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ORIGINAL ARTICLE

Relationship between nurses' use of verbal de-escalation and mechanical restraint in acute inpatient mental health care: a retrospective study

Alonso Pérez-Toribio, [1] ***Antonio R. Moreno-Poyato,*** [2] ***Teresa Lluch-Canut,*** [2] ***Laura Molina-Martínez,*** [3] ***Anna Bastidas-Salvadó,*** [4] ***Montserrat Puig-Llobet*** [2] ***and Juan F. Roldán-Merino*** [5]

[1]*Unitat de Salut Mental de l'Hospitalet, Servei d'Atenció Primària Delta de Llobregat / Direcció d'Atenció Primària Costa de Ponent, Institut Català de la Salut,* [2]*Department of Public Health, Mental Health and Maternal and Child Health Nursing, Nursing School, Universitat de Barcelona, L'Hospitalet de Llobregat,* [3]*Programa Atención Domiciliaria Intensivo (PADI), Associació d'Higiene Mental Nou Barris,* [4]*Coordinator Acute Unit Psichiatry, Hospital Clinic de Barcelona, and* [5]*Campus Docent Sant Joan de Déu Fundació Privada, School of Nursing, University of Barcelona, Barcelona, Spain*

ABSTRACT: *Although the use of verbal de-escalation in nursing has been shown to be an effective tool for controlling agitation and avoiding mechanical restraint, there is scarce evidence supporting the use of de-escalation by nurses and factors related to the patients who ultimately receive mechanical restraint. This retrospective study sought to examine the relationship between the use of verbal de-escalation by nurses and the clinical profile of patients who had received mechanical restraint at an acute mental health unit. This study analysed the records of patients who had received mechanical restraint between the years 2012 and 2019. A bivariate analysis was initially performed, followed by multiple logistic regression analysis. A total of 493 episodes of restraint were recorded. Of these, in almost 40% of cases, no prior use of verbal de-escalation was noted. The factors associated with the use of verbal de-escalation by nurses were patients with a history of restraint episodes and patients who previously had been administered medication. Furthermore, episodes of mechanical restraint that occurred later during the admission were also associated with the use of de-escalation. These findings confirm the relevance of early nurse interventions. Consequently, it is important to establish an adequate therapeutic relationship from*

Correspondence: Antonio R. Moreno-Poyato, Department of Public Health, Mental Health and Maternal and Child Health Nursing, Nursing School, Universitat de Barcelona Campus Bellvitge, Pavelló de Govern, 3d floor, office 305 C Feixa Llarga, s/n. 08907-L'Hospitalet de Llobregat, Barcelona, Spain. Email: amorenopoyato@ub.edu

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Alonso Pérez-Toribio, RN, MSc.
Antonio R. Moreno-Poyato, RN, MSc, MHN, PhD.
Teresa Lluch-Canut, RN, MHN, PhD.
Laura Molina-Martínez, RN, MHN.
Anna Bastidas-Salvadó, RN, MHN.
Montserrat Puig-Llobet, RN, MHN, PhD.
Juan F. Roldán-Merino, RN, MSc, MHN, PhD.

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the start of hospitalization to facilitate getting to know the patient and to enable the timely use of verbal de-escalation, thus avoiding the use of mechanical restraint.

KEY WORDS: *inpatient, mechanical restraint, mental health, nurse intervention, verbal de-escalation.*

INTRODUCTION

The scientific literature repeatedly points to the need to find alternatives to the use of restraints in mental health hospital settings because of the negative impact on both patients and nurses (Aguilera-Serrano *et al*. 2018; Jury *et al*. 2019; McKeown *et al*. 2019; Thomann *et al*. 2021). Numerous studies report negative experiences related to these practices and provide the scientific community with alternatives to the use of these measures (Fernández-Costa *et al*. 2020; Guzman-Parra *et al*. 2020). Thus, verbal de-escalation has been highlighted as the main strategy for the control of pre-agitation states due to its high patient acceptance and its positive impact on the feelings of health professionals, patients, and health institutions (Kuivalainen *et al*. 2017; Price *et al*. 2018). In addition, risks arising from other interventions that may require the use of force are minimized (Jury *et al*. 2019) which facilitates the establishment of a good therapeutic relationship (Garriga *et al*. 2016).

Background

Mechanical restraint is a common restraint measure currently permitted for use in mental health. It is defined as an intentional limitation of the patient to control their freedom of movement as part of a treatment. It can affect a part of the body or the whole (Mahmoud 2017; Vedana *et al*. 2018). Thus, mechanical restraint is an intervention used to limit a patient's movements to prevent destructive behaviours and preserve the safety and integrity of the patient and others (Mahmoud 2017; Vedana *et al*. 2018; Wilson *et al*. 2018). It is important to distinguish mechanical restraint from physical restraint; the latter is defined as the immobilization of a patient by bodily force by holding the person on the floor or on a bed, with the help of several people (Lepping *et al*. 2016; Steinert & Lepping 2009). Typically in inpatient units, the profile of patients includes those with diagnoses of schizophrenia or psychosis, bipolar disorder, personality disorder, substance abuse, and risk of violence (Garriga *et al*. 2016).

The use of mechanical restraint has been shown to be a traumatic experience for patients and nurses and may present an ethical dilemma for staff, while encouraging regressive behaviour and patient dependence on institutions (Di Lorenzo *et al*. 2014). Both patients and staff verbalize feelings of distress, fear, anger, anxiety, and frustration (Kinner *et al*. 2017; Wilson *et al*. 2017). In fact, many direct and indirect physical injuries, such as lung disease, lacerations, asphyxiation, and even sudden death, have been reported (Di Lorenzo *et al*. 2014; Kuivalainen *et al*. 2017). In addition, the use of mechanical restraint compromises the therapeutic relationship and the establishment of trust between nurses and patients experiencing these restrictive practices (McKeown *et al*. 2020).

In recent years, there has been a shift in international policy to reduce restrictive interventions (Cusack *et al*. 2018; McKenna 2016). Reduction towards the elimination of mechanical restraint is a constant orientation for mental health services (Al-Maraira & Hayajneh 2019; McKeown *et al*. 2020). In fact, many European countries are aligned with the USA and Australia in the interest of creating a legal framework to tend to reduce or even eliminate the use of mechanical restraint in mental health units (McKeown *et al*. 2020; Pérez-Revuelta *et al*. 2021). Legislative changes and new regulations have started to emerge to prevent its use or restrict it to very extreme situations (Guzman-Parra *et al*. 2016). In Europe, mechanical restraint is not allowed in England, Wales, Scotland, Ireland, Netherlands, and Iceland. The case of Iceland is the most extreme, where no type of restraint measure is allowed for controlling the patient in case of violence or agitation (Steinert & Lepping 2009). In the UK, Australia, and New Zealand, work is underway on seclusion reduction guided by the 'Six core strategies for reducing seclusion and restraint use' (Jury *et al*. 2019). In the USA, various initiatives have been taken in many states to end the use of the most restrictive measures in mental health settings (Steinert *et al*. 2010). Despite support for the reduction and elimination of mechanical restraints, and evidence that a reduction in the use of restrictive practices does not

lead to an increase in assaults (Kuivalainen *et al*. 2017; McKenna *et al*. 2017; Muir-Cochrane *et al*. 2018), these practices continue to be used in mental health care (Bullock *et al*. 2014; Muir-Cochrane *et al*. 2018; Price *et al*. 2018). Restraint rates from four European countries with similar social and health structures are remarkably similar regarding patients affected by restraint. However, large differences exist concerning the type and length of coercive measures used (Lepping *et al*. 2016).

In order to reduce or eliminate the use of mechanical restraint, nurses use interventions aimed at addressing the patient in a state of agitation such as environmental or spatial restraint, pharmacological restraint, and verbal restraint or de-escalation (Pérez-Revuelta *et al*. 2021). Of these, verbal de-escalation is the intervention that generates the most confidence, and thus it is considered the first psychomotor agitation control strategy (Hallett & Dickens 2017; Lavelle *et al*. 2016). De-escalation techniques consist of a variety of psychosocial techniques aimed at reducing violent and/or disruptive behaviour. They are intended to reduce/eliminate the risk of violence during the escalation phase, through the use of verbal and non-verbal communication skills (Lavelle *et al*. 2016; Price & Baker 2012). Verbal de-escalation techniques have the potential to decrease agitation and reduce the potential for associated violence, in the emergency setting (Richmond *et al*. 2012). Nurses use verbal de-escalation to help patients manage violent behaviour and redirect them to calm down without confrontation or provocation (Berring *et al*. 2016) and favour a better relationship between the staff and the patient, together with a solidification of the therapeutic alliance (Fernández-Costa *et al*. 2020; Mavandadi *et al*. 2016). Numerous studies have demonstrated the benefits of managing violent situations or agitated patients by means of verbal de-escalation techniques (Berring *et al*. 2016; Cusack *et al*. 2016; Fernández-Costa *et al*. 2020; Garriga *et al*. 2016; Hallett & Dickens 2015, 2017; Jury *et al*. 2019; Kuivalainen *et al*. 2017; Lavelle *et al*. 2016; Mavandadi *et al*. 2016; McKeown *et al*. 2019; Price *et al*. 2015, 2018; Richmond *et al*. 2012). In addition to the reduced intervention time, other authors have described the following benefits: (i) avoiding violence and preventing harm without having to resort to mechanical restraint or isolation (Fernández-Costa *et al*. 2020; Jury *et al*. 2019), (ii) verbal de-escalation helps nurses develop better relationships with their patients (Garriga *et al*. 2016), increasing self-esteem, and job satisfaction (Cowin *et al*. 2004; De Berardis *et al*. 2020; Price *et al*. 2018), (iii) verbal de-escalation is less time-consuming than the process of mechanical restraint and involuntary medication (Richmond *et al*. 2012).

Although the most common characteristics of patients who require mechanical restraint have been extensively studied (Bowers *et al*. 2015; Bullock *et al*. 2014; Cusack *et al*. 2016; Hotzy *et al*. 2018; Keski-Valkama *et al*. 2010; Knutzen *et al*. 2013; McKenna *et al*. 2017; McLaughlin *et al*. 2016) and there are known effective alternatives for the management of agitation such as verbal de-escalation (Garriga *et al*. 2016; Hallett & Dickens 2017) to avoid the use of mechanical restraint (Gaynes *et al*. 2017; Hallett & Dickens 2017; Price *et al*. 2015; Richmond *et al*. 2012), no studies have been found that deepen the knowledge on the use of verbal de-escalation and the patients who have required the use of mechanical restraint. Examining this relationship could help deepen our knowledge regarding the factors that condition the use of de-escalation by nurses during clinical practice in mental health inpatient units and thus establish strategies for improvement to reduce or eliminate the use of mechanical restraint. The aim of this study was, therefore, to examine the relationship between the use of verbal de-escalation among nurses and the clinical profile of patients who ultimately receive mechanical restraint at an acute mental health unit.

METHODS

Design

To address the research aim, a retrospective cohort study was performed of patients who had required mechanical restraint.

Study setting and participants

The study was carried out at a mental health unit of a tertiary-level general hospital serving a total population of 540 000 inhabitants in the urban area of the city of Barcelona. The mental health unit is a closed facility for the care of patients in the acute phase of their mental illness. It has 24 beds distributed in 13 ensuite rooms (11 double and two single) and one isolation room. The unit is controlled by a video surveillance system, with exclusive viewing function, to ensure the safety of the users. The patient–nurse ratio for this unit is 8, with 12 in the night shift. The nurses are

accompanied by at least one auxiliary health personnel and one orderly in each work shift.

Data collection

Data were extracted from the unit's computerized medical records from 1 January 2012 to 31 December 2018. The following variables were extracted from patient chart records: sociodemographic factors including age (years) and sex (male/female), clinical factors including the number of days since admission when mechanical restraint took place, the diagnosis (schizophrenia/psychotic disorder, mania, personality disorder/substance use disorder, depression, and other) according to ICD-10, substance use (yes/no), date, time and reason for restraint (physical aggression against others/agitation, disorganization/restlessness, risk of self-injury, and other), previous mechanical restraint (yes/no), and pharmacological restraint (yes/no). The use of verbal de-escalation collected dichotomously (yes/no) was the dependent variable based on the admission case log where nurses noted whether this technique was performed in the attempt to manage cases of escalation of agitation.

Data analysis

The means and frequencies of all variables were calculated. Bivariate analyses were performed using χ^2, Fisher's exact test, or Student's *t*-test to examine differences in clinical and sociodemographic variables with the use of verbal de-escalation. Subsequently, based on clinical experience and theoretical rationale, all sociodemographic and clinical variables associated with the use of de-escalation were simultaneously entered as covariates in a multivariate logistic regression. A confidence level of 95% was used. To perform the analysis, the SPSS 27 software was used (IBM, Chicago, IL).

ETHICAL CONSIDERATIONS

The study obtained approval from the Ethics Committee of the institution (Reg. HCB/2019/0012).

RESULTS

In total, 493 episodes of mechanical restraint were recorded, of which 59.8% of the cases were men. The mean age was 40.72 years (SD = 17.3), and the mean number of days from hospitalization until the episode occurred was 6.6 (SD = 10.8). The most frequent diagnosis of the restrained subjects was schizophrenia or psychotic disorders, representing over 40% of the cases ($n = 198$). The most reported reason for restraint was physical aggression against others or agitation with 52.1% of the total ($n = 257$). In over 60% of the episodes recorded during the eight years of study ($n = 300$), the patient had required restraint on some other past occasion, and in 42.4% of the cases ($n = 209$), the patient had a history of substance abuse. Almost 80% of the cases ($n = 383$) had received pharmacological treatment prior to the episode for which mechanical immobilization was required (Table 1).

Table 1 shows the differences in the use of verbal de-escalation according to sociodemographic and clinical variables. Verbal de-escalation was not performed in over 40% of all mechanical restraint episodes ($n = 204$). The mean length of stay in the mechanical restraint episodes in which verbal de-escalation was not performed was almost four days shorter than those in which the intervention was performed ($t = 3.75$; $P < 0.0001$). While no differences were observed by age or gender, the diagnosis of patients who did not receive verbal de-escalation was significantly higher in those with schizophrenia or other psychotic disorders ($\chi^2 = 13.83$; $P = 0.007$). No differences in the use of de-escalation were found either in relation to the reason for restraint or to the existence of substance abuse. Conversely, those patients who had been previously restrained in the hospitalization unit studied ($\chi^2 = 18.79$; $P < 0.001$) and those who had been previously administered pharmacological treatment ($\chi^2 = 18.31$; $P < 0.001$) did have a significantly higher use of de-escalation.

To examine whether the use of verbal de-escalation could be explained by clinical and sociodemographic factors, a logistic regression model was constructed that adjusted for age, number of days of admission, sex, administration of premedication, substance abuse, previous restraint episode, four dummy variables for diagnosis, and reason for mechanical restraint with three dummy variables (Table 2).

In this case, the variables associated with the use of verbal de-escalation by nurses in episodes of mechanical restraint were early administration of medication (adjusted OR: 2.55, 95% CI: 1.59–4.06) and the patient having had a previous episode of mechanical restraint (adjusted OR: 2.04, 95% CI: 1.37–3.04). Also, a greater number of days of hospitalization at the time of the episode was associated with the use of de-escalation by the nurses (adjusted OR: 1.03, 95% CI: 1.01–1.06).

TABLE 1 *Use of verbal de-escalation and characteristics of episodes that received mechanical restraint*

Variable (n = 493)	N = 493 Mean (SD)	Verbal de-escalation YES n = 289 Mean (SD)	Verbal de-escalation NO n = 204 Mean (SD)	P value
Age	40.72 (17.28)	41.70 (16.6)	39.35 (18.1)	0.138
Number of days of admission	6.62 (10.79)	8.10 (11.2)	4.52 (9.7)	<0.0001
	n (%)	n (%)	n (%)	P value
Gender				
Male	295 (59.8)	166 (56.3)	129 (43.7)	0.225
Female	198 (40.2)	123 (62.1)	75 (37.9)	
Diagnosis				
Schizophrenia/ psychotic disorder	198 (40.2)	98 (49.5)	100 (50.5)	0.007
Maniac	159 (32.3)	105 (66.0)	54 (34.0)	
Personality Disorder/ substance use Disorder	87 (17.6)	59 (67.8)	28 (32.2)	
Depressive	17 (3.4)	10 (58.8)	7 (41.2)	
Others	32 (6.5)	17 (53.1)	15 (46.9)	
Substance abuse				
Yes	209 (42.4)	123 (58.9)	86 (41.1)	0.929
No	284 (57.6)	166 (58.6)	118 (41.5)	
Reason for MR				
Physical aggression against others/agitation	257 (52.1)	152 (59.1)	105 (40.9)	0.832
Disorganization	192 (38.9)	114 (59.4)	78 (40.6)	
Risk of self-harm	26 (5.3)	14 (53.8)	12 (46.2)	
Other	18 (3.7)	9 (50.0)	9 (50.0)	
Previous episode of MR				
Yes	300 (60.9)	199 (66.3)	101 (33.7)	<0.0001
No	192 (38.9)	89 (46.4)	103 (53.6)	
Pre-medication administration				
Yes	383 (77.7)	244 (63.7)	139 (36.3)	<0.0001
No	110 (22.3)	45 (40.9)	65 (59.1)	

Abbreviations: MR, mechanical restraintSD, standard deviation.

DISCUSSION

This study aimed to examine the relationship between the previous use of verbal de-escalation by nurses and the clinical profile of patients who have received mechanical restraint in a mental health inpatient unit. In this regard, the main finding was that in over 40% of patients who had required the use of mechanical restraint during the study period, no previous verbal de-escalation attempts were used. In contrast, pharmacological restraint had been used as a tool to try to avoid the use of mechanical restraint in over 80% of the cases. The failure to use verbal de-escalation in our results was very high; this finding could be explained in part by incomplete or inadequate nursing records in the patients' clinical notes, or records based more on the biomedical model than on nurse-patient interactions (Buus & Hamilton 2016; Myklebust *et al*. 2018). It could also be due to factors identified by patients in the teams, such as lack of staff reflection on the culture and practice of de-escalation or the need to assert dominance over patients (Price *et al*. 2018).

As in other studies, the profile of the patient who underwent mechanical restraint was higher in men than in women (Al-Maraira & Hayajneh 2019; Guzman-Parra *et al*. 2020; Knutzen *et al*. 2011; Lantta *et al*. 2016; Lavelle *et al*. 2016; Lykke *et al*. 2020) and the mean age was around 40 years old (Guzman-Parra *et al*. 2020; Jury *et al*. 2019; Lantta *et al*. 2016; Lykke *et al*. 2020). The median number of days from hospitalization to the episode that led to the use of mechanical restraint was around day six (Bullock *et al*. 2014), and physical aggression against others or agitation were the most reported reasons for restraint (Bullock *et al*. 2014; Guzman-Parra *et al*. 2020; Iozzino *et al*. 2015; Lykke *et al*. 2020). Furthermore, the most frequent diagnosis was schizophrenia (Guzman-Parra *et al*. 2020; Iozzino *et al*. 2015; Knutzen *et al*. 2013; McLaughlin *et al*. 2016).

In relation to the use of de-escalation, it should be noted that the results indicate that nurses used verbal de-escalation to a lesser extent in those patients who had not previously undergone mechanical restraint and who were not administered medication to prevent agitation. In fact, these patients were restrained earlier during their hospitalization period. This finding confirms that the risk of restraint is higher during the first days of admission (Pérez-Revuelta *et al*. 2021); consequently, this justifies how important it is to establish a good nurse–patient therapeutic relationship as early as possible and thus be able to perform verbal de-escalation in a timely manner in order to avoid mechanical restraint (Kuivalainen *et al*. 2017).

Likewise, the results indicate that nurses performed verbal de-escalation to a lesser extent in patients with schizophrenia or other psychotic disorders. In fact, it is widely known that patients with these diagnoses have a higher rate of agitation and restraint (Guzman-Parra *et al*. 2020; Knutzen *et al*. 2013; Lykke *et al*. 2020). However, this result is striking since, despite being a known fact, it is apparently not being considered for a closer monitoring of the possible prodromes of these

TABLE 2 *Unadjusted and adjusted associations (odds ratio) for the use of verbal de-escalation in mechanical restraint episodes* (N = *493*)

Variable	Use of verbal de-escalation versus non-use			
	Unadjusted OR (95% CI)	*P*-value	Adjusted OR (95% CI)	*P*-value
Age	1.01 (0.99–1.02)	0.138	1.02 (0.99–1.01)	0.730
Number of days of admission	1.04 (1.02–1.06)	<0.001	1.03 (1.01–1.06)	**0.002**
Gender (male)	0.78 (0.54–1.13)	0.196	0.81 (0.53–1.22)	0.308
Pre-medication administration (Yes)	2.53 (1.64–3.91)	<0.001	2.55 (1.59–4.06)	**<0.001**
Substance abuse (Yes)	0.98 (0.68–1.41)	0.929	1.02 (0.63–1.66)	0.917
Previous restraint episode (Yes)	2.25 (1.56–3.27)	<0.001	2.04 (1.37–3.04)	**<0.001**
Disorder_dummy (Schizophrenia/psychotic disorder)	0.53 (0.37–0.77)	<0.001	1.19 (0.52–2.70)	0.685
Disorder_dummy (Maniac)	1.59 (1.07–2.34)	0.021	2.24 (0.96–5.22)	0.062
Disorder_dummy (Depressive)	1.00 (0.37–2.70)	0.986	1.45 (0.38–5.67)	0.577
Disorder_dummy (Personality Disorder/Substance Use Disorder)	1.61 (0.98–2.63)	0.056	2.54 (0.98–6.58)	0.054
Reason for restraint_dummy (physical aggression against others/agitation)	1.05 (0.73–1.50)	0.806	1.40 (0.51–3.90)	0.510
Reason for restraint_dummy (disorganization)	1.05 (0.73–1.52)	0.786	1.33 (0.46–3.83)	0.598
Reason for restraint_dummy (risk of self-harm)	0.81 (0.37–1.80)	0.612	1.12 (0.30–4.15)	0.870

Abbreviations: CI, confidence interval; OR, odds ratio.
Bold indicates statistically significant values.

patients. This would indicate that further professional and possibly environmental interventions are needed, as nurses may be influenced by aspects such as lack of experience or training, fear, and perceptions of lack of alternative methods for maintaining safety or unsuitable physical environments within the units (Brophy *et al*. 2016; Cusack *et al*. 2016; Muir-Cochrane *et al*. 2018; Wilson *et al*. 2017).

Furthermore, no differences were found in the use of de-escalation by the nurses in relation to the reason for restraint or the existence of substance abuse. However, those patients who had been previously restrained, either in the same admission or in previous ones, and those who had been administered pharmacological treatment when prodromes of verbal agitation were observed, showed a significantly greater use of de-escalation. This suggests that nurses have been able to identify some of the factors that are usually present in agitated patients and, therefore, treat the presenting symptoms with special emphasis to try to avoid the escalation of agitation (Guzman-Parra *et al*. 2020). The fact that these patients ultimately required the use of mechanical restraint affirms that verbal de-escalation is a useful technique in the early treatment of agitation symptoms (Fernández-Costa *et al*. 2020; Hallett & Dickens 2017; Kuivalainen *et al*. 2017; Price *et al*. 2015, 2018); however, this does not make it a surefire technique to deactivate agitation (Kuivalainen *et al*. 2017). This could also be due to the fact that not all nurses are knowledgeable on how and when to perform verbal de-escalation and should be provided with assistance in developing and maintaining a good therapeutic relationship with the patient admitted to the mental health unit (Hartley *et al*. 2020). Knowledge of the most useful techniques, for example those defined as domains by previous authors (Richmond *et al*. 2012) and knowing when to apply them based on the agitation escalation cycle, will be a determining factor in the success of verbal de-escalation.

Limitations

This retrospective cohort study was conducted based on the analysis of nursing records collected from patients' medical histories; therefore, it is not possible to determine the extent to which the reported data reflect all prolonged use of verbal de-escalation in episodes ultimately requiring mechanical restraint intervention in the adult acute mental health unit of the hospital under study during the given time period. Following the line of all retrospective cohort studies, the research focused on the analysis of the collected variables, with the purpose of monitoring individual and contextual factors surrounding the use of these restrictive interventions. However, two of the main strengths of our study is that we have data from an eight-year period, and we have collected a large number of variables. This allows us to quite accurately describe and understand the context of the use of mechanical restraint in our setting over an extended period.

CONCLUSIONS

This study has identified the main factors associated with the use of verbal de-escalation by nurses in the case of patients who require the use of mechanical restraint in a mental health inpatient unit. The results indicate that almost half of the patients who undergo mechanical restraint do not benefit from the use of prior verbal de-escalation. In addition, verbal de-escalation is not normally used in those patients who are eventually contained and for whom there is no known history of the use of mechanical restraint and who are in their first days of admission.

RELEVANCE FOR CLINICAL PRACTICE

The results of this study can help nurses both identify individuals at risk of being mechanically restrained and facilitate the implementation of strategies to reduce the use of mechanical restraint, such as verbal de-escalation. The findings of this study point to the importance of establishing an adequate therapeutic relationship as early as possible, since knowing the patient and their possible reactions facilitates the nurse's intervention and the use of verbal de-escalation in an effort to avoid the use of restrictive techniques.

Further research is needed to understand the phenomenon of the use of verbal de-escalation by nurses in clinical practice. Thus, to determine whether nurses are effectively trained and what contextual factors condition the use of these methods. Moreover, the content and quality of nursing records should be examined. In this sense, the use of qualitative approaches aimed at the people directly involved, both nurses and patients, would offer new knowledge in this important field for nurses in mental health units.

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