent CM in patients most at risk. Beyond general recommendations (Gooding et al., 2018), data on the use of CM should be made more transparently available for research and practice, e. g. by installing nation-wide registers (Noorthoorn et al., 2015). Register data can also be presented in feedback sessions to monitor the effects of preventive interventions and motivate a further reduction of CM.

As involuntary admission increases the risk for CM, efforts to reduce the number of involuntary stays should be undertaken. This includes continuous communication between professionals, patients, and relatives as well as focusing on building trustful relationships and shared decision-making with patients (Thornicroft & Henderson, 2016). Here, clinical psychologists play a central role as they can create crisis plans in collaboration with patients containing past helpful strategies and advance preference statements for emergency situations. This can reduce the number of CM (Henderson et al., 2017).

Since communication ability in German was predictive of CM, staff should be critically aware of misunderstandings and cultural stereotyping. On a policy level, more resources for regular visits by translators on wards are needed. Such measures should eventually enable patients' recovery in a person-centred, humane setting without coercion.

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Appendix A

Codebook

Note: Not all collected variables were used for the purpose of this thesis. Variables omitted in the thesis are marked in grey.

nr	var_name	description	type	answer options	coded	created in R	comment
1	patient_id	Patient identifier	numerical		x		
2	patient_caseid	Case ID of the patient	numerical		x		
3	patient_ward	To which ward was the patient admitted?	factor	34 36 37 39	x		
4	treatment_startdate	Time and date of admission	POSIXct			x	
5	treatment_startdate_weekend	Did treatment start on a weekend?	dummy	0 1		x	
6	treatment_enddate	Enddate of treatment in dd.mm.yyy format	POSIXct			x	
7	treatment_length	Length of treatment in days, counting first and last day as full days	numerical			x	
8	patient_age	Age of the patient in years	numerical		x		
9	patient_gender	Gender as indicated in records	factor	male female diverse	x		
10	patient_residence	Where (city/country) does the patient normally live?	factor	catchment area of the clinic Berlin_other Germany abroad	x		
11	patient_nationality	Nationality of the patient	factor	German other EU other non EU	x		
12	patient_migrationbackground	Was a migration background indicated in the record?	dummy	0 1	x		
13	patient_German_nationality		dummy	0 1	x		
14	patient_housing	In what type of housing does the patient normally live?	factor	alone with core family with family homeless shared flat assisted living retirement home with partner refugee home other	x		
15	patient_job	What is the patient's current job situation?	factor	employed self-employed student/apprentice retired jobless/jobseeking other	x		
16	patient_communication	How well was the patient able to communicate at time of admission?	factor	capable of exploration not possible due to language not possible limited due to language exploration limited mutistic sub-mutistic	x x		

17	patient_communication_final	How well was the patient able to communicate at time of admission? Simplified version	factor	capable of exploration limited not possible		x	
18	patient_German	How well is the patient able to communicate in German?	factor	perfect limited not possible			
19	patient_known	Was the patient known to any of the wards at time of admission (stay in last 5 years)?	dummy	0 1	x		
20	patient_treatment_previous	Has the patient previously been in any psychiatric/psychological treatment?	factor	none inpatient outpatient both	x		
21	diagnosis_ICD	What is the patient's main diagnosis? Exact ICD code	numerical		x		
22	diagnosis_category	Overarching ICD category, e.g. F30.x	numerical	F0 F1 F2 F30, 31 F32-39 F4 F5 F6 F7 F8 F9		x	
23	diagnosis_psychosis	Was the patient in a psychotic episode at time of admission (irrespective of main diagnosis)	dummy	0 1	x		
24	diagnosis_mania	Was the patient in a manic episode at time of admission (irrespective of main diagnosis)	dummy	0 1	x		
25	diagnosis_substance	Does the patient have a comorbid substance abuse diagnosis?	dummy	0 1	x		
26	diagnosis_substance_ICD	Which comorbid substance abuse diagnosis does the patient have? Exact ICD code	string		x		
27	patient_intoxication	Was the patient acutely intoxicated at time of admission?	dummy	0 1	x		
28	patient_substances	Which substances was the patient intoxicated with at time of admission?	string		x		
29	patient_aggression	Has the patient shown physical or verbal aggression against persons or objects prior to admission?	dummy	0 1		x	
30	referral_reason	Reason that police or fire department or individuals themselves gave for the referral of the patient	factor	suicidal thoughts/self-harm suicide attempt health-related problems self endangerment disorientation/helplessness/	x		

				unorganised/irregular			
				confusion			
				aggression against persons (physical assault)			
				aggression against persons (threatening)			
				exhibitionism			
				aggression against objects/vandalism			
				other			
31	referral_comment	Comment on the reason for referral	string		x		
32	referral_call	Who called the ambulance/police?	factor	patient	x		
				relatives/friends			
				neighbours			
				social psychiatric service			
				doctor/nurse			
				legal guardian			
				passer-by			
				other			
33	referral_location	Where did the patient come from?	factor	home	x		
				other private house			
				street			
				mainstation			
				referral			
				psychologist/doctor practice			
				other clinic			
				workplace			
				other			
34	referral_location_comment	Comment on where the patient came from	string		x		
35	referral	Mode of referral to the emergency room	factor	alone	x		
				legal guardian			
				accompanied (family)			
				accompanied (other)			
				ambulance			
				emergency doctor			
				fire service			
				police			
36	referral_2	Additional mode of referral, if patients were referred by more than one authority	factor	alone	x		
				legal guardian			
				accompanied (family)			
				accompanied (other)			
				ambulance			
				emergency doctor			
				fire service			
				police			
37	referral_unified	Mode of referral to the emergency room; simplified to one mode only	factor	alone		x	The two modes for referral were unified into one by choosing the seemingly most "intrusive" mode of referral. The mode chosen as most intrusive was by police, followed by ambulance and family or friends
				legal guardian			
				accompanied (family)			
				accompanied (other)			
				ambulance			
				emergency doctor			
				fire service			
				police			

38	referral_legalbasis	Legal basis of referral to the emergency room	factor	police voluntary BGB preliminary PsychKG existing PsychKG coercion with police	x		
39	referral_involuntary	Was the referral to the emergency room involuntary?	dummy	0 1		x	
40	admission_legalbasis	The patient's legal basis for admission to the ward	factor	BGB voluntary preliminary PsychKG PsychKG	x		
41	admission_involuntary	Was the admission to the ward involuntary?	dummy	0 1		x	
42	status_change	Did the patient's legal basis for treatment change during the stay?	factor	none yes, PsychKG to voluntary yes, BGB to PsychKG yes, BGB to voluntary yes, voluntary to PsychKG yes, voluntary to BGB yes, PsychKG to BGB yes, BGB to PsychKG yes, PsychKG to BGB	x		
43	cm_overall	Did the patient receive any coercive measures (cm) during the stay?	dummy	0 1	x		
44	cm_overall_number	How many coercive measures (irrespective of type) did the patient receive in total during the stay?	numerical		x		
45	cm_overall_duration	Total duration of all cm in minutes	numerical			x	
46	cm_overall_24h	Did any cm occur in the first 24h of treatment?	dummy	0 1		x	
47	cm_overall_later	Did any cm occur after the first 24h of treatment?	dummy	0 1		x	
48	cm_compulsoryhospital	Was the patient in compulsory hospitalisation during coercive measures?	dummy	0 1	x		
49	cm_seclusion	Did the patient experience seclusion at least once during the stay?	dummy	0 1	x		
50	cm_seclusion_number	How many times was the patient subjected to seclusion during the stay?	numerical		x		
51	cm_seclusion_duration	Total duration of all seclusion episodes in minutes	numerical			x	
52	cm_seclusion_24h	Did any seclusion occur in the first 24h of treatment?	dummy	0 1		x	
53	cm_seclusion_later	Did any seclusion occur after the first 24h of treatment?	dummy	0 1		x	
54	cm_seclusion_1_start	Startdate and -time of first seclusion episode	POSIXct			x	Similarly, all further episodes of seclusion were coded
55	cm_seclusion_1_end	Enddate and -time of first seclusion episode	POSIXct			x	
		Did the patient experience restraint at least once					

56	cm_restraint	during the stay?	dummy	0 1	x		
57	cm_restraint_number	How many times was the patient subjected to restraint during the stay?	numerical		x		
58	cm_restraint_duration	Total duration of all restraint episodes in minutes	numerical			x	
59	cm_restraint_24h	Did any restraint occur in the first 24h of treatment?	dummy	0 1		x	
60	cm_restraint_later	Did any restraint occur after the first 24h of treatment?	dummy	0 1		x	
61	cm_restraint_1_start	Startdate and -time of first restraint episode	POSIXct			x	Similarly, all further episodes of restraint were coded
62	cm_restraint_1_end	Enddate and -time of first restraint episode	POSIXct			x	

Appendix B

Full results of Chi-squared comparisons between coerced and non-coerced patients

Variable	no CM (n = 1295)		CM (n = 261)		χ^2	p
	n	%	n	%		
Socio-demographic						
Gender					0.19	.665
Female	483	37.3	90	34.5		
Male	812	62.7	171	65.5		
Job status ^a						
Employed	226	17.9	31	12.8	3.25	.071
In education	81	5.4	65	5.2	0.62	.430
Jobless/Jobseeking	755	60.0	172	70.8	9.00	.003**
Retired	214	17.0	24	9.9	6.88	.009**
Living situation ^a						
Alone	485	38.2	97	40.0	0.02	.876
Assisted Living	147	11.6	28	11.2	0.002	.968
Shared flat	394	31.0	71	28.5	0.17	.677
Homeless	212	16.7	48	19.3	0.81	.369
Retirement/Refugee home	32	2.5	5	2.0	0.06	.799
Communication in German ^a						
Perfect	1175	90.8	205	78.5	31.47	<.001***
Limited	66	5.1	30	11.5	14.24	<.001***
Not possible	53	4.1	26	10.0	14.31	<.001***
Migration background ^a	586	45.6	156	59.5	17.29	<.001***
Admission-related						
Involuntary admission	164	12.7	195	74.70	467.71	<.001***
Aggression	133	10.3	163	62.4	380.59	<.001***
Acute intoxication	362	28.0	99	37.9	9.90	.002**
Known ^a	722	55.7	146	55.9	0.00	1
Communication at admission ^a						
Capable of exploration	988	76.2	96	36.8	159.20	<.001***
Exploration limited	243	18.8	95	36.4	39.03	<.001***
Not possible	65	5.0	70	26.8	129.20	<.001***
Referral to emergency room						
Police	290	22.4	193	74.0	267.29	<.001***
Alone	459	35.4	14	5.4	91.48	<.001***
Emergency services	337	26.0	34	13.0	687.12	<.001***
Family/Friends	198	15.3	18	6.9	12.11	<.001***
Legal guardian	11	0.9	2	0.8	0.01	1
Clinical details						
Psychosis	533	41.1	168	64.4	46.99	<.001***
Mania	87	6.7	63	24.1	73.68	<.001***

Note. Chi-square tests of significance were conducted for all variables. Variables that differ on a $p < .05$ significance level between coerced and non-coerced patients are marked in bold. All significant effects remained stable under Bonferroni correction, accounting for multiple pairwise Chi-squared tests. ^aData were missing for some patients.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Appendix C

Full results for the linear regression conducted in the exploratory analyses

Dependent variable: cumulative length of CM in minutes

Variable	Models	
	(1)	(2)
Male gender	42.63 (102.29)	38.60 (100.29)
Age	-6.03 (4.08)	-6.53 (3.99)
Acute intoxication	-184.95 (173.71)	-128.00 (82.14)
Known	216.69 (129.00)	210.93 (117.28)
Involuntary admission	614.80** (210.58)	592.87** (216.02)
Aggression	419.98 (241.21)	261.05 (219.32)
Psychotic episode	234.46* (107.21)	242.67* (113.89)
Manic episode	596.42* (284.07)	398.39 (304.47)
Communication in German (<i>Ref.</i> : Perfect)		
Limited	96.91 (228.13)	91.69 (218.79)
Not possible	393.70 (266.88)	394.94 (262.41)
Interactions		
Psychosis*Aggression		246.42 (446.68)
Psychosis*Intoxication		-308.27 (418.98)
Mania*Aggression		150.25 (577.03)
Mania*Intoxication		711.81 (856.83)
Intercept	199.83 (230.55)	212.14 (221.40)
n	1555	1555
Adj. R^2	0.05	0.05
F	7.09*** (df = 13; 1541)	5.63*** (df = 17; 1537)

Note. Clustered standard errors and ward-FEs included.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Appendix D

Full results for the logistic regression models using seclusion and restraint as separate dependent variables

Variable	Models		
	Any CM	Restraint	Seclusion
Male gender	-0.38 (0.20)	-0.09 (0.23)	-0.34 (0.21)
Age	-0.02*** (0.01)	-0.03*** (0.01)	-0.0*** (0.01)
Communication in German (<i>Ref.: Perfect</i>)			
Limited	0.73* (0.39)	-0.19 (0.45)	0.68* (0.39)
Not possible	1.18*** (0.32)	0.42 (0.40)	1.14*** (0.33)
Psychotic episode	0.48* (0.21)	0.46 (0.24)	0.43* (0.22)
Manic episode	0.91** (0.31)	0.30 (0.32)	1.19*** (0.29)
Acute intoxication	0.52* (0.20)	0.60** (0.23)	0.18 (0.22)
Known	-0.03 (0.19)	-0.19 (0.22)	0.24 (0.19)
Involuntary Admission	2.24*** (0.20)	1.88*** (0.26)	2.35*** (0.21)
Aggression	1.71*** (0.20)	1.45*** (0.25)	1.41*** (0.21)
Intercept	-2.09*** (0.38)	-2.65*** (0.50)	-2.10*** (0.39)
n	1555	1555	1555
Log Likelihood	-427.37	-333.51	-403.13
Akaike Inf. Crit.	882.74	695.01	834.27

Note. Clustered standard errors and ward-FEs included.

* p<.05,

** p<.01,

*** p<.001.