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Original article

The use of mechanical restraint in a psychiatric setting: an observational study

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SUMMARY

Objectives

The use of mechanical restraints is a practice used both in hospital and extra-hospital settings. This paper aims to outline the socio-demographic and clinical variables related to physical containment.

Methods

This observational study evaluates data from 65 adult psychiatric inpatients hospitalized at General Hospital Psychiatric Ward in Varese, Northern Italy, from January 2016 to August 2017.

Results

Patients were found to be mainly males (61.5%), with an average age of 43 years (Tab. I). The main reasons for restraints resulted to be "confusion" (81.5%), followed by "aggression" (61.5%) and "opposition to treatments" (20%). A positive correlation between length of hospitalization and numbers of episodes of restraint was found (Tab. II). Furthermore, a statistically significant correlation between female gender and number of restraints for single hospitalization emerged (p = 0.039) (Tab. III). Schizophrenia spectrum disorder was the most represented diagnosis, accounting for 44.60% of the sample (Tab. IV).

Conclusions

The study provides an overview on patients' characteristics and variables related to mechanical restraints. An early identification of these factors can be useful in the management of confused and agitated patients in order to reduce the episodes of restraint.

Key words: physical restraint, involuntary admission, compulsory admission, coercive measure

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Conflict of interest
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Introduction

The use of restraints is a practice used both in hospital and extra-hospital settings, such as emergency medicine, psychiatry, geriatrics and nursing homes [1] and it has always aroused clinical and ethical debates, but only in recent years it has returned to be a topic of scientific discussion [2]. This change is in part due to the greater attention paid to patients' perception of treatment, therapeutic alliance, prevention strategies and early rehabilitation and to patients' coping and resilience factors [3-8]. It is known that physical restraint can represent a trauma for patients, determining a worse therapeutic alliance and a worse outcome [9] and that relational methods to prevent and control aggressive behavior and agitation are the first-lines strategies [10]. Even so an increasing consumption of novel psychoactive substances, such as smart drugs, with unpredictable effects, has led to an increasing utilization of emergency care, physical restraint and psychiatric consultation [11-12]. I Moreover in some cases, such as in the drug addicts and

malingerers, agitation and aggression can be feigned in order to obtain drugs or secondary advantages [13-15]. Other frequent causes of agitation and aggressive behavior, little responsive to relational containment, arerelated to organic factors that can lead to cognition's alterations: brain trauma, dementia, mental confusion induced by organic and metabolic causes, pain, infections and medications [16-20]. Among psychiatric disorders, as shown by literature, schizophrenia, bipolar disorder and personality disorders [21] are more frequently associated with aggressive behavior and agitation.

There are different kinds of coercive strategies: a) pharmacological restraint: the use of medications in order to obtain sedation; b) environmental restraint: limitation of personal freedom to access all areas of the environment; c) mechanical restraint: any mechanical device that immobilizes or reduces patient's ability to move [22-23]. As far as pharmacological containment is concerned, the molecules used are generally chosen basing on the diagnoses, respiratory, cardiac and metabolic comorbidities as well as individual tolerability, and in elderly or compromised patients on an organic level, although pharmacological restraint does not always appear to be an applicable strategy [24-25]. Regarding environmental restraint, if isolation can prevent aggression, on the other hand can predispose to aggressive behaviour [26-27]. In some situations, such as psychotropic substances abuse, mechanical restraints can be considered safer than drug containment, because of possible adverse reactions; on the other hand, mechanical restraint can be associated with a higher risk of thromboembolic events, respiratory distress and trauma [28]. Moreover, this experience is often lived by the patient with enormous suffering, with the development of traumatic memories and with the onset of post-traumatic stress disorder (PTSD) as well as in many cases with the risk of reinforce aggression [29]. For these reasons, the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment of Punishment considers mechanical restraint an issue of particular concern, justifying it only very rarely [30]. In light of these considerations, the early identification of risk factors associated with aggression and violence could prevent the need for physical restraint. The characteristics of patients who are more frequently subjected to mechanical restraint measures in the psychiatric environment are still uncertain and not well defined [31-32].

This paper aims to outline the socio-demographic and clinical features related to physical containment in a sample of patients admitted to the Psychiatric Ward.

Materials and methods

This observational study was conducted in the psychiatric ward of "Azienda Socio Sanitaria Territoriale dei Sette Laghi – Varese", a teaching hospital in Northern Italy (Deliberate n. VIII/4221, February 28th, 2007). Data from 65 adult psychiatric inpatients hospitalized at General Hospital Psychiatric Ward (SPDC) in Varese from January 2016 to August 2017 were collected. All patients included in the study had to be ≥ 18 years old. To avoid duplication, we included only data referring to first hospitalization of the recruitment period of patients who had multiple admissions. The following clinical data have been taken into consideration: period of hospitalization; diagnosis; number of restraints and total length of them during a single admission; substance abuse; hospitalization regime (compulsory or voluntary); previous hospitalizations (distinguishing between compulsory or voluntary), reason for restraint. In order to examine the causes of restraints, the reasons for containment, reported in the medical record and in the nursing register, were grouped in 4 categories: "confusion"; "aggression"; "opposition to therapies"; "other". The restraint time was considered as the sum of all the restraints that occurred during the hospitalization. Data collection was integrated into the normal diagnostic assessment procedure and quality check processes. Data were obtained by consulting:

- restraints' records for the years 2016-2017: including all cases of restraint (start and end times, lenght, presence of law enforcement, reason for restraint, type of admission, signature of the prescribing doctor and the nurse in charge);
- management software "Portale": information on patients' age, sex, nationality, outpatient service to which patients refer at discharge, beginning and end of hospitalization in which a restraint episode was detected, primary and secondary diagnosis, substance abuse, previous voluntary and/or compulsory admission, home therapy, discharge therapy and contacts for treatment continuation;
- medical records: containing the patient's personal and clinical information relating to the period of hospitalization.

Clinical discharge diagnosis was recorded using the International Classification of Diseases, 11th edition (ICD-11). Since the study is a descriptive observational investigation, an informed consent was not required. Data were analyzed anonymously. All personally sensitive information contained in the database used for this study was previously de-identified according to the Italian legislation (D.L. 196/2003, art. 110, -24 July 2008 art. 13). The study was carried out in accordance with the Declaration of Helsinki (with amendments) and Good Clinical Practice. Statistical analysis was performed by IBM SPSS Statistics version 25.0. For descriptions of socio-demographic and clinical variables, a descriptive statistical analysis was performed, while the bivariate

correlation was used to correlate sociodemographic and clinical characteristics to the restraining episodes. All statistical tests were two-tailed, with $p < 0.05$ considered statistically significant.

Results

Table I reports patients' socio-demographic and clinical data (Tab. I). The comparison between age and sex shows that in the juvenile age groups mechanical restraints prevail in male patients, while in the most advanced age groups this trend appears reversed. The population is divided between the two possible hospitalization modalities: 48% of patients were compulsorily admitted, while 52% were voluntarily hospitalized. Dating back to the year 2000, 61.5% of patients have had at least a previous admission; 27.7% have had a previous compulsory admission. The average length of hospitalization was 21 days, with s of 13 days, (range from 2 to 153); the length of hospitalization appears to be greater in males, without a difference statistically significant between genders. The bivariate correlation between length of hospitalization and numbers of episodes of restraints appears to be statistically significant, as shown in Table II ($p = 0.0004$).

The average number of containment episodes per subject was 3.3, while the median was 1, (range 1-41). 54% of patients had only one coercive act during the hospitalization, while 8% of patients were contained more than 10 times. The 25% of the patients examined have a history of substance abuse; cannabinoids, cocaine and alcohol were the most consumed substances. However, substance abuse was not significantly related to restraint, as found with Pearson's correlation. Despite the fact that male patients are contained more frequently than women, a statistically significant correlation between female gender and number of restraints for single hospitalization emerged ($p = 0.039$); considering a single hospitalization, it appears that almost 61% of the restraint episodes are carried out on female patients, as shown in Table III.

The average restraint time, considering as the sum of all the episodes occurred during the hospitalization, was

TABLE I. *Socio-demographic and clinical features.*

Gender		Nationality		Previous psychiatric contacts		Type of admission		Substance use	
Male	Female	Italian	Foreign	Yes	Not	Compulsory	Voluntary	Yes	Not
61%	39%	88%	12%	77%	23%	48%	52%	25%	75%
N = 40	N = 25	N = 57	N = 8	N = 50	N = 15	N = 31	N = 34	N = 16	N = 49

TABLE II. *Correlation between number of restraints and length of hospitalization.*

		Number of restraints	Length of hospitalization
Number of restraints	Pearson's correlation	1	.518
	Sig. (2-code)		.000
	N	62	61
Length of hospitalization	Pearson's correlation	.518	1
	Sig. (2-code)	.000	
	N	61	61

TABLE III. *Correlation between gender and number of restraints.*

		Sex	Number of restraints
Sex	Pearson's correlation	1	.263
	Sig. (2-code)		.039
	N	63	62
Number of restraints	Pearson's correlation	.263	1
	Sig. (2-code)	.039	
	N	62	62

TABLE IV. *Sample distribution according to diagnosis.*

Diagnosis	%
Schizophrenia, schizotypal disorder and delusional disorders	(N = 29) 44.60%
Mood disorders	(N = 17) 26.30%
Behavioral syndromes associated with physiological dysfunctions and physical factors	(N = 2) 3.10%
Personality and behavioral disorders in adults	(N = 14) 21.50%
Intellectual disability	(N = 1) 1.50%
Behavioral and emotional disorders with onset usually occurring in childhood and adolescence	(N = 1) 1.50%
Missing data	(N = 1) 1.50%

54.5 hours, the median was 34 hours. 58.4% of patients had at least one restraint episode lasted more than 24 hours. Total duration of restraints was longer in male patients (average 62 hours) than in female patients (average 42 hours). Table IV shows the distribution of the considered population according to diagnosis. In male patients the most represented diagnosis was schizophrenia (57.5%), while among female patients mood disorders (40%), followed by schizophrenia and personality and behavior disorders (24% for each one).
The main reasons responsible of restraints use resulted to be "confusion" (81.5%), followed by "aggression" (61.5%) and "opposition to treatments" (20%). The bivariate correlation between restraints cause and number of containments during a single hospitalization showed a slightly statistical significance (p = 0.0052). Furthermore, a statistically significant correlation between the length of hospitalization and "confusion" as reason of restraint, emerges (p = 0.022).

Discussion

Regarding the relation between sociodemographic variables and restraints, the results of the study appear to be in line with the literature's data. Male patients are more often subject to mechanical restraints [33]. However, it is interesting to note that the greater number of restraints for single hospitalizations resulted among female patients. This could be explained by the type of detected diagnosis; the main diagnosis in male patients resulted schizophrenia, while in women a prevalence of diagnosis of mood disorders (including bipolar disorder type I and II and depression) and personality disorders emerged. Mood disorders and personality disorder are characterized by mood swings and a greater rate of impulsiveness and aggressiveness, leading to an alternation of phases in which patients appear calm and cooperative and phases in which aggression is uncontrolled [34-35]. While the phase of aggression in schizophrenia spectrum disorder, largely supported by the presence of hallucinatory state, generally has a short duration and a good response to pharmacological containment; moreover in mood disorders and personality disorders it is more common to have fluctuation that make restraints necessary even afterwards a period of good behavioral control [36]. Another interesting datum is the statistically significant linear relationship between the duration of hospitalization and the number of restraints. On one hand, this relationship can be explained from the fact that more severe psychopathologies with clamorous manifestations tend to require long time for remission, on the other hand, several findings in professional literature show that psychical restraint often cause low compliance in patients, as well as longer hospitalizations and a worse quality of life [36]. Observing the reasons that led to the physical containment, mental confusion emerged as the most common cause, differently from the literature where aggression resulted to be the main reason [25,37]. This data is not of unambiguous interpretation. In different countries confused patients are likely to be managed in different departments, such as neurology, geriatrics, medicine, so they are not included in the statistics of psychiatric departments [38]. It is evident that the remission of agitation in confused patients is longer and much less predictable than in pure psychiatric diagnoses [38]. The majority of restraint episodes (75.4%) occurred in patients that do not use psychotropic substances. However, this datum could be underestimated for the increasing diffusion of smart drugs or novel psychoactive substances, which are often not traceable in standard drug tests [39]. These subjects are particularly difficult not only for the diagnostic assessment, but also for the treatment. In fact, those molecules can present interactions with medicaments both counteracting the therapeutic effects and worsening the side effects [39]. The main limitation of this study is that it evaluates only restrained patients, without a control group. Other important study limitations are the lack of an instrument to assess personality disorder diagnosis, based only on clinical observation, the absence of the evaluation of patients'perception or of the onset of

PTSD after restraint use. The estimation of this disturb, that frequently occurs in patients subjected to coercive measures, could represent a future goal of study. Moreover, the recruitment in a single hospital gives few clues about the national and international reality about the restraint's phenomenon. Despite these limitations, the study provides an overview on the characteristics and variables related to mechanical restraint use. An early identification of these factors can be useful in the management of agitation and aggression.

Conclusions

It is not yet known whether physical restraints can be a factor of worsening the patient's clinical progress and increase the length of hospitalization. In light of the growing attention to recovery style and resilience factors, it is interesting to investigate whether physical restraint can represent an obstacle to an optimal patient recovery and if early modification of possible associated factors to restraints use could limit its recourse.

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