

Prevalence and risk factors for the use of restraint in psychiatry: a systematic review

Fattori di prevalenza e rischio per l'uso della contenzione in psichiatria: una rassegna sistematica

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SUMMARY. Aim. Despite the poor evidence supporting the use of coercive procedures in psychiatry wards and their “psychological damage” on patients, the practice of restraint is still frequent (6-17%) and varies 10-20 times among centers. **Methods.** We searched the PubMed, Embase and PsychInfo databases for papers published between January 1 1990 and March 31 2010 using the key words “restraint”, “constraint”, “in-patient” and “psychiatry wards” and the inclusion criteria of adult samples (studies of selected samples such as a specific psychiatric diagnosis other than psychosis, adolescence or the elderly, men/women only, personality disorders and mental retardation were excluded), the English, French, Italian or German languages, and an acute setting. **Results.** The prevalence of the use of restraint was 3.8-20% (not different from previous data), despite the attempts to reduce the use of restraint. The variables most frequently associated with the use of coercive measures in the 49 studies included in this review were male gender, young adult age classes, foreign ethnicity, schizophrenia, involuntary admission, aggression or trying to abscond, and the presence of male staff. **Conclusions.** Coercive measures are still widely used in many countries (albeit to a greater or lesser extent) despite attempts to introduce alternatives (introduction of special protocols and nurses’ training courses) in some centers that should really be tested in large-scale multi-centre studies in order to verify their efficacy.

KEY WORDS: coercive measures, epidemiology, predictors.

RIASSUNTO. Scopo. Nonostante non vi sia attualmente una chiara evidenza scientifica sull’utilizzo dei metodi coercitivi nei reparti di psichiatria e sul loro “danno psicologico” sui pazienti, l’utilizzo della contenzione è ancora frequente (6-17%) e presenta una variazione di 10-20 volte tra i vari centri. **Metodi.** Abbiamo effettuato una ricerca bibliografica nei database PubMed, Embase e PsychInfo per manoscritti pubblicati dal 1 gennaio 1990 al 31 marzo 2010 utilizzando le parole chiave “restraint”, “constraint”, “in-patient” e “psychiatry wards” e i criteri di inclusione “campione di popolazione adulta” (studi su popolazioni selezionate come una diagnosi psichiatrica specifica che non sia psicosi/disturbo psicotico, anziano o adolescente, solo maschi/solo femmine, disturbi di personalità o ritardo mentale sono stati esclusi), manoscritti in lingua italiana, inglese, francese o tedesca, e setting acuto. **Risultati.** La prevalenza dell’utilizzo della contenzione è del 3,8-20% (che non differisce dai dati precedenti), nonostante i tentativi di riduzione dell’utilizzo della contenzione. Le variabili risultate più frequentemente associate nei 49 studi inclusi nella rassegna sono sesso maschile, classi di età medio-giovani, un’etnia straniera, schizofrenia, un ricovero non volontario, aggressività o tentativi di fuga e la presenza di staff maschile. **Conclusioni.** Le misure coercitive anche se in percentuali in alcuni casi simili, in altri differenti sono ancora molto utilizzate in numerosi paesi nonostante alcuni tentativi di trattamento alternativo all’uso di questa tecnica (attraverso l’introduzione di protocolli speciali e corsi di training dell’équipe infermieristica). Questi metodi dovrebbero essere sperimentati su larga scala e in studi multicentrici per valutarne l’efficacia.

PAROLE CHIAVE: metodi coercitivi, epidemiologia, predittori.

INTRODUCTION

The question of physical restraint has a long and contentious history among physicians working in psychiatric hospitals. At its first meeting in 1844, the new Association of Medical Superintendents of American Institutions for the Insane (now the American Psychiatric Association) made this declaration: «It is the unanimous sense of this convention that the attempt to abandon entirely the use of all means of personal restraint is not sanctioned by the true interests of the insane». On the other hand, 19th century British psychiatrists were opposed to physical restraint, although attendants were allowed to “tackle” (1). Some of the procedures used in the past have been abolished (punishments, blood-letting, lobotomies, and insulin therapy) but the act of physical restraint has remained more or less unchanged (2).

The rates, duration and methods of seclusion and restraint vary enormously. A review by Mion et al. (3) found that the incidence of the use of physical restraint in hospitals varied from 6% to 17%, and was even higher in subjects aged more than 65 years (18-20%). The Joanna Briggs Institute Best Practice (4) similarly found that restraint was used in 3.4-21% of hospitalized patients. Stewart et al. (5) have shown that 45 empirical studies carried out by psychiatric services led to an average of up to five episodes of restraint a month in wards with an average of 20 beds; the episodes lasted about 10 minutes and the restrained patients tended to be younger, male and hospitalized against their will.

The experimentation of new drugs can lead to nothing less than “pharmacological restraint”, an alternative to physical restraint based on typical and atypical antipsychotics and benzodiazepines, even though the scientific evidence concerning their efficacy is rather limited (6).

Fisher (7) sustains it is impossible to have a psychiatric treatment that does not take into account the possibility of restraining patients, but other authors, above all in Italy (8) have begun to experiment with treatments that do not foresee the use of these techniques, and obtained some encouraging results. In support of them, three recent systematic reviews of the literature (9-11) and a general consensus (12) do not show any scientific evidence concerning the higher (or lower) efficacy of restraint in comparison with other methods of treating aggressiveness because currently available comparative studies are characterized by numerous methodological defects (non-randomized trials, small patient samples); there is therefore a need to conduct randomized trials comparing restraint with alternative treatments that are less traumatic for patients. It has in

fact been shown that restraint and seclusion have deleterious physical and psychological effects on both patients and staff (7,13). In particular, the experience of restraint in women who have suffered previous sexual abuse exacerbates traumatic emotional reactions such as fear, anxiety and anger (14).

A review by Huckshorn (15) underlines the fact that the use of seclusion and restraint is also dangerous in disabled subjects as it increases the risk of death and serious accidents, in addition to causing “psychological damage”. Seclusion and restraint are rarely triggered by the demographic and clinical condition of the patients, as is confirmed by two important reviews of the literature (7,16). The patients who have suffered physical restraint tend to be in their thirties, have a diagnosis of schizophrenia, a bipolar disorder or other psychotic disorders, and have often been hospitalized against their will. The most frequent reasons for the use of coercive measures are episodes of aggressiveness or the fear of episode of aggressiveness (17).

The opinions of staff and patients concerning the causes leading to restraint are generally very different (18): in this study, the majority of staff (53/81) cited reasons of safety, whereas this reason was given by only 33 of the 81 patients, and 23 cited a “lack of compliance”. Similar results were found by Outlaw and Lowery (19) and by Duxbury and Whittington (20). Aggressiveness against staff is much more frequently punished with restraint and seclusion than aggressiveness against other patients (35% vs 25%) (21).

METHODS

This review began with a search of the PubMed, Embase and PsychInfo databases for English, Italian, French or German language papers published between January 1 1990 and December 31 2010 using the key words “restraint” or “constraint” and “in-patient” or “psychiatry wards”.

The inclusion criteria were adult samples representative of the entire population of psychiatric in-patients and papers written in English, French, Italian or German.

The exclusion criteria were selected patient samples (a specific psychiatric diagnosis other than psychosis, adolescents or the elderly, men/women only, personality disorders and mental retardation or intellectual disability), studies of alternatives to restraint/seclusion, studies of staff/patient views and studies carried out in non-acute settings.

Studies of psychotic diagnoses were included because psychosis accounts for a large proportion of the restrained population.

We initially considered 842 studies: 338 were excluded because they did not fit the objectives of the review; 240 because they involved special populations (the elderly,

children/adolescents, men/women only, or patients with personality disorders or mental retardation); 61 because they had not been carried out in acute psychiatry wards; 58 because they concerned the use of alternatives to seclusion or restraint; 31 because they represented staff/patient opinions; 26 because they were in languages other than English, Italian, German or French; 9 because they were not found; and 6 because they concerned the physical complications of restraint.

The final analysis was therefore based on 74 studies: the 49 included in the table, and a further 25 used as references for the introduction and discussion.

RESULTS

As underlined by Betemps (22), Needham (23), Husum (24) and Korkeila (25) in multicenter studies, the number of coercive measures (seclusions) varies widely from center to center (with the difference sometimes as much as 10 times) and they very often depend

not on the type of patient but on specific methodological approaches to the subject.

If compared as a whole, similar prevalence rates have been found in the United States [8% by Hendryx (26), and 13.6% of men and 9.2% of women by Minnick (27)], Australia [9.4% by Irwing (28), 12.5% by Whitehead (29), and 12% of reclusions by Roberts (30)], Germany [7% by Hübner-Liebermann (31)], and 10.4% by Martin (32)], and Switzerland [6.6% by Martin (32)], whereas lower rates were found by Korkeila (25) in Finland (3.8%) and by Tavcar (33) in Slovenia (5%). Higher rates have been found by Knutzen (34) in Norway (14.1%), Kostecka and Zardecka (35) in Poland (15.7%), and Porat (36) in Israel (14,2%), and higher rates in Japan [20% by Hübner-Liebermann (31) and 18% by Odawara (37)].

The demographic, clinical and social variables associated with the use of restraint are summarised in **Tables 1** (38-72) and **2**.

Table 1. Use of restraint in unselected psychiatric patient samples: associated variables

Author	Study design	No. patients	Study variables	Results
Alexander (38)	Case-control	30 patients, 30 nurses	Age, ethnicity, schizophrenia, depression, bipolar disorder, anxiety, obsessive compulsive disorder, behavioural disorders, substance use, patient outcomes, previous admission, ward rules, ward atmosphere, ward design, nurse/patient relationships	UV: Coercion related to distress confinement, acceptance dehumanisation, victimisation and humiliation, lack of clear rules and a therapeutic context for rule enforcement
Beck et al. (39)	Retrospective cohort (5-year follow-up)	622 patients	Age, gender, ethnicity, schizophrenia, schizoaffective, bipolar disorders, antisocial personality, borderline personality, admission status	MV: Three classes (trajectories) of restraint: low- (71%), medium- (22%) and high-trajectory class (7%). High-trajectory class younger, more females, less psychotic, more borderline or antisocial personality disorder
Benjaminsen et al. Denmark (40)	Case-control	235,000 patients (violent vs non-violent psychotic patients)	Gender, psychosis, alcohol or drug abuse, violence, bipolar	UV: Correlation with violence; correlation with mania (in females), psychosis plus abuse of alcohol or drugs, psychotic disorders
Betemps et al. (22)	Multicentre retrospective cohort (1-year follow-up)	82 medical centres	Geographic location, per diem cost, patient/staff ratio, university affiliation, schizophrenia	UV: Correlation with geographic location, schizophrenia. The 20 centres that secluded more, secluded 10 times more than the centres that secluded less
Bilanakis et al. (41)	6-month follow-up retrospective cohort	282 patients	Type of admission, gender, age, marital status, education, previous treatment history, ICD-10 diagnoses (psychotic, mood, anxiety, personality disorders)	11% of coercive measures (9.5% secluded, 1.8% restrained) UV: Correlation with involuntary admission

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Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Bowers (42)	Cross-sectional (6-month follow-up)	136 acute psychiatry wards with their patients and staff	Gender, age, ethnicity, schizophrenia, acute psychiatry wards, acute mental disorders, deprivation, social fragmentation, staff demographic characteristics, staff group factor, violence, absconding	MV: Correlation with deprivation, social fragmentation, youths, males, detention under the Mental Health Act; schizophrenia; ethnic minority categories; white British admissions inversely associated with conflict rates. For containment, correlation with white nurses, aggression, absconding
Bowers et al. (43)	Cross-sectional study (1-year follow-up)	136 acute mental health wards	Gender, age, education, working status, psychiatric disorder, staff gender, staff age, staff education, seclusion, time-out, patient routines, conflict, containment	MV: Positive correlation with seclusion room; time-out was inversely associated with seclusion room availability and associated with male staff; seclusion was associated with containment methods, associations with door locking
Crenshaw et al. (44)	Prospective cohort (1-year follow-up)	124 centers	Violence, containment	UV: Slight correlations between restraint and seclusion, and between violent patients and coercive measures
Demir (45)	Cross-sectional study (2-month follow-up)	254 nurses	Age, marital status, number of children, education, working status, type of work, years worked, number of physical restraints, types of physical restraint	UV: Only one-third of nurses decided on physical restraint together with physicians, and three-fourths tried alternative methods. Nurses reported physical reasons in relation to physical restraint, and also reported 9 patient deaths in chest restraints. Reduction in the frequency of caregiving was related to complications
El-Badri Mellsop (46)	Prospective cohort (9-month follow-up)	539 patients	Gender, race, age, marital status, number of previous admissions, schizophrenia, bipolar disorder, substance abuse, use of psychotropic medication, use of seclusion	84 (16%) were secluded in 129 seclusion episodes. 2/3 of the seclusion events in the first week of admission, and 3/4 had 1 episode. UV: Male gender and ethnicity other than European or Maori related to seclusion. Seclusion was mainly associated with risk of, or actual violence toward staff, patients or property
Frueh et al. (47)	Prospective cohort (2-year follow-up)	142 patients	Adult sexual assault, childhood sexual abuse, adult physical assault	Restraint related to adult sexual assault and not significantly to physical assault
Gudjonsson et al. (48)	3-year follow-up retrospective cohort	422 patients	Ethnicity, civil, criminal or informal section, trying to abscond, nurse target, agitation, extent of injury, age, gender	MV: Restraint: attempts to abscond, a nurse being a target, agitation, being in a civil section and violence. Seclusion: male gender, a nurse being the target agitation, younger age and being in a civil section
Hammer et al. (49)	Case control	622 patients	Childhood sexual and physical abuse	MV: No correlation
Hendryx et al. (26)	Retrospective cohort (1-year follow-up)	1266 patients	Forensic, geriatric, and psychiatric adults, disabled adults with co-occurring mental illness	Seclusion in 12%, restraint in 8%. MV: Significant correlation between seclusion hours and restraint hours ($p < 0.001$), and between number of seclusion and restraint episodes ($p < 0.001$)

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Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Hübner et al. (31)	Multicentre prospective cohort (1-year follow-up)	865 schizophrenic patients (Germany); 50 schizophrenic patients (Japan)	Prevalence, subtype of schizophrenia	Mechanical restraints more frequent in Japan ($p < 0.001$): 7% of patients of the German and 20% of the Japanese were under restraint: females 5% vs 16% ($p = 0.023$); males 8% vs 25% ($p = 0.006$). No association was found between schizophrenic subtype and frequency of restraint
Husum et al. (24)	Cross-sectional prospective study	3572 patients (1214 involuntary admissions)	Ward size, double or single rooms, crowding and patient turnover. Staff/patient ratio, staff age and gender, staff experience, proportion of unqualified staff, de-escalation training, staff turnover, attitudes of staff and administrators. Diagnoses (psychosis vs other diagnosis), aggression, age, gender, ethnicity, time of day, season, pharmacological treatment, psychotherapy, voluntary admission	0%-88% of patients were restrained/secluded (across wards) Wards in urban areas used seclusion (OR=7.65) and restraint (OR=3.58) more often. Of the 1214 involuntarily admitted patients, 424 (35%) had been secluded, 117 (10%) restrained, and 113 (9%) had received involuntary depot medication at discharge. MV: There was a positive association between the risk of being secluded and aggressiveness/overactiveness, self-injury/suicide and psychosis, and a negative association between depressed mood and seclusion. There was a positive association between the risk of being restrained and aggressive/overactive and self-injury/suicidal symptoms. Patients other than Norwegians were at lower risk of being restrained (OR=0.39)
Irving et al. (28)	Prospective cohort	256 patients	Epidemiology, method	UV: 24 (9.4%) restrained. Bedrails were the most frequent method. One-third of patients aged ≥ 85 years were restrained
Kaltiala et al. (50)	Retrospective cohort (6-month follow-up)	1543 patients	Number of episodes during a treatment period; reason for each episode, time spent in seclusion and restraint during the treatment period; voluntary admission, gender, and ICD-10 diagnoses of the secluded/restrained patients as made by the psychiatrists of the hospital (psychotic, substance use, affective disorder, anxiety, personality disorder)	370 seclusion episodes (77%) and 112 episodes of mechanical restraint (23%). Number of seclusion/restraint episodes: mean 3.8. Median duration of total seclusion was 13 h; median duration of total restraint 9 h. 57.1% males. Violence was the most frequent reason for mechanical restraint. Agitation/disorientation: reason for seclusion/restraint when diagnoses of schizophrenia or substance use-related disorders were involved
Kaplan et al. (51)	Prospective cohort (1-year follow-up)	224 patients	Gender, mood/affective disorder vs schizophrenia and other non-affective disorders. Time of day	MV: Mood-disordered patients 175% more restrained than schizophrenic patients. Patients with a single restraint: female/male ratio was 0.7 for both affective and schizophrenic patients. Repeatedly restrained subjects: female/male proportion in the mood-disordered group 1.0; in the schizophrenic group 0.63. During the night, the number of restraints sharply declined in both groups ($p < 0.01$)

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Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Keski-Valkama et al. (52)	(15-year follow-up) during a predetermined week in 1990,1991, 1994, 1998 and 2004		Seclusion, restraint, duration of the restraint incidents, duration of seclusion, regional variation, gender, age, diagnosis (psychosis, mood disorders, mental retardation, personality disorders, substance use disorder)	Seclusion and restraint episodes during the study week were 263 in 1990, 242 in 1991, 217 in 1994, 161 in 1998 and 129 in 2004. The average age of the secluded/restrained patient was 39.1 years (SD 11.4) and 55.7% were male. In 64.2% of cases, the main diagnosis was psychosis, in 9.5% a substance use-related diagnosis, in 7.6% affective disorder, in 2.2% personality disorder, in 1.9% organic disorder, in 1.5% mental retardation, and in 1.2% other main diagnoses
Keski-Valkama et al. (53)	1 year retrospective cohort		Age, gender, main diagnosis (mood disorders, schizophrenia, substance use-related disorders, other disorders), phase of hospital stay	UV: Substance use-related disorders and schizophrenia related to seclusion/restraint
Klinitz et al. (54)	10 months prospective study	148 restraints	Aggression	Correlation in 70% of cases
Knutzen et al. (34)	2-year follow-up retrospective cohort	960 patients	Gender, age, ethnicity	14.1% restrained. UV: The rate was significantly higher among immigrants, especially in the younger age groups. Most commonly used methods were mechanical restraint alone for native-born patients and a combination of mechanical and pharmacological restraints for immigrants. The use of restraints decreased when patients reached 60 years
Korkeila et al. (25)	6-month follow-up retrospective cohort		Legal status upon admission, gender, age, marital status, socio-economic status (SES), previous treatment history and ICD-10 diagnoses (organic psychiatric syndromes, substance use-related disorders, schizophrenia, mood disorders, personality disorders, other)	Seclusion in 6.6%, restraint in 3.8% UV: MV: involuntary status, previous commitments, substance use disorders. Significant difference in seclusion and restraint among centers
Kostecka, Zardecka (35)	1-month prospective cohort	452 patients in 1989 and 414 patients in 1996	ICD-9 diagnosis (schizophrenia, mood disorders, alcohol dependence, substance disorder)	UV: 21.7% in 1989, 15.7% in 1996 (difference not significant) UV: in 1989, 54% met ICD-9 criteria for endogenous psychoses, mainly schizophrenia. The next most common diagnosis was alcohol dependence. In 1996 74% had a diagnosis of schizophrenia, and 11% a diagnosis of alcohol dependence
Martin et al. (32)	Cross-sectional	6761 German schizophrenic patients vs 1976 Swiss schizophrenic patients	Restraint and seclusion rates	6.6 % (Switzerland) and 10.4 % (Germany) of admissions were affected by mechanical restraints, and 17.8 % (Switzerland) and 7.8 % (Germany) by seclusion. Restraint longer in Swiss hospitals
Migon et al. (55)	Randomised multicentre clinical trial (6-month follow-up)	301 patients	Gender, age, first admission to the service, provisional diagnosis on admission, severity of agitation, medication to which patient was allocated in the trial, period of day and day of week	UV: Use of physical restraints more frequent with more severe agitation and when agitation attributed to substance abuse, dementia, learning disability and organic disorders; younger age (34.8 ± 11.1 vs 39.1 ± 12.2 years). Arrival in morning and people with substance abuse. MV: No correlation

(continued)

Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Minnick et al. (27)	Descriptive study (2003-2005)	74 psychiatric units	Gender, age	UV: In almost every type of unit being male was associated with a greater likelihood of being restrained. At least one reason for restraint was “manage behaviour” in 13.6% of men vs 9.1% of women in adult units
Odawara et al. (37)	4-year follow-up prospective cohort	1334 patients	Gender, age, length of stay, previous treatments, diagnosis (mood disorders, schizophrenia, substance abuse, delusion disorder, organic disorder), history of suicide attempt, aggressiveness, type of admission	18% restrained. UV: Association with older age, male gender, involuntary admission, no previous treatment, history of suicide attempt, unconsciousness, aggressiveness, organic cerebral illness
Papaliagkas et al. (56)	1-year retrospective cohort	342 patients	Gender, age, psychosis mood disorder, personality disorder, history of psychiatric disorder, reason	UV: Male gender, psychotic disorder, absconding
Porat et al. (36)	Prospective cohort (1-month follow-up)	1419 patients	Reason, gender, age, psychosis, country of origin, marital status, religion, number of previous admissions, acute settings	14.2% underwent restraint: most frequent reasons were behaviour, violence, and aggression of the patient towards others or himself. UV: The subpopulation of restrained patients was mainly male, born in Israel, unmarried, Jewish, aged 20-49, diagnosed as psychotic, and held in an ‘acute’ ward
Price et al. (57)	Retrospective cohort (7.5-year study period)	806 forensic patients	Race, aggression and restraint	UV: Racial groups did not differ significantly from each other in terms of the number of violent incidents or the number of episodes of restraint. However, Asians and blacks were more likely to have been secluded than other racial groups
Raboch et al. (58)	Case-control	770 coerced vs 1260 non-coerced patients	Gender, age, employment status, housing status, previous hospitalisation, schizophrenia, mood disorder, other disorder, country, reason	Coercive measures used in 38% of patients (varying from 21% to 59% depending on country). The most frequent reason was patient aggression against others. The most frequent measure was forced medication. In 8 countries, and mechanical restraint in 2 countries. Seclusion rarely used and reported in only six countries. UV: A diagnosis of schizophrenia and more severe symptoms were associated with a higher probability of undergoing coercive measures
Ray et al. (59)	Prospective cohort (1-month follow-up)	125 psychiatric settings	Percentage of patients restrained, percentage of patients secluded, rate of seclusion orders, and rate of restraint orders	MV: Use of restraint was not related to use of seclusion. Only 12 of the 112 tested relationships between facility/patient characteristics and variations in the restraint and seclusion measures were significant
Sandhu et al. (60)	Cross-sectional survey	189 physicians	Physicians’ characteristics (age, gender, years as physician, country of medical school, medical school education concerning physical/chemical restraint, specialty, primary practice setting, current level, previous experience of ordering physical restraint)	MV: Higher appraisal of harm ($p < 0.001$), less knowledge of restraint ($p = 0.03$), and male sex ($p = 0.005$) were the only indicators of the likelihood of ordering restraint. Psychiatry ($p = 0.03$) or internal medicine physicians ($p = 0.05$) were less likely to order restraint

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Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Sangiorgio, Searlato (61)	Retrospective cohort	22 psychiatric units	Written protocol, medical records, restraint register, specific training, quality of environment, number of officials, average period of stay, number of nurses per shift, number of doctors, number of psychologists, acknowledged leadership, working group, crisis at home, crisis in emergency unit, Catchment area, number of outpatient related to inpatient, involuntary admission,, number of psychiatric admissions in emergency units	MV: The individual regression coefficients (and the significance tests applied to them) showed that the duration of restraint is affected by the working group ($p = 0.03$), the number of psychologists ($p = 0.04$), and the number of beds ($p = 0.03$)
Simpson et al. (62)	Retrospective cohort	181 pts before and 171 after use of i.m. olanzapine	Use of i.m. olanzapine upon admission	UV: No differences
Smith (63)		48 episodes of restraint	Gender, age, purpose, diagnosis	UV: The patients involved in the 48 episodes of physical restraint were predominantly schizophrenic (60%), male (67%), and had been restrained because of physical violence to others (44%) or because they were attempting to abscond (31%)
Southcott (64)	Retrospective cohort (3-year follow-up)	234 incident forms	Purpose of restraint	55 restraints There was no evidence to suggest that having a higher than average number of staff involved in the restraint or the avoidance of female staff in limb management had a detrimental effect on effectiveness or safety of the restraint. Breakaway was used in 13% of attacks on staff and, in 70% of these, the intended purpose of the breakaway was achieved
Steinert, Gebhardt (65)	Prospective cohort	193 patients	Aggression, severe psychopathology	UV: Correlation with aggression and severe psychopathology
Steinert et al. (66)	Prospective cohort	117 patients with schizophrenia	Purpose for restraint, aggression, life-threatening psychiatric event	24 men (42.9%) and 18 women (29%) had experienced seclusion or restraint in their psychiatric history. MV: Seclusion or restraint during the current admission was best predicted by physically aggressive behaviour (OR, 11.5), and hostility at admission (OR, 23.6). Seclusion or restraint in the psychiatric history was mainly associated with lifetime exposure to life-threatening traumatic events (OR, 7.2)
Swett (67)	1-year prospective cohort	370 patients	Borderline personality, age, irritability	31% restrained Correlation with borderline personality, younger age, irritability
Tavcar et al. (33)	Restrospective cohort (2-month follow-up)	312 patients	Epidemiology	5% restrained. Better clinical global impairment scores for bed belt restraint vs net beds

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Table 1. (continued)

Author	Study design	No. patients	Study variables	Results
Tunde-Ayinmode, Little (68)	Retrospective cohort (1-year follow-up)	450 admissions	Gender, age, education, housing status, schizophrenia, depression, adjustment disorder, involuntary admission, duration, rate of medication per day, previous admission, medication at admission, legal status	31% of patients admitted were secluded. UV: Secluded patients were more likely to be young, and admitted involuntarily with a diagnosis of schizophrenia. The most common indicator of seclusion was risk to others (74%) followed by risk to self (61%) and risk of absconding (55%) Seclusion was more likely to occur in the evenings, when staff/patient ratios were lower
Unruh et al. (69)	Retrospective cohort (1-year follow-up)		Nurse absenteeism, high patient load	UV: Neither a high rate of Registered Nurse absenteeism nor a high patient load separately correlated with use of restraint. However, a high rate of absenteeism was related to restraint use when the patient load was high
Wallsten et al. (70)	Prospective cohort (3-week follow-up)	233 patients	Outcome	MV: No correlation between coercion and outcome UV: No correlation between coercion and outcome
Way, Banks (71)	Case-control	657 restrained vs 22939 not restrained	Age, gender, length of stay, type of admission, mental retardation, psychosis, mood, anxiety and personality disorder	UV: Younger age, long stay, involuntary admission, female gender, a diagnosis of mental retardation
Whitehead (29)	Case-control	408 patients	Age	UV: Older age related to restraint
Wynn (72)	Retrospective cohort (4.5-year follow-up)	235 patients restrained, pharmaco-logically restrained or secluded (1269 episodes)	Gender, age, organic psychotic disorders, non-organic psychotic disorders, and non-psychotic disorders	UV: Physical restraint was preferred more often in the case of male, younger, and non-psychotic patients. Pharmacological restraint was preferred more often in the case of female patients and older patients with a non-organic psychotic disorder. Seclusion was preferred more often in the case of older male patients with an organic psychotic disorder

UV: univariate analysis; MV: multivariate analysis; OR: odds ratio; SD: standard deviation

Table 2. Summary of investigated variables

	MV (studied)	MV (positive)	UV (studied)	UV (positive)
Age	7	3 young	17	6 young, 2 old, 1 medium
Gender	8	4 male, 1 female	15	6 male, 1 female
Ethnicity	4	1 positive, 1 negative for minority	5	3 positive, 1 negative for minority
Marital status	1		2	
Education	1		2	
Social class	1			
Housing status			2	
Employment status	1		1	
Organic disorder	1		3	2
Schizophrenia	5	4 positive, 1 negative	16	9 positive, 1 negative

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Table 2. (continued)

	MV (studied)	MV (positive)	UV (studied)	UV (positive)
Mood disorder	2	1	10	
Depression	1	1 negative	2	
Bipolar	1		3	1
Anxiety			5	
Substance use	1		8	3
Alcohol use			2	1
Personality disorder	2	1	4	1
Previous treatment	1	1	2	1 negative
Previous admission	1		6	1
Involuntary admission	3	2	5	4
Violence	5	5	11	8
Absconding	3	2	2	2
Suicidal behaviour	1	1	1	1
Agitation	2	1	2	2
Staff gender	3	2 male	1	
Staff age	3		1	
Staff experience	1			
Staff marital status	1		1	
Staff/patient ratio	1	1 low	4	2 low
Seclusion/restraint correlation	3	2	2	1
Ward atmosphere	1		1	1 lacking
Time of day	3	1 daytime	3	1 morning, 3 evening

UV: univariate analysis; MV: multivariate analysis

None of the studied demographic variables seems to be a very robust predictor of restraint. However, in the light of the findings, restrained patients tend to be more frequently male (a statistically significant variable in 4 of the 8 multivariate, and 6 of the 16 univariate analyses), young adults (statistically significant in 3 of the 7 multivariate, and 6 of the 18 univariate analyses), and non-autochthonous (statistically significant in 1 of the 4 multivariate, and 3 of the 5 univariate analyses).

In terms of diagnosis, patients with schizophrenia are more likely to be restrained than those with anxiety, personality or mood disorders, or disorder due to alcohol or substance abuse (statistically significant in 4 of the 5 multivariate, and 9 of the 17 univariate analyses).

In the majority of cases, the reason for restraint was aggressiveness against others (statistically significant in all of the 5 multivariate, and 8 of the 12 univariate analyses) or an attempt to abscond (statistically significant

in 2 of the 3 multivariate, and both of the univariate analyses). Episodes of restraint are more frequent among patients hospitalized against their will (statistically significant in 2 of the 3 multivariate, and 3 of the 4 univariate analyses).

Male nurses have a greater propensity to use restraint than female nurses (statistically significant in 2 out of 3 multivariate analyses).

DISCUSSION

On the basis of the findings described in this review, restraint is still widely used in psychiatry wards (3.8-20%) even though its efficacy has not been demonstrated, and our data are in line with those of other reviews by Mion (3) (6-17%) and the Johanna Brings Institute (4) (3.4-21%). This means that the attempts to reduce the use of restraint by means of the introduction of special protocols, nurses' training courses, etc.,

are limited to local level and have not been extended nationally: for example, there are still no nationally recognised protocols concerning the use of coercive measures in Italy (73).

Particularly in the United States, numerous attempts have been made over the last ten years to implement projects aimed at reducing the number of episodes of physical restraint in a bid to find new ways of dealing with violence (especially violence in psychiatry wards), all of which require a multi-professional approach.

On the basis of scientific evidence, some authors (74,75) say that suitable training for nursing staff, an assessment of the risk of aggressiveness, and adequate alternative resources are essential factors for reducing the number of seclusions and episodes of physical restraint. The results of these studies seem to be very encouraging in terms of the actual medium/long-term reduction and in terms of the fact that the introduction of “softer” strategies did not increase the number of episodes of aggressiveness and violence. Comparison of studies carried out in different countries indicates that coercive measures are used in 100% of the wards in Germany, 60% of those in Switzerland, and in none of the wards in Great Britain, where physical restraint is applied only along with pharmacological restraint and for a very short period of time (mean 12 minutes) (76).

Calculations of the incidence of the use of physical restraint measures vary widely from study to study. The high prevalence in Japan may be explained by its relatively recent use of outpatient clinics (about 10 years) or the recent introduction of atypical neuroleptics but, in any case, merits further study as the published figures are based on relatively small patient populations (31,37).

In terms of age, our findings differ from those of Mion (3), who found a greater prevalence of the use of restraints among elderly subjects. However, it must be remembered that we only considered psychiatry wards and it is obvious that, in the case of general medicine and geriatrics, restraints are used not only following episodes of aggressiveness against others, but also in order to prevent falls or to deal with consciousness impairment, which are very frequent in the elderly.

Concerning the other risk factors, it is interesting to note that restraining measures are used more frequently in the case of immigrants, as was also found in the interesting study by Price et al. (57) in which the incidence of seclusion proved to be statistically higher among Asians and blacks than among whites, even though there was no race-related difference in the

episodes of aggressiveness against others. This suggests that the actions of someone who is little known are more frightening and, therefore, the consequent reaction “must” be more drastic. Difficult communications is another factor that can induce staff to be more interventional.

Another interesting finding of this review is that a male staff is more likely to use restraint than a female staff. As we found in a previous study (77), aggressiveness tends to be directed against people of the same gender and, given that more male patients are restrained, this is more likely to be done by male staff.

Aggressiveness against others is robustly associated with the use of restraint, but this partially conflicts with the demographic variable described by us in a previous review (77), which did not find any clear prevalence of male gender, although there was a correlation with a young age. In both cases, the presence of schizophrenia was found to increase the risk of aggressiveness and restraint, but this seems to be more robust in relation to restraint, which may mean that an episode of aggressiveness involving a patient with a psychotic disorder is more alarming for the healthcare team. However, this clearly conflicts with Binswanger’s phenomenological theory (78) that “psychosis is essentially a different way of being in the world” without the degree of lucidity that may be encountered in patients with personality or mood disorders.

Both reviews also found that involuntary hospitalization is associated with a higher risk of episodes of aggressiveness or coercive measures. By definition, patients admitted against their will do not accept the admission, and consequently tend to be more hostile towards their “jailers”; furthermore, involuntary admission seems to make staff more predisposed to adopt a more negative view of the patient than in the case of those who agree to be admitted.

In conclusion, the results of our review show that coercive measures are still widely used in many countries (albeit to a greater or lesser extent) despite attempts to introduce alternatives in some centres that should really be tested in large-scale multicentre studies in order to verify their efficacy. To prevent the risks associated with the use of restraint in psychiatry, it is necessary to intervene on the staff by means of training courses designed to encourage the use of different ways of managing aggressive patients. Finally, our findings suggest the importance of studying the use of restraint in greater detail by extending the investigation to other wards (geriatric, general medicine, etc.), involving larger numbers of patients, and bearing in mind the demographic and clinical variables that seem to be most significant.

Prevalence and risk factors for the use of restraint in psychiatry: a systematic review

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