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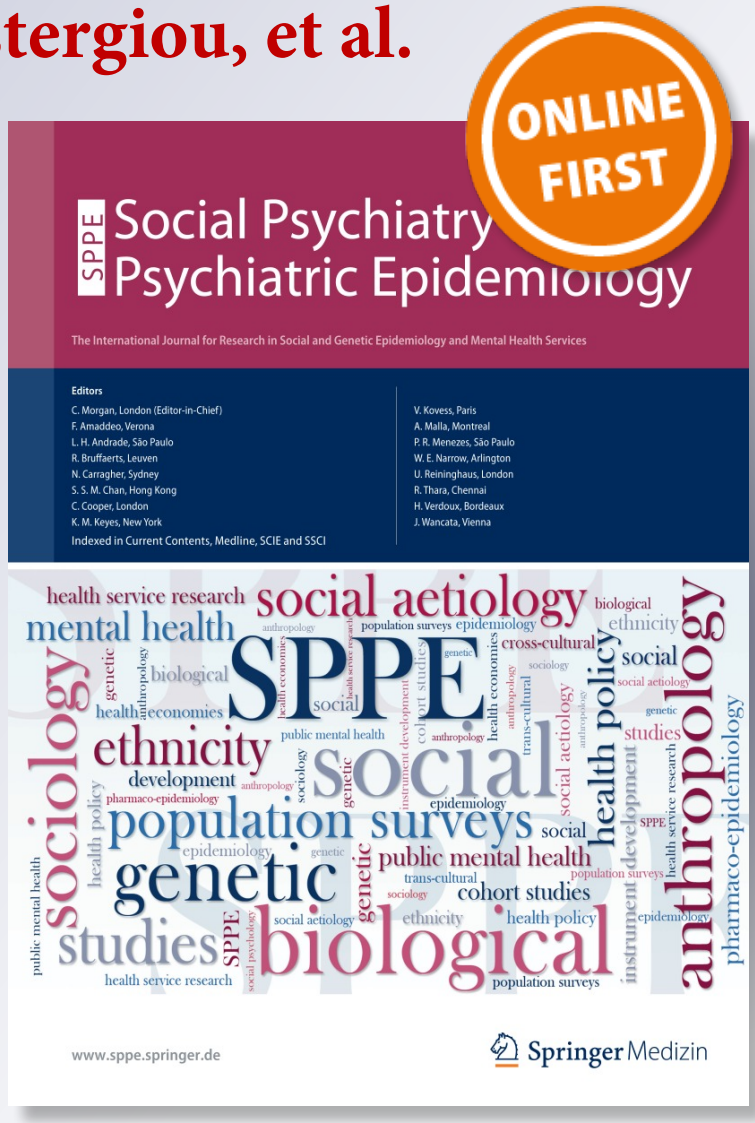

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ORIGINAL PAPER

Do patient and ward-related characteristics influence the use of coercive measures? Results from the EUNOMIA international study

Lucie Kalisova · Jiri Raboch · Alexander Nawka · Gaia Sampogna · Libor Cihal · Thomas W. Kallert · Georgi Onchev · Anastasia Karastergiou · Valeria del Vecchio · Andrzej Kiejna · Tomasz Adamowski · Francisco Torres-Gonzales · Jorge A. Cervilla · Stephan Priebe · Domenico Giacco · Lars Kjellin · Algirdas Dembinskas · Andrea Fiorillo

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Abstract
Purpose This study aims to identify whether selected patient and ward-related factors are associated with the use of coercive measures. Data were collected as part of the EUNOMIA international collaborative study on the use of coercive measures in ten European countries.
Methods Involuntarily admitted patients ($N = 2{,}027$) were divided into two groups. The first group ($N = 770$) included patients that had been subject to at least one of these coercive measures during hospitalization: restraint, and/or seclusion, and/or forced medication; the other group ($N = 1{,}257$) included patients who had not received any coercive measure during hospitalization. To identify predictors of use of coercive measures, both patients' sociodemographic and clinical characteristics and centre-related characteristics were tested in a multivariate logistic regression model, controlled for countries' effect.
Results The frequency of the use of coercive measures varied significantly across countries, being higher in Poland, Italy and Greece. Patients who received coercive measures were more frequently male and with a diagnosis of psychotic disorder (F20–F29). According to the regression model, patients with higher levels of psychotic and hostility symptoms, and of perceived coercion had a higher risk to be coerced at admission. Controlling for countries' effect, the risk of being coerced was higher in Poland. Patients' sociodemographic characteristics and ward-related factors were not identifying as possible predictors because they did not enter the model.
Conclusions The use of coercive measures varied significantly in the participating countries. Clinical factors, such as high levels of psychotic symptoms and high levels of perceived coercion at admission were associated with the use of coercive measures, when controlling for countries' effect. These factors should be taken into

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consideration by programs aimed at reducing the use of coercive measures in psychiatric wards.

Keywords Coercion · Physical restraint · Involuntary commitment · International aspects

Introduction

Coercion has been used in psychiatry since the beginning of this medical specialty, but the use of coercive measures still represents a controversial practice raising serious ethical dilemmas [35, 60, 79, 87]. Today, coercive measures are applied in psychiatry as a last resort to control self- and hetero-aggressive behaviors in situations where all other possible strategies have failed, and the life or health of a person with a mental illness is in danger [34, 37]. Many efforts have been carried out to reduce the use of coercive measures and legal, ethical and clinical regulations and/or recommendations have been developed [18, 77]. Despite all attempts, coercive measures are still widely used in acute psychiatric settings throughout Europe.

Until now, the use of coercive measures in routine psychiatric care has rarely been explored on an empirical basis. Generally, no systematic study on the use of coercive measures in psychiatry was carried until the late 1990s. In the 1970s and 1980s, only some nonspecific, small studies examining a few factors, and with inconsistent results, were carried out, mainly in the US and UK [19, 75, 83]. In the last decade of the 20th century, researchers mostly from Northern and Western European countries began to pay a closer attention to the application of coercive measures [1, 21, 28, 39, 43, 50, 78]. However, the first studies carried out on the use of coercive measures in psychiatry mostly had a retrospective design, with several national and methodological differences among the studies. The results of these studies showed that the frequency of the use of coercive measures varies internationally (2–66 %) and even among different hospitals within a given country [1, 9, 21, 28, 39, 49, 71, 78]. The European Commission funded the EUNOMIA (European Evaluation of Coercion in Psychiatry and Harmonization of Best Clinical Practice) study to examine the use of coercive measures in psychiatry in different European countries. EUNOMIA was carried out on a very large sample of patients in 12 countries, allowing meaningful international comparison [36]. The aim of the study, which focused mainly on patients with acute mental illness who were involuntarily admitted, was to evaluate the clinical practice of the use of coercive measures (involuntary admission, restraint, seclusion and forced medication) and to set the outcomes, and to create recommendations for European standardization and harmonization of good clinical practice. Centres participating in the EUNOMIA study were placed in demographically and economically different regions, but patients were recruited according to exact inclusion criteria and coercive measures were clearly defined. Involuntarily admitted patients have a higher probability of receiving some application of chemical (forced medication) or physical restraint (seclusion, mechanical restraint) during hospitalization, especially within the first weeks following admission [4, 15]. A recent study from The Netherlands confirmed that involuntary admission is the factor that significantly predicts the use of coercive measures [21]. Only a few studies have been previously carried out on involuntary patients. Kaltiala-Heino et al. [39] reported the use of restraint or seclusion in 32.3 % of patients and forced medication in 8.4 % of patients. A study from Norway stated that 35 % of involuntarily admitted patients were exposed to some coercive measures (seclusion, restraint or forced medication) [28]. A general overview of detailed monitoring of the use of physical restraint, seclusion and forced medication in the European context based on EUNOMIA results from ten countries revealed that 38 % of involuntarily admitted patients reported being exposed to coercive measures. The frequency of the use of coercive measures displayed a marked international variance—with the lowest frequency in Spain (21 %) and the highest in Poland (59 %). Forced medication was the most frequently used coercive measure in 7 out of 10 countries, with the exception of UK, Germany and Greece. Seclusion rooms were available only in six countries and were most frequently used in UK. Some kind of mechanical restraint was used in all centers [67].

It is to be added that while involuntary admission has a legal framework in all European countries, the detailed regulations of coercive measures (mechanical restraint, seclusion and forced medication) are present only in some countries. In some EUNOMIA centers, the use of coercive measures is based only on local recommendations or guidelines [34, 89].

The frequency of use of coercive measures may be influenced by different patient- or ward-related variables. Factors related to the patient can be subdivided into sociodemographic characteristics—either fixed (age, gender, ethnicity, etc.) or variable (employment, housing, education, etc.)—and characteristics related to the mental illness (diagnosis, severity of symptoms, level of aggression, recurrence of hospitalization, etc.) [2, 20, 28, 29, 42, 82, 86]. Ward characteristics include factors, which mirror ward structure (the size of the ward, the number of patients in one room, etc.), organizational aspects (work routine, internal guidelines) and staff-related factors (staff/patient ratio, gender, age of staff, qualification and training of staff, attitudes of staff, time of shift and others) [3, 13, 30, 47, 59, 63, 72, 82].

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Purpose of this paper

Papers based on EUNOMIA data that have been published by the EUNOMIA research group have paid attention mostly to different factors related to coercion concerning patients' admission into a psychiatric ward. According to Kallert et al. [38], not only legally involuntary admitted patients, but also some legally voluntarily admitted patients feel subjectively coerced to accept admission to psychiatric ward. Coercion perceived by patients at admission has been found to decrease over time in concordance with the improvement of psychopathology due to psychiatric treatment [17, 38, 41, 66]. 39–71 % of involuntarily admitted patients retrospectively consider that their admission has been somewhat useful [41, 66]. The only paper on the use of restraint, seclusion and forced medication gives a general overview on the frequency of the use of various types of coercive measures and on reasons leading to its use [67].

This paper aims to broaden results concerning the use of coercive measures in involuntary admitted patients and investigate which characteristics are associated with the use of coercive measures in ten European centres. It may be hypothesized that coercive measures may be applied to a group of patients with similar clinical traits in different countries. Despite transnational variance of clinical practice, similar circumstances may play a role in the application of coercive measures. The identification of risk factors of the use of coercive measures may be useful to develop programs aimed at minimizing the application of coercive measures and at orienting research efforts on the effectiveness of such programs.

Methods

Sampling

Data were collected during the longitudinal multicenter EUNOMIA study between July 2003 and October 2005 [36].

This paper presents results from 10 European countries centres—Bulgaria (Sofia), Czech Republic (Prague), Germany (Dresden), Greece (Thessaloniki), Italy (Naples), Lithuania (Vilnius), Poland (Wroclaw), Spain (Granada and Malaga), Sweden (Orebro) and the United Kingdom (London). Two other EUNOMIA study centers, initially included in EUNOMIA study, Israel (Tel Aviv) and Slovakia (Michalovce), were omitted from the analyses for this paper due to insufficient provided data.

All patients who were involuntarily admitted to acute psychiatric wards were considered for inclusion in the study. Involuntary admission was defined according to the national legal regulations of individual countries [34, 37]. Patients older than 65, younger than 18, patients with eating disorders, dementia and patients admitted due to forensic reasons were excluded. All eligible patients ($N = 4{,}212$) were assessed for participation in the study.

2,027 patients were included in the final sample (48 %) and gave their informed consent to participate. 2,182 patients were excluded from the study because they were too unwell to participate ($N = 684$; 16.2 %), they were discharged or transferred within 3 days after admission ($N = 687$; 16,3 %), or they refused to participate ($N = 811$; 19.3 %). A detailed description of the EUNOMIA project methodology can be found elsewhere [36, 64, 66, 67]. The final sample was for the purposes of this paper subdivided into two groups with regard to whether they had received coercive measures (Group 1) or not (Group 0). The relevant national and local ethics committees in each participating country approved the study.

Procedures and measures

The use of coercive measures (mechanical restraint, seclusion and forced medication) was monitored in detail for a period of 4 weeks after admission using an ad hoc instrument developed during the EUNOMIA study [36, 67]. Collected information included the type of coercive measure, the reason for their use, the procedure and the identification of staff members involved in the application of measures and the length of the procedure. Restraint was defined as the fixation of at least one patient's limb by a mechanical appliance or being held by staff longer than 15 min. Seclusion was described as the involuntary placement of an individual in a locked room. Forced medication was considered the administration of medication against patient's will under high psychological or physical pressure.

The characteristics listed below were considered to identify differences between the two groups (Groups 1 and 0) and to make comparisons among centers.

Patient related characteristics

All patient-related characteristics were gathered within the first 3 days after admission.

(a) Basic sociodemographic characteristics, such as age, gender, occupational status and living situation.
(b) Mental illness-related characteristics, such as main ICD-10 diagnosis and information about previous hospitalizations [88]. Social, occupational and psychological functioning 1 week before admission were evaluated on the GAF scale (Global Assessment of Functioning Scale) [23]. This scale evaluates the patient's global functioning on a score from 0

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(minimum) to 100 (maximum). Severity of symptoms was assessed using the expanded version of BPRS-E (Brief Psychiatric Rating Scale, the expanded version) [54, 62]. Overall scores for this scale range from 24 to 168 (higher scores indicating more psychopathology). Items of the BPRS-E scale were divided into the following five subscales: (1) depression/anxiety (5 items—depression, anxiety, guilt, suicidality, somatic concerns), (2) psychotic (5 items—unusual thought content, hallucinations, conceptual disorganization, bizarre behavior, grandiosity), (3) activation/manic (6 items—excitement, tension, mannerism and posturing, motor hyperactivity, distractibility, elevated mood), (4) negative psychotic (5 items—blunted affect, psychomotoric retardation, emotional withdrawal, disorientation, self-neglect) and (5) hostility/suspiciousness (3 items—suspiciousness, hostility, uncooperativeness). Inter-rater reliability (intraclass correlation coefficient—ICC) in BPRS and GAF ratings was 0.78 and 0.74, respectively [38].

(c) Perceived coercion at admission, which reflects the amount of pressure perceived by patients at admission. The Cantril Ladder scale assessed the level of perceived coercion at admission. This is a visual analog scale, which is rated on a 10-point scale, from one corresponding to the minimum level of perceived coercion to 10, the maximum level [27]. The scale is shown to the patient that is asked to mark the degree of perceived coercion on it. Researchers explain to the patients the circumstances on an involuntary admission and of the use of coercive measures, asking them to try to consider if they were subjected to any kind of coercion or pressure and to figure what step, on the scale shown, was the best corresponding with the amount of pressure.

Characteristics related to psychiatric wards

Characteristics of each psychiatric ward were monitored using the European Service Mapping Schedule, version 3 (ESMS) [31]. This includes information about the average size of the ward in each center, the average number of beds per room, and working hours of clinical staff per bed per week [36].

Statistical analyses

Different types of statistical analyses were performed. Descriptive analyses, correlation analyses and binary logistic regressions were used for assessing the influence of patient- and center-related factors on the use of coercive measures. Since we used a dichotomous variable (having received coercive measures vs. not having received coercive measures) as an outcome, logistic regression was used to estimate univariate and adjusted odds ratios of tested explanatory variables. The candidate explanatory variables for a multiple regression were screened with univariate ordinal logistic regression. A logistic multivariate regression model, according to forward model was applied. Chi-square test and *t* test were used to assess bivariate associations.

Results

Use of coercive measures

The total sample included 2,027 involuntarily admitted patients from 10 European countries. The number of participants recruited for each center is reported in Table 1.

For the purposes of our study, patients were divided in two groups, the first (Group 1) included 770 (38 %) patients, who received at least one coercive measure during the first 4 weeks of hospitalization. The second group (Group 0) included 1,257 (62 %) patients, who did not receive any coercive measure during hospitalization.

Descriptive analyses

Patients' sociodemographic and clinical characteristics

No significant difference between the two groups was found as regards patients' sociodemographic characteristics. However, in both groups patients were more frequently male, who were younger than women (mean age of men in Group 1: 35.8 ± 11.0 vs. 41.0 ± 11.0; mean age of men in Group 0: 37.1 ± 11.0 vs. 41.1 ± 11.0). Patients from both groups were more frequently unemployed (65 %).

In both samples, the most frequent main diagnosis at admission was psychosis (69 vs. 64 %). The only clinical characteristics, which were different between the two

Table 1 Number of patients from each participating center ($N = 2{,}027$)

Country	*N* (%)
Spain	421 (20.8)
Bulgaria	309 (15.2)
Great Britain	267 (13.2)
Greece	222 (11)
Czech Republic	202 (10.0)
Poland	152 (7.5)
Germany	145 (7.2)
Italy	127 (6.3)
Sweden	97 (4.8)
Lithuania	85 (4.2)

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Table 2 Patients' sociodemographic and clinical characteristics in Groups 1 and 0

	Applied coercive measures (Group 1)	Not applied coercive measures (Group 0)	*p*
Total *N*	770 (38 %)	1,257 (62 %)	
Age	38.2 (11.1)	38.8 (11.3)	Ns
Gender, male	55 %	57 %	Ns
Unemployed, yes (%)	64.7	64.5	Ns
Diagnosis psychosis, yes (%)	69	64	Ns
BPRS total score, *M* (SD)	58.0 (16.7)	52.9 (15.4)	<0.000
BPRS depression/anxiety symptoms, *M* (SD)	10.1 (4.3)	11.0 (5.0)	<0.000
BPRS psychotic symptoms, *M* (SD)	15.0 (6.0)	12.5 (5.7)	<0.000
BPRS manic symptoms, *M* (SD)	14.8 (7.3)	13.1 (6.6)	<0.000
BPRS negative symptoms, *M* (SD)	10.3 (4.5)	9.6 (4.2)	<0.000
BPRS suspiciousness/hostility, *M* (SD)	9.4 (4.2)	8.2 (3.6)	<0.000
Perceived coercion, *M* (SD)	7.5 (3.1)	6.4 (3.4)	<0.000
GAF, *M* (SD)	30.5 (13.9)	33.7 (15.1)	<0.000

groups, were BPRS total score and GAF mean score. In particular, patients from Group 1 showed a more severe symptomatology (58.0 ± 16.7 vs. 52.9 ± 15.4; $p < 0.0001$) and a worse global functioning (30.5 ± 13.8 vs. 33.7 ± 15.1; $p < 0.0001$).

Patients, who received coercive measures had higher levels of hostility/suspiciousness and positive symptoms, while patients in Group 0 had higher levels of depressive and anxiety symptoms. The main sociodemographic and clinical characteristics of the two groups, as well as differences between them, are reported in Table 2.

Center-related characteristics

Statistically significant differences were found as regards ward-related characteristics among the ten participating countries. In particular, the average number of beds per ward varied from 13 in Italy to 50 in Greece. The number of beds per room was higher in Eastern than in Western countries (e.g., 1.2 beds in Sweden and 1.3 in Great Britain vs. 5.6 in Bulgaria and 8.0 in Lithuania). The working hours of all clinical staff per bed per week (staff: patient ratio) greatly varied among centers, being higher in Italy and Sweden and lower in Bulgaria and Lithuania.

The center-related characteristics are summarized in Table 3.

Multivariate regression logistic analyses

The variable "center" was tested as possible predictor of the use of coercive measures in the univariate logistic regression model. As compared to Spain, which was the center with the lowest level of use of coercive measures, patients from Poland had the highest risk of receiving coercive measures when admitted to a psychiatric ward.

Table 3 Center-related characteristics

	Frequency of use of coercive measures (%)	Number of beds per ward	Number of beds per room	Staff:patient ratio (per bed per week)
Bulgaria	32	28	5.6	19.9
Cezch Republic	46	37	4.2	26.5
Germany	43	18	1.9	38.1
Great Britain	35	16	1.3	38.5
Greece	52	50	1.8	46.4
Italy	58	13	3.1	77.2
Lithuania	29	40	8.0	22.0
Poland	59	28	3.3	31.7
Spain	21	30	2.3	48.0
Sweden	30	14	1.2	59.8

The staff:patient ratio was tested in the univariate association as predictor for the use of coercive measures, but did not show any significant impact.

At the multivariate logistic regression model controlled for countries, the risk of receiving coercive measures was increased if patients had higher levels of psychotic symptoms, suspiciousness/hostility and of perceived coercion. On the other hand, the risk was reduced if patients had higher levels of anxiety-depressive symptoms.

The results of the multivariate logistic regression model are reported in Table 4.

Discussion

Almost 40 % of involuntarily admitted patients received some form of coercion during their treatment, according to

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Table 4 Multivariate logistic regression model

Independent variables	Univariate analyses		Multivariate analyses	
	OR	95 % CI	OR	95 % CI
Gender, male	1.081	0.903–1.296	–	–
Age	.995	0.987–1.003	–	–
Unemployed	1.007	0.835–1.215		
Diagnosis, psychosis	1.239*	1.025–1.499	–	–
GAF	.985**	0.979–0.992	–	–
Perceived coercion	1.069**	1.040–1.100	1.060***	1.024–1.098
BPRS total score	1.020**	1.013–1.026	–	–
BPRS depression/anxiety symptoms	.958**	0.939–0.977	.961***	0.938–0.985
BPRS psychotic symptoms	1.073**	1.056–1.091	1.054**	1.031–1.078
BPRS manic symptoms	1.035**	1.022–1.049	–	–
BPRS negative symptoms	1.038**	1.016–1.060	–	–
BPRS suspiciousness/hostility	1.083**	1.058–1.110	1.082**	1.041–1.124
Staff:patient ratio	1.005	0.999–1.011	–	–
Center				
Spain	–	–	–	–
Bulgaria	1.758***	1.257–2.458	0.725	0.483–1.090
Czech Republic	3.165**	2.201–4.551	3.574**	2.382–5.361
Greece	4.141**	2.910–5.894	1.749	0.958–3.184
Italy	5.458**	3.570–8.345	2.433**	1.497–3.953
Lithuania	1.577	0.935–2.658	1.178	0.673–2.061
Poland	5.493**	3.683–8.193	5.462**	3.526–8.460
Germany	2.827**	1.887–4.235	1.927***	1.210–3.068
Great Britain	2.090**	1.483–2.947	1.637*	1.102–2.434
Sweden	1.614*	0.985–2.645	2.149*	1.239–4.012

* $p < 0.05$; ** $p < 0.000$; *** $p < 0.01$; Test di Hosmer–Lemeshow: Step 5, Chi-square 9.468, *df*: 8, $p = 0.304$

EUNOMIA results. Similar results were reported from other studies on involuntarily admitted patients [21, 28]. The variance in clinical practice of the use of coercive measures is extensive. Differences are found internationally and also among hospitals, or even individual wards within one country. Even when psychiatric hospitals are subject to the same regulations, significant differences in the number of applied coercive measures have been found, as robust as two- or threefold higher numbers between hospitals [50, 78]. This paper has confirmed significant patient-related predictors, which are valid internationally, regardless of the heterogeneity of clinical practice. These predictors indicate patients who are at a higher risk of receiving coercive measures.

Patient-related risk factors for the use of coercive measures

Sociodemographic characteristics

Our findings failed to detect any association between patients' sociodemographic characteristics (age, gender, occupational and social status) and the use of coercive measures. The role of gender on coercion has been explored in several studies, some reporting an association with male [9, 50, 53, 83], some others with female gender [56, 57, 70, 86], and some others failed to identify any role of gender on the use of coercion [20, 26, 39, 42, 51, 74, 87]. The fact that we did not find any gender difference on the use of coercion could be due to the choice of dependent variable. In fact, while in most of the studies the effect of gender was explored on a given coercive measure, such as seclusion, physical or mechanical restraint, forced medication, involuntary hospitalization, we tested gender on coercion in general. Although this methodological choice can be considered as a weakness of the study, on the other hand, it gave us the chance to identify predictors of use of coercive measures regardless the type of coercive measures, with the aim to obtain more generalizable results that can be easily adopted in clinical practice.

Many studies have reported that younger patients are coerced more frequently [9–11, 21, 42, 57, 63, 70, 86]. However, analyses regarding a potential age effect yielded inconclusive findings, as other researchers have identified a higher age to be a risk factor for the use of coercive

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treatment [69], and others have failed to find any association between age and being coerced [4, 7, 19, 39, 42, 65]. Some studies suggest that while younger patients are more likely to be restrained and secluded, older patients are restrained and secluded for longer periods of time [74], and that restraint is more frequently applied to younger patients and seclusion to older ones [42, 87]. In addition, we could not analyze in detail the effect of age on the different coercive measures since we used as dependent variable for our analyses "having received coercion".

Illness-related characteristics

According to our findings, the most robust association was found between illness-related characteristics and the use of coercive measures. In particular, as already suggested by previous studies [2, 10, 28, 42, 78, 86], the diagnosis of psychotic disorder was confirmed as risk factor consistently associated with the likelihood of receiving coercive measures also in our study. However, many other diagnoses are recognized as risk factor for the use of coercive measures, such as organic mental disorders (in particular dementia) [76, 78], substance abuse disorders [39, 78], personality disorders [57, 70] and mental retardation [81, 86], but one important limitation of the EUNOMIA study was the exclusion of patients over 65 years, including those with dementia [55, 78]. Moreover, many centers did not recruit patients with substance abuse, which are treated in different contexts, and therefore our sample made predominantly by psychotic patients, may not be completely representative of the population receiving coercive measure, but it is representative of the population followed in mental health centers.

The severity of illness also appeared in previous studies as a factor influencing the use of coercive measures [28, 40, 42, 50]. The common denominator, which has been identified as a frequent reason for the use of coercive measures regardless the diagnosis in the past, was acute [59, 70, 74, 75, 83] or threatening violence [15, 25, 80, 86]. In addition to acute or threatening violence, disorientation and agitation have been reported to be a frequent reason for the use of coercive measures [21, 39, 65, 68]. These findings correspond with our results, where the BPRS subcategories most significantly associated with the use of coercive measures included hostility, uncooperativeness and positive psychotic symptoms.

Moreover, according to our data, a decreased level of global functioning is also associated with a higher likelihood to be coerced, but only at the univariate analysis. This association was confirmed also in an Italian study, which found lower levels of GAF scores in patients showing hostility and violence in acute psychiatric settings [68].

Perceived coercion

The change from a paternalistic medical approach to a more balanced attitude model of treatment has resulted in an increased interest to the patients' subjective feelings [3, 24, 48]. The perception of being coerced is presumed to be associated with the severity of psychopathology and lack of insight [44–46].

According to our results, a relationship between the levels of perceived coercion and the probability of receiving a coercive measure was found. Previously published EUNOMIA analyses show a mutual relation between the severity of positive symptoms, the level of global functioning and perceived coercion at admission [17]. Moreover, it is well documented that high levels of perceived coercion can be detrimental on patient–clinician therapeutic relationship with a negative impact on patients' long-term outcome [33, 58, 61]. Moreover, David recently found that high levels of perceived coercion worsen patients' attitudes towards psychiatric treatment and reduce their adherence to medications [12]. Recommendations of good clinical practice, such as those developed by the EUNOMIA consortium, on compulsory treatments [18] can be used as a guidance to improve the practice of coercion, thus reducing the levels of perceived coercion.

Center-related risk factors

Recently, many studies have analyzed the impact of ward-related characteristics on the use of coercive measures [6, 13, 50, 59, 63, 72]. In contrast to other studies, our results did not show any significant association of the size of the ward and the number of patients per room with the use of coercive measures [50, 63, 84].

Palmstierna et al. [63] showed that an increased number of patients in the ward significantly increase the risk of aggressive behaviors in patients with psychosis. Although we expected that a higher clinical staff:patient ratio would have caused a decrease in the use of coercive measures, our results did not allow us to confirm this hypothesis. Obviously, more staff during the day means more activities for patients, with the risk of over-stimulation [82], while during the night, a lower number of staff may lead to a higher need of the staff to control (and, in some patients, to prevent) violent behaviors [52]. Some studies, including those derived by the EUNOMIA consortium, did not find a significant relationship between the number of staff and the use of coercive measures [28, 86]. The female:male ratio of staff has been found to be important in previous studies. Staff with a higher proportion of women tended to use coercive measures more frequently [30, 59]. Also, a significant association was previously found between the use

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of coercive measures with the education and experience of nurses [30, 47, 59].

Data presented in this paper revealed that despite the fact that the 10 countries have markedly different practices concerning the use of coercive measures, which are influenced by sociocultural and legal norms, it appears that coercive measures are used similarly in a similar group of patients. These patients have high levels of positive symptoms and hostility and have a poor global functioning before admission, and have high levels of perceived coercion at admission. Researchers and clinicians should focus on these traits and predictors when considering the preparation of specific programs to reduce the use of coercive measures in psychiatry. It can be assumed that programs, which support minimal coercion at admission, could reduce the use of coercive measures. The results from a comprehensive study in Germany confirmed that lower levels of compulsory measures were associated with the use of guidelines for compulsory measures and proper de-escalation techniques [78]. The EUNOMIA group has published general recommendations on appropriate procedures for involuntary hospital admission based on the multilevel gathering of information from representatives participating in the process of involuntary admission in each center. These guidelines, which include exact detailed recommendations, took into consideration the experiences of professionals, ex-users, relatives of patients, representatives of emergency services and the police [18]. It would probably improve the current situation if this material is incorporated into routine clinical practice across Europe. Standardization of the legal framework for the use of coercive measures would be a first step. The need for standardization should be addressed on a policy level, based on the recommendations from the EUNOMIA study. However, it seems that legislative steps are not enough to influence the level of the use of coercive measures. Data from Sweden show that cultural factors, including ward organization, are more important for changing clinical practice [43]. On the basis of our results, programs could focus on techniques leading to effective and fast management of hostility and of positive symptoms. Experiences from The Netherlands also suggest that uniform guidelines or uniform methods are still not enough to manage violent behaviors and patients' individual choices should be considered [22]. Despite many international guidelines on the management of agitated patients, clinical practice still relies mostly on local and national traditions rather than on scientific evidence [21]. Some efforts should be made to include efficient guidelines in daily practice. Some studies also reported on programs aimed at reducing the use of coercive measures in acute psychiatric settings [14]. These programs try to change the routine practice of using coercive measures by making changes to the ward structure and climate (training of staff, changes in unit rules) and also by including a higher involvement of patients in treatment planning [5, 14, 32, 73]. Future research should focus on programs, ideally at the international level, which could support staff training and would reduce the use of coercive measures.

Strengths and limitations

The major strength of this study is the large sample size, which allowed for interpretation of both positive and negative findings and the number of assessed factors and, in particular, the thorough documentation of the coercive measures received by patients.

It must be noted that only around 50 % of patients were eligible for the study; hence, a possible selection bias should be considered when interpreting the results. The sample was large, but not epidemiologically representative of all psychiatric in-patient wards in participating countries; yet, due to the large sample size we had enough statistical power to interpret findings. Patients with dementia were excluded by the exclusion criteria. Patient ethnicity was not followed and could have an important influence [25]. The severity of symptoms of admitted patients may also vary across countries according to national criteria for involuntary admission; this might have influenced the rate of coercive measures used in different countries. The EUNOMIA study did not take into consideration dual diagnoses, mainly the abuse of psychoactive drugs, which may have an important impact according to previously published studies [8]. Another limitation of the study which needs to be acknowledged is that the study was carried out between 2003 and 2005, and, since then, many societal changes occurred, with the economic crisis and related stressors—such as unemployment—having an impact on mental health [16, 85]. However, to our knowledge, no changes have occurred in mental health legislations in the participating countries in the last 10 years. Therefore, we have no reason to think that our findings, although 10 years old, are not representative of the current situations.

Finally, only a restricted number of characteristics related to psychiatric facilities in each of the ten centers could be analyzed, thus limiting the generalizability of the findings. We cannot exclude that other characteristics (for example staff experience, training, organizational aspects. etc.) of the psychiatric wards may be associated with the use of coercive measures and should be the focus of future research.

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