Soc Psychiat Epidemiol (2010) 45:1087–1093
DOI 10.1007/s00127-009-0150-1

ORIGINAL PAPER

Who are the restrained and secluded patients: a 15-year nationwide study

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Received: 20 October 2008 / Accepted: 25 September 2009 / Published online: 21 October 2009

Abstract
Background To find interventions for reducing the use of restraint and seclusion, it is necessary to identify who the restrained and secluded patients are. The aim of the present study was to determine which demographic and clinical groups of psychiatric inpatients are at risk of being restrained/secluded, and whether there have been changes in the restrained/secluded patients' profiles over a 15-year period in Finland.
Method A structured postal survey concerning the demographic and clinical information of restrained/secluded patients was completed in all Finnish psychiatric hospitals during a predetermined week in 1990, 1991, 1994, 1998, and 2004. The National Hospital Discharge Register was used to gather information on all psychiatric inpatients during the study weeks.
Results Out of the variables studied (age, gender, main diagnosis, phase of hospital stay), only the main diagnosis and the phase of hospital stay were independent risk factors for restraint/seclusion, and remained constant over time. The age profile of the restrained/secluded patients was unstable over time and the risk of being restrained/secluded was not associated with gender.
Conclusion Restraint and seclusion is used mainly among the acute and the most disturbed patients. Therefore, in order to reduce the use of restraint and seclusion, resources should be targeted especially to these groups.

Keywords Seclusion · Restraint · Coercion

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Introduction

Despite the general movement towards the least restrictive environment in treatment, coercive measures are widely used in psychiatry [9]. The preferred methods (mechanical restraint, physical restraint, seclusion) and the frequency of the use vary, but coercive measures are nevertheless used across legislation and service systems [21]. Use of coercive measures [22] as well as perceived coercion [3, 25] has been suggested to be important outcome measures in service evaluation. The current trend is the development of specific programmes to reduce the use of restraint and seclusion. This has mostly been done at the level of individual hospitals [9], but a recent international study revealed more extensive ongoing initiations in a few European countries as well [21]. Progress in this area has

been hampered by the inadequate knowledge of who the restrained and secluded patients really are in clinical practice.

Studies on the use of restraint and seclusion, examining the influence of demographic and clinical factors, such as age, gender, diagnosis and phase of hospital stay, have produced contradictory results. Younger patients have been quite consistently found to be restrained/secluded more frequently [8, 17, 19, 20]. However, some research has failed to find an association between age and being restrained/secluded [4, 13]. Some indication suggests that while younger patients are more likely to be restrained/secluded, older patients are restrained/secluded for a longer period of time [20], and that restraint is more frequently applied with younger patients and seclusion with older ones [27]. Findings regarding gender are inconsistent, with evidence suggesting that the use of restraint/seclusion is more frequent with female patients [17, 19, 26], and contradictory evidence suggesting that male patients are restrained/secluded more frequently [5, 24], or differences cannot be found at all [8, 10, 13, 16]. Higher rates of seclusion and restraint have been found among psychotic patients compared with non-psychotic patients [17], and more precisely among patients with schizophrenia [2]. However, personality disorders [17, 19], mental retardation [23, 26], and organic or substance use-related disorders [13] have also been associated with restraint/seclusion. A German study comprising data from ten psychiatric hospitals associated subjection to coercive measures with organic disorders, mental retardation, and schizophrenia disorders [22]**.** Higher restraint and seclusion rates are reported soon after admission [7, 15, 24], and at hospitals providing acute care compared with hospitals providing chronic care [6].

Partly contradictory results in evaluating clinical factors related to the use of restraint/seclusion are explained by studies done only in one or a few hospitals or at one time-point only. Selective populations and differences in definitions are a common methodological problem in these studies. To discover interventions for reducing the use of restraint/seclusion in psychiatry, it is necessary to study the persistence of restraint/seclusion patterns over time with a larger, even a nationwide psychiatric population.

Our previous study indicated that more restrictive legislation alone is not enough to reduce the use of seclusion and restraint [14]. The use of coercion and coercive measures are regulated by the Finnish Mental Health Act. However, until 2002 the regulation was weak, simply stating that coercive measures may be used only among involuntary patients, and only when absolutely necessary. More specific regulation emerged when the partly revised Act came into effect in 2002. The current Act confines use of restraint and seclusion primarily to violent situations, but also allows using them due to other specific reasons. Recording and reporting to administrative courts has become stricter. The aim of the present study was to determine, by using a nationwide study design, which demographic and clinical factors among psychiatric inpatients are associated with the risk of being restrained/secluded, and whether there have been changes in the restrained/secluded patient profiles over a 15-year period in Finland. The independence and stability over time of two demographic (age, gender) and two clinical factors (main diagnosis, phase of hospital stay), derived from previous studies, were studied.

Materials and methods

Survey data on seclusion and restraint

The restraint/seclusion data were collected during a specific week in December of the years 1990, 1991, 1994, 1998 and 2004 using a structured postal survey of Finnish psychiatric hospitals at the official request of the National Public Health Institute and the National Research and Development Centre for Welfare and Health. The hospitals were reached on the basis of the Register of Institutions which is maintained by the National Research and Development Centre for Welfare and Health. The medical directors of the hospitals were approached and they distributed the study materials to all wards using restraint and/or seclusion for working-age (18–64 years) patients. The response rate was 92.3% in 1990, 98.1% in 1991, 98.3% in 1994, 100% in 1998 and 98.2% in 2004.

A detailed survey concerning the first restraint or seclusion incident of each patient in the study week was completed. Restraint was defined as mechanical restraint, i.e., confining the patient to a restraint bed. Seclusion was defined either as moving the patient to a locked seclusion room or locking up the patient in his or her own room. The survey included structured questions regarding the type of the coercive measure (restraint/seclusion) and the demographic and clinical data (age, gender, main diagnosis, date of admission, date of the index restraint/seclusion episode) of the patients.

Register data on all psychiatric inpatients

The demographic and clinical data (age, gender, main diagnosis, date of admission) of all hospitalised psychiatric patients during the study weeks were gathered from the National Hospital Discharge Register authorised by the National Research and Development Centre for Welfare and Health. Each hospital in Finland is obliged to supply a detailed document to the register at the completion of each

patient's treatment period. Thus, it is possible to obtain information on the number and characteristics of inpatients at any given time.

Combined survey and register data

The restrained/secluded patients were identified from the register data by the admission date, age, gender and diagnosis. In 617 (92.1%) cases the information was complete and the patients could be matched to the register data. In the remaining cases (7.9%) there was some information lacking and the identification could not be carried out reliably. Thus, in order to insure the reliability of the results, we report data only of those restrained/secluded patients who were reported in the survey data and identified in the register data.

Variables

Two demographic variables (age, gender) and two clinical variables (main diagnosis, phase of treatment) were studied.

Age was classified into four categories: (1) 18–29 years, (2) 30–39 years, (3) 40–49 years, (4) 50–64 years.

Main ICD-10 *diagnoses* were divided into four categories: (1) schizophrenia-related group (F20–F29), (2) substance use-related group (F10–F19) (3) mood disorder–related group (F30–F39), and (4) the rest of the diagnoses which included organic mental disorders (F00–F09), mental retardation (F70–F79), personality disorders (F60–F69), and some other main diagnosis than psychiatric. These four categories were formed, because on the basis of the preliminary analysis, the prevalence of the use of restraint/seclusion was too low for reliable annual statistical analysis in many main diagnosis groups.

Length of the hospital stay prior to the index restraint/seclusion episode was used to categorize the patients in the three different *phases of hospital treatment*: acute phase (0–4 days), sub-acute phase (5–90 days), and chronic phase (91 days or more). The categories were determined by the regulations regarding the involuntary hospitalization process of the Finnish Mental Health Act. The involuntary hospitalization process is initiated by the observation period which may last for a maximum of 4 days. If the commitment criteria are fulfilled at the end of the observation period, the decision of involuntary detainment is valid for a maximum of 3 months. For the restrained/secluded patients, the length of the hospital stay was calculated from the date of admission to the beginning of the index restraint/seclusion episode. For the non-restrained/non-secluded patients, the length of the hospital stay was calculated from the date of admission to the end of the study week.

Statistical analyses

Restraint and seclusion were analysed together. *Prevalence* of the use of restraint/seclusion was reported with 95% confidence intervals of all psychiatric inpatients. *Multivariate binary logistic regression analyses* were used to calculate which groups of inpatients were at risk of being restrained/secluded. Being the subject of restraint/seclusion (yes/no) was used as a dependent variable. Demographic (age, gender) and clinical variables (diagnosis, phase of hospital stay prior the index restraint/seclusion) were used as independent variables.

In the first phase, four different analyses of multivariate logistic regression were conducted to ascertain if the effect of the independent variable is stable over time. In each model, an interaction term between the study year and each independent variable separately was entered into the model together with all other independent variables. If an interaction was found between a certain independent variable and the study year (i.e. the risk profile varied over time), risks of restraint/seclusion for that variable were calculated with a multivariate logistic regression model separately for each year. In the next phase for those variables which had no interaction with a study year (i.e. the risks are stable over study years), all study years were combined and risks were obtained from one multivariate logistic regression model. This model included all independent variables (age, gender, diagnosis, phase of hospital stay and study year), and those interaction terms with year which were found to be significant in the first phase. Odds ratios (OR), 95% confidence intervals (CI) and p values are presented. Data were analysed using SPSS for Windows (version 15.0) statistical software.

Results

In total, the studied material comprised 28,064 working-age (18–64 years) psychiatric inpatients (Table 1). The number of the youngest (18–29 years) patients tended to increase over time, and the number of the oldest (50–64 years) patients decreased in the early stages of the study period but subsequently increased. A majority of the psychiatric inpatients had a diagnosis of schizophrenia. The number of mood and substance use diagnoses increased over the study time mostly at the expense of schizophrenia diagnoses. During the study period, the number of acute patients increased slightly and sub-acute patients increased clearly, whereas the number of chronic patients decreased.

The restrained/secluded patients comprised 2.2% (617/28,064) of all the psychiatric inpatients (Table 1). The proportion of restrained/secluded patients remained stable over the study period.

Table 1 Distribution of age, gender, diagnosis and phase of hospital stay among all psychiatric inpatients ($n = 28{,}064$) during the study weeks in 1990, 1991, 1994, 1998 and 2004, and proportion (% with 95% CI) of the restrained/secluded (R/S) ($n = 617$) in each sub-group

	1990			1991			1994			1998			2004			Total		
	All	R/S		All	R/S		All	R/S		All	R/S		All	R/S		All	R/S	
	N	%	(95% CI)	*N*	%	(95% CI)	*N*	%	(95% CI)	*N*	%	(95% CI)	*N*	%	(95% CI)	*N*	%	(95% CI)
Age (years)																		
18–29	972	3.8	(2.8–5.2)	1,109	3.2	(2.4–4.5)	1,115	3.2	(2.3–4.4)	1,025	1.8	(1.1–2.8)	1,146	1.8	(1.2–2.8)	5,367	2.8	(2.4–3.2)
30–39	1,686	2.8	(2.1–3.7)	1,595	2.9	(2.2–3.9)	1,486	2.6	(1.9–3.5)	1,324	1.9	(1.3–2.8)	988	2.1	(1.4–3.2)	7,089	2.5	(2.2–2.9)
40–49	1,674	2.4	(1.8–3.2)	1,552	2.4	(1.7–3.3)	1,789	2.6	(2.0–3.5)	1,472	1.4	(0.9–2.2)	1,176	1.5	(1.0–2.4)	7,663	2.1	(1.8–2.5)
50–64	2,085	1.5	(1.1–2.2)	1,847	0.8	(0.5–1.3)	1,395	1.6	(1.1–2.5)	1,349	2.0	(1.4–2.9)	1,269	2.5	(1.8–3.5)	7,945	1.6	(1.4–1.9)
Gender																		
Male	3,741	2.4	(1.9–2.9)	3,544	2.2	(1.7–2.7)	3,385	2.4	(2.0–3.0)	2,944	1.5	(1.1–2.0)	2,497	2.2	(1.7–2.9)	16,111	2.2	(1.9–2.4)
Female	2,676	2.5	(2.0–3.2)	2,559	2.2	(1.7–2.9)	2,400	2.6	(2.0–3.3)	2,226	2.1	(1.6–2.8)	2,092	1.7	(1.3–2.4)	11,953	2.3	(2.0–2.5)
Diagnosis																		
Schizophrenia	4,457	2.5	(2.1–3.0)	4,256	2.4	(2.0–2.9)	3,911	2.9	(2.4–3.4)	3,323	1.9	(1.5–2.5)	2,760	2.0	(1.6–2.6)	18,707	2.4	(2.2–2.6)
Substance use	198	8.6	(5.4–13.3)	190	4.2	(2.2–8.1)	240	6.2	(3.8–10.1)	275	2.9	(1.5–5.6)	269	6.7	(4.3–10.3)	1,172	5.6	(4.5–7.1)
Mood disorder	592	1.7	(0.9–3.1)	670	2.1	(1.3–3.5)	874	1.0	(0.5–2.0)	937	1.3	(0.7–2.2)	1,081	1.1	(0.6–1.9)	4,154	1.4	(1.1–1.8)
Other	981	1.7	(1.1–2.8)	822	1.2	(0.7–2.2)	661	1.2	(0.6–2.4)	617	1.1	(0.6–2.3)	465	1.3	(0.6–2.8)	3,546	1.4	(1.0–1.8)
Phase of hospital stay																		
Acute	251	13.5	(9.9–18.3)	322	11.5	(8.5–15.4)	437	11.2	(8.6–14.5)	420	7.4	(5.3–10.3)	433	9.2	(6.9–12.3)	1,863	10.3	(9.0–11.7)
Sub-acute	2,342	1.2	(0.9–1.8)	2,454	1.4	(1.7–2.8)	2,680	1.8	(1.3–2.3)	2,703	1.2	(0.9–1.7)	2,599	1.2	(0.9–1.7)	12,778	1.4	(1.2–1.6)
Chronic	3,824	2.4	(2.0–3.0)	3,327	1.9	(1.5–2.4)	2,668	1.8	(1.4–2.4)	2,047	1.3	(0.9–1.9)	1,557	1.3	(0.9–2.1)	13,423	1.9	(1.7–2.1)
Total	6,417	2.4	(2.1–2.8)	6,103	2.2	(1.9–2.6)	5,785	2.5	(2.1–2.9)	5,170	1.8	(1.4–2.2)	4,589	2.0	(1.6–2.5)	28,064	2.2	(2.0–2.4)

Length of hospital stay prior to the index restraint/seclusion episode or at the end of the study week: acute (0–4 days), sub-acute (5–90 days), chronic (over 90 days)

Table 2 Annual risks of being restrained/secluded in different age groups

	1990			1991			1994			1998			2004		
	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*
Age			0.001			<0.001			0.146			0.724			0.240
18–29	1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference	
30–39	0.64	0.41–0.00		0.89	0.56–1.40		0.72	0.45–1.16		1.04	0.56–1.94		1.02	0.54–1.90	
40–49	0.57	0.36–0.91		0.74	0.46–1.19		0.74	0.47–1.17		0.83	0.44–1.59		0.73	0.38–1.40	
50–64	0.37	0.23–0.61		0.24	0.13–0.46		0.53	0.31–0.91		1.17	0.63–2.17		1.36	0.77–2.40	

Adjusted for gender, diagnosis and phase of hospital stay

Age

In total, the prevalence of the use of restraint/seclusion was the lowest in the oldest inpatients group and highest in the youngest inpatients groups (Table 1). However, annual prevalence indicated the differences disappeared during the study period. This was confirmed by the multivariate logistic regression analysis. An interaction was found between age and study year ($p = 0.004$), i.e., the age profile of the secluded/restrained patients varied during the study years. Annual logistic regression analyses indicated, that compared to the youngest age group, the older patients had a statistically significantly lower risk of being restrained/secluded at the beginning of the 15-year study period (Table 2). However, the risk of being restrained/secluded tended to migrate towards older age groups during the study period, though not statistically significantly.

Gender

The prevalence of the use of restraint/seclusion was almost identical for both genders overall and annually (Table 1). Because no interaction was found between gender and study year ($p = 0.245$) (i.e., females' risk of being restrained/secluded did not differ from males' risk over the study years), in multivariate logistic regression all years were combined. This analysis indicated that gender is not a statistically significant independent risk factor for the use of restraint/seclusion (OR for females 1.18, 95% CI = 0.99–1.39, $p = 0.058$).

Diagnosis

In total, restraint/seclusion was most frequently used in the treatment of substance use-related group, and next most frequently in schizophrenia-related group (Table 1). Annual prevalence indicated that the prevalence of the use of restraint/seclusion in different diagnosis groups was quite stable over time. No interaction was found between diagnosis and study year ($p = 0.246$), i.e. the diagnostic profile of the restrained/secluded patients remained the same during the study years, so study years were combined for further analysis. Multivariate logistic regression analysis indicated that the diagnosis is a statistically significant independent risk factor for the use of restraint/seclusion ($p < 0.001$). Both the mood disorder-related group (OR = 0.49, 95% CI = 0.37–0.66) and the other main diagnosis groups (OR = 0.43, 95% CI = 0.32–0.59) had a lower risk of being restrained/secluded than the schizophrenia group. The risk of the substance use group did not differ statistically significantly from the schizophrenia group (OR = 1.30, 95% CI = 0.96–1.77).

Phase of hospital stay

Restraint/seclusion was most frequently used in the acute phase of psychiatric treatment both in total and over time (Table 1). No interaction was found between the phase of hospital stay and the study year ($p = 0.286$), i.e., the profile remained the same during the study years. Multivariate logistic regression analysis, in which study years were combined, indicated that the phase of hospital stay is a statistically significant independent risk factor for the use of restraint/seclusion ($p < 0.001$). Compared to the chronic group, the acute group had a higher risk (OR = 6.77, 95% CI = 5.43–8.44) and the sub-acute group had a lower risk (OR = 0.80, 95% CI = 0.65–0.98) of being restrained/secluded.

Discussion

To the best of our knowledge, this report is the first nationally representative long-time study design of restraint and seclusion in psychiatric care. Our aim was to determine which demographic and clinical groups of psychiatric inpatients are at risk of being restrained/secluded, and whether there have been changes in restrained/secluded patients' profiles over a 15-year period in Finland. Findings in previous studies have shown inconsistent

demographic and clinical profiles of restrained/secluded patients, partly due to methodological problems, such as selective populations or variables measured at one time-point only. Our data offered the possibility to overcome the typical drawbacks of previous research. It allowed the use of a multivariate approach regarding variables that have been previously studied separately. Among the variables of age, gender, diagnosis and phase of hospital stay, only the main diagnosis and the phase of hospital stay were independent risk factors for being restrained/secluded, and remained constant over time. Previous suggestions that the use of restraint and seclusion would be related to a young age were not confirmed in this study. The age profile of the patients was unstable over time and the risk of being restrained/secluded was not associated with gender. The present findings indicate that the prediction models for restraint and seclusion cannot rely solely on actuarial factors, but need to be dynamic, i.e. consider situational and contextual factors as well.

Use of restraint/seclusion was most prevalent in the group of substance abuse-related diagnosis and next most prevalent in the schizophrenia-related diagnosis group. However, the differences between the substance abuse group and the schizophrenia group disappeared when the diagnosis variable was adjusted for the other variables (year, age, gender, phase of hospital stay) in the logistic regression analysis, i.e., the effect of the substance abuse diagnosis in the use of restraint/seclusion was dependent on the other factors. Not surprisingly, the risk of being restrained/secluded was smaller in the mood disorder-related diagnosis group when compared with the schizophrenia group. Presumably the main problem of the patient with mood disorder is not disturbing or violent behaviour towards others. It could be assumed that the largest sub-category in the mood disorder group consists of manic patients who are at risk of being restrained/secluded because of their unanticipated and disturbed behaviour. Unfortunately, the data size did not allow for separating sub-categories from the main diagnoses.

The patients who had been in treatment fewer than 4 days prior to the study week (i.e., acute inpatients) formed a minority group among the psychiatric inpatients. However, their risk of being restrained/secluded was manyfold compared to the patients whose hospitalization period had already lasted over 3 months (i.e., chronic inpatients). This result is consistent with previous studies, which have also found that most of the restraint/seclusion episodes occur soon after admission [7, 15, 24]. At the beginning of an inpatient treatment period, the patient is generally most confused and disorientated. The condition of the patient is acute, and since she/he is unknown to the staff, which may be more inclined to manage the emergency situation by use of restraint or seclusion. Some evidence already exists that the reduction of the use of restraint and seclusion can be achieved by systematic training programmes in managing aggressive and agitated patients [9] as well as a continuing structured risk assessment with individualised risk management plans [1].

The patients who had been in hospital from 5 days to 3 months prior to the study week (i.e., sub-acute patients) were less likely to be restrained/secluded compared to the chronic inpatients. It could be assumed that the prolonged hospital stay of chronic patients reflects a more complicated psychiatric situation compared to many patients in the sub-acute group. In the former situation, the staff has a much better possibility to become familiar with the patient, and is therefore more capable of anticipating their behaviour and mental state. Consequently, preventive measures and more therapeutic and longer-term non-physical approaches could be applied to manage emergencies with the chronic patients instead of using restraint and seclusion. Studies have indicated that behavioural methods and cognitive behavioural therapy are effective in reducing violent and agitated behaviour in chronic psychiatric inpatients [11].

The data of the present study had the advantages of nationwide coverage, an exceptionally long follow-up period, and an unusually high response rate. Furthermore, special attention was paid to the collection of data so that it was performed in the exactly similar method in each study year. In addition, we were able to confirm the reliability of the survey data by pairing it to the register data, assuring an almost complete match. Less than 8% of the cases reported were excluded from the analyses, due to some missing data on the survey forms. Because of the comprehensiveness of the Finnish National Hospital Discharge Register, it was possible to count the risks of seclusion and restraint in different patient populations.

Restraint and seclusion have been analysed either together or separately in previous studies. Because the Finnish Mental Health Act does not separate the indications of restraint and seclusion, we analysed them together. Due to the limited sample size, separate analyses would also have produced problems regarding statistical power. The collection of the survey data was confined to only 1 week per year and only the first restraint/seclusion incident of each patient during this week was documented in detail. Even though there is no reason to suspect that the week chosen for study differed from other weeks of the year, we cannot be certain of its absolute representativeness. The diagnoses were not made by structured interviews, but were taken from the patient medical files. However, in Finland the basic diagnostic procedures have been proven to be reliable [12, 18].

Conclusions

This study confirmed in a comprehensively gathered nationwide data set that restraint/seclusion is used mainly among the psychiatric inpatients who are generally assumed to require coercive measures: the acute and the most disturbed patients. Age or gender is not associated with the use of restraint/seclusion. Current opinion seems to be that, although the use of restraint and seclusion cannot be totally eliminated, these measures should be used only as a last resort due to the serious safety issues when other interventions have failed. Continuous monitoring and systematic efforts to reduce the use of restraint and seclusion should be one core indicator of quality assurance in psychiatric inpatient treatment. To minimize the use of coercive measures in psychiatry, the future challenge would be to tailor specialized interventions and target more resources to the care of the acute and most disturbed patients whose risk of being restrained/secluded is the highest.

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