

Title

Factors influencing critical care nurses' intentions to use physical restraints adopting the Theory of Planned Behaviour: a cross-sectional multicentre study

Running head

Critical care nurses' intentions to use restraints and influencing factors

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ABSTRACT

Background: Studies addressing critical care nurses' practices regarding physical restraints have focused on individual nurses' knowledge and attitudes but lack the understanding of other social influences that could affect nurses' intentions to use them.

Objective: To determine critical care nurses' attitudes, subjective norms, perceived behavioural control, and intentions to use physical restraints in intubated patients and the relationship between them and socio-demographic, professional, and contextual factors using a survey approach.

Methods: A cross-sectional, multicentre study was conducted in a convenience sample of 12 intensive care units from 8 hospitals in Spain (n=354). The data were obtained using the Physical Restraint-Theory of Planned Behaviour questionnaire and a researcher-developed survey to collect structural and clinical data from each unit. Multilevel model analysis was used.

Results: Critical care nurses showed a moderate level of intention to use physical restraints 12.52(SD=3.81) [3-21]. More than a half (52%) agreed restraints were safe. The highest perceived barrier against physical restraint use was patient cooperation. Although nurses did not feel that others expected them to use restraints, they did not perceive high levels of disapproval of such practice. Nurses who had received previous training on restraints and who worked in units with a flexible family visitation policy, an informed consent form for restraint use, analgo-sedation and restraint protocols, and nurse-driven analgo-sedation management reported lower levels of intention to use restraints. Working in smaller units (beta -1.81 [95%CI: -0.18; -3.44]) and in units with a consent form for restraint use (beta -4.82 [95%CI: -2.80; -6.85]) were the variables with the highest impact on nurses' intentions to use restraints.

Conclusions: Critical care nurses' intentions to use physical restraints is moderate and is influenced by intrapersonal, patient and contextual factors. Nurses who work in units with organisational policies and alternatives to restraints demonstrated lower levels of intention to use them.

Keywords: Attitude, Behaviour, Intensive Care Units, Intention, Critical Care Nurses, Restraint Physical.

Introduction

The use of physical restraints in intensive care units (ICUs) is a low-care nursing intervention that causes physical and psychological harm to patients (1). Several studies have associated their use with skin, vascular, and nerve injuries (2,3), increased risk of nosocomial infection (4), major agitation (5), delirium (6), higher rates of unplanned self-extubation (4,7,8), higher use of psychotropic medications (7,9), and longer hospital stay (3,4). In addition, physical restraint use affects the patients' autonomy and dignity to the extent that, in some countries, physical restraint use is considered a deprivation of liberty and a form of imprisonment (10).

In ICUs, nurses justify the use of wrist restraints, mittens, or belts to prevent the unplanned self-removal of life-support devices or to control patients exhibiting disruptive behaviours, without a clear and evidence-based rationale of their efficacy and safety (11,12). The prevalence of restraint use in critical care settings varies greatly worldwide, ranging from 0% to 100% (11). Differences in restraint practices have been attributed to analgo-sedation practices, staffing patterns, nurses' knowledge about physical restraints, cultural norms and national regulations (11,13-15). In Spain, there is currently no national or regional specific legislation regarding physical restraint use in acute and critical care. Following general legislation, a written consent form must be sought in situations that can cause harm to patients, such as physical restraints. Moreover, recommendations from national critical care societies encourage nurses to '*not use physical restraints*' (16), to have a doctor's prescription and to decide their application in partnership with the multidisciplinary team (17), according to international guidelines and recommendations (10,18). However, a recent nationwide multicentre study **conducted in Spain** reported that 21.3% of ICU patients were on restraints. Only 24.7% of them were documented. Regarding ICUs, 3% had a written consent form for physical restraint use, 16.5% had a specific protocol for physical restraint use in ICU patients and 39% required a doctor's prescription (19).

Previous research has revealed that high rates of physical restraint use have been related to older patients (8), patients with a history of neurologic or psychiatric conditions (7,20), patients with agitation, delirium or coma (6,20,21), patients who smoke (22), patients on mechanical ventilation (11,20,21), patients with a higher number of medical devices (8), and a higher use of psychotropic medications (7,20,23). Other contributing factors were the analgo-sedation administration method (7,23,24), a lack

of nurse's knowledge about restraints (25,26), favourable attitudes towards the use of restraints (25,27), a low nurse-to-patient ratio (11), the working shift (3,21,28), or large ICUs. On the other hand, the treating unit (3,20,29), early pharmacologic treatment of pain and delirium, (29) and early mobility (30) have been associated with lower physical restraint use rates.

Studies about physical restraint use in the ICU have been primarily descriptive without an empirically supported theoretical basis. Some studies have proposed multi-component interventions as effective approaches to address behaviour change (31–33). Hence, the use of social theories, such as the theory of planned behaviour (TPB), can help to explore this issue in depth, as other social influences (social pressure, opportunities, cooperation of others) that could influence ICU nurses' intentions to use physical restraints are included in the analysis. The TPB hypothesises that individuals make behavioural decisions based on careful considerations of internal and environmental factors. According to the TPB, the intention to perform an action is the main predictor of a behaviour. In turn, behavioural intention is influenced by the attitude towards the behaviour (person's overall evaluation of the behaviour and its consequences), subjective norms (a person's perception of social pressure to perform a behaviour or not), and perceived behavioural control (the extent to which a person feels able to enact the behaviour). Furthermore, these three dimensions are indirectly influenced by behavioural, normative, and control beliefs (Figure 1) (34,35). Following this proposal, the objective of the study was to determine ICU nurses' attitudes, subjective norms, perceived behavioural control, and intentions to use physical restraints in intubated patients and the relationship between them and socio-demographic, professional, and contextual factors adopting the TPB.

Methods

Study design

A cross-sectional, multicentre study was conducted in a convenience sample of 12 ICUs (8 general, 2 cardiological, 1 surgical, and 1 burn ICU) from 8 acute care hospitals (5 public and 3 private) in three regions in Spain, from October to December 2017 (Table 1). Clinical Ethics Committees at 5 hospitals approved the study (PR183/15). The other centres waived the need to obtain permission to conduct the study as it had approval from other centres.

Participants

All ICU nurses (n=360) within the units included, hired as regular staff with over one year of professional experience were invited to participate in the study, and 354 initially agreed to participate. A designated contact at each hospital delivered paper copies of the questionnaire to participating nurses with the instructions to fill in the questionnaire. An information sheet explaining the purpose of the study was attached. Nurses had 1 month to answer the questionnaire. Once the questionnaires were completed, the participants returned them to a designated contact person at each hospital or were kept inside sealed boxes specifically supplied for this purpose. Participants who returned the completed questionnaire were considered to have given informed consent.

Data collection

Two instruments were used for data collection: the *Physical Restraint Theory of Planned Behaviour* (PR-TPB) questionnaire to address ICU nurses' attitudes, subjective norms, perceived behavioural control, and intentions to use physical restraints in intubated patients (36,37), and a researcher-developed survey to collect structural and clinical data from each unit.

1. The Physical Restraint Theory of Planned Behaviour questionnaire

The PR-TPB was organised into 5 sections: 4 subscales according to the theoretical constructs of the TPB (48 items) and a last 9-item section to gather socio-demographic and professional data of the participants (Supplementary file 1-2). The PR-TPB questionnaire was previously validated with acceptable reliability for all direct and indirect constructs and good content validity. Confirmatory factor analysis indicated satisfactory fit indices for factorial structure according to the TPB: Chi-squared=556.574; df=369; $p<0.001$; Chi-squared/df=1.51; CFI=0.93; TLI=0.92; RMSEA=0.04 SRMR=0.06 (36).

Section 1. Attitude subscale

This subscale was divided into direct attitude and behavioural beliefs.

Direct attitude was assessed with a 4-item scale using semantic bipolar adjectives. The nurses were asked to rate their opinion on using restraints as *unsafe/safe*, *unnecessary/necessary*, *harmful/beneficial*, and *unacceptable/acceptable*, using a 7-point scale for each one (range: 4-28). Cronbach's alpha=0.81. Behavioural beliefs were evaluated through 9 multi-composite items following the formula *behavioural belief x outcome evaluation*. The 9 belief statements were graded on a 7-point Likert scale (1=*strongly disagree*; 7=*strongly agree*; as well as the 9 outcome evaluation items (1=*extremely undesirable*; 7=*extremely desirable*). Statements about disadvantages were reverse scored (range: 9 to 441). Cronbach's alpha=0.78. For both components, lower values indicated that participants had unfavourable attitudes towards physical restraint use.

Section 2. Subjective norm subscale

This subscale was divided into 2 different components: direct subjective norm and normative beliefs. To assess direct nurses' perceptions of social pressure towards physical restraint use, 2 general statements, following the TPB guidelines, were developed. The items were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*) (range: 2-14). Cronbach's alpha=0.64. The normative belief component consisted of 4 multi-composite items following the formula *normative belief x motivation to comply*. The belief statements were graded on a 7-point Likert scale (1=*strongly disagree*; 7=*strongly agree*), and the motivation to comply items were rated from 1 (*not at all*) to 7 (*very much*). The belief statements were reverse scored (range: 4-196). Cronbach's alpha=0.88. A higher mean score indicated that nurses perceived that others expected them to use physical restraints or that the behaviour was approved of.

Section 3. Perceived behavioural control subscale

This subscale was divided into 2 factors: direct perceived behavioural control and control beliefs. To assess direct perceived behavioural control, 3 items assessing nurses' self-efficacy and control of physical restraint use in intubated patients were included. Each item was evaluated on a 7-point Likert scale (1=*strongly disagree*; 7=*strongly agree*) (range 3-21). Cronbach's alpha=0.68.

Control beliefs were assessed using 5 multi-composite items following the formula *control belief x power of control*. The 5 control beliefs and the 5 power of control statements were graded on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Belief statements were reverse scored (range: 5-245). Cronbach's alpha=0.72.

For both measures, lower values indicated that nurses had less self-efficacy and control of the situation.

Section 4. Intention subscale

Behavioural intention was assessed using 3 simulated scenarios created according to the most common situations reported in the literature in which ICU nurses place physical restraints on intubated patients: a cooperative intubated post-surgical patient with light sedation; a tracheostomised restless patient without agitation but with a history of psychoactive substance use; and an intubated patient with hyperactive delirium. For each scenario, nurses were asked to rate their decision using a 7-point Likert scale (1=*in no case*; 7=*in all cases*) (range: 3-21). A higher mean score represented a greater intention to use physical restraints. Cronbach's alpha=0.60.

Section 5. Socio-demographic and professional information

This last section included information from participants such as the following: age, gender, academic degree, years of clinical experience in the ICU, working unit, work shift, type of contract, and previous training in physical restraint use.

2. Context-related factors survey

In the second data collection instrument, a designated contact collected structural and clinical questions for each unit: reference hospital, hospital type, ICU type, number of beds, nurse-to-patient ratio, family visitation policy, the person who decides to apply restraints, the presence of a physical restraint doctor's prescription, request for informed consent prior to physical restraint use, physical restraint documentation, availability of a restraint and a multidisciplinary analgo-sedation protocols, and nurses' autonomy in analgo-sedation management. Moreover, before delivering the questionnaire to nurses, the same designated contact individually examined the total number of patients admitted to the ICU and the

number of patients with restraints. Side rails were not registered as restraints as they were considered 'usual care'. This examination was unannounced.

Data analysis

Descriptive statistics, normality tests, and frequency distributions were computed to test sample characteristics and all variables under study. A bivariate analysis was performed to evaluate the relationship between the direct measures with the nurses' socio-demographic and professional data and the contextual variables of each unit. To compare continuous variables, a two-sample *t*-test or the Mann-Whitney U test was used, depending on the data distribution. A Chi-squared test and the Fischer test were used for the comparison of qualitative variables. One-way ANOVA test was applied to determine differences in mean values between more than 2 groups. For hypothesis testing, a 5% level of significance was set ($p < 0.05$). When statistical significance was reached, the effect size was calculated. Multilevel models with random intercepts at the unit level were specified to estimate the impact of contextual factors on the intention variable. The IBM SPSS program version 24.0 (Armonk, NY: IBM Corp) was used.

Results

3.1 Sample description

Of the 354 questionnaires distributed, 254 were returned and 4 were excluded due to a large amount of incomplete data, resulting in 250 participants (participation rate: 70.62%). The mean age of the participants was 36.8 (SD=9.5) years, with a mean of 10.7 (SD=8.4) years of professional experience in critical care. Most participants were female (84.8%), and 74.8% had never received previous training on physical restraint use (Table 2).

For the units included, only one hospital used physical restraints with a doctors' prescription, and 3 units had a written informed consent sheet to be signed by relatives prior to the use of physical restraints.

In those units, nurses referred to doctors concerning the patient's behaviour and the need for consent. In 3 units, physical restraint practice was not documented (Table 1).

Regarding physical restraint use, among the 120 included patients, 58 were intubated, and 14 of them (24.1%) were physically restrained at the moment of the examination. The prevalence rate varied across units, ranging from 0 to 58.3%.

3.2 Attitudes

The direct attitude mean score for critical care nurses was 18.15 (SD = 4.5) [4-28], representing a moderately favourable attitude towards using physical restraints in intubated patients. More than half of the participants moderately (45.5%) or strongly agreed (6.6%) that physical restraints were safe, and one-third moderately (28.1%) or strongly (8.5%) agreed that their use was acceptable (Table 3).

Regarding behavioural beliefs, 63.8% and 61.2% of nurses slightly to strongly agreed that physical restraints would prevent self-extubation or catheter self-removal, respectively. Almost two-thirds of participants (62.4%) slightly to strongly agreed that physical restraints provide relief for nurses when they cannot watch over the patient, and 83.6% slightly to strongly agreed that physical restraint use is higher when the patient is undergoing a weaning or an awakening trial. In relation to the disadvantages, 56% of nurses agreed that the patient became more agitated, and 57.3% slightly to strongly agreed that the use of physical restraints upsets nurses (Supplementary file 3).

3.3 Subjective norms

Mean nurses' perception of direct social pressure was 4.83 (SD=2.94) [2-14], showing that nurses did not perceive that others expected them to use restraints (Table 3). However, in terms of normative beliefs, 78.8%, 80%, and 60% of nurses slightly to strongly agreed that the nursing supervisor, doctors, or relatives, respectively, approved of the intervention. Motivation to comply with these groups of referents was higher with patients' relatives, followed by the nursing supervisor. The family was the group of referents with the highest perception of social pressure (Supplementary file 4).

3.4 Perceived behavioural control

In relation to direct perceived behavioural control, the mean score for nurses was 11.88 (SD=4.76) [3-21], indicating a neutral midpoint of self-confidence and control of the situation. Approximately one-

third of nurses moderately (20.8%) or strongly agreed (10.8%) that the decision to use physical restraints in intubated patients was easy to make, and 19% strongly agreed they felt confident in making the decision. Conversely, 16.1% and 26.5% of nurses moderately and strongly disagreed, respectively, that the decision to use physical restraints was entirely up to them (Table 3). Indirect control belief scores showed that the highest perceived barrier against physical restraint use was patient cooperation followed by the pharmacological management of the patient's agitation and family presence (Supplementary file 2).

3.5 Intention

The mean overall score of intention to use physical restraints in intubated patients was 12.52 (SD=3.81) [3-21], showing a light to moderate intention. Scores of the different simulated scenarios indicated that nurses had greater intentions to use physical restraints in patients exhibiting obvious agitation with hyperactive delirium, followed by a restless (non-agitated) tracheostomised patient, and a post-surgical patient with light sedation (Table 3).

3.6 Socio-demographic and professional variables related to nurses' direct attitudes, subjective norms, perceived behavioural control, and intentions to use physical restraints

Critical care nurses working during the morning shift reported lower intention scores to use physical restraints. Likewise, nurses who received previous physical restraint courses exhibited significantly lower intention scores to use restraints than those who received no training ($p=0.03$; d Cohen=0.32 [0.03;0.61]). Professional variables significantly related to attitude, subjective norms and perceived behavioural control are displayed in Table 2.

3.7 Structural and clinical variables related to nurses' direct attitudes, subjective norms, perceived behavioural control, and intentions to use physical restraints

The bivariate analysis showed that nurses who worked in units with a flexible family visitation policy, an informed consent form for restraint use, and nurse-driven analgo-sedation management reported lower attitudes, subjective norms, perceived behavioural control, and intention levels to use restraints

(Table 4). Moreover, nurses from units with analgo-sedation protocols graded lower scores for subjective norms and intention to use physical restraints. A significantly lower level of intention was observed in nurses who worked in units with physical restraint protocols than those who did not ($p=0.05$, $d\text{Cohen}=0.36 [0.11;0.62]$).

When grouping the results by units, units that had an informed consent form for physical restraint use (beta -4.82 [95%CI: -2.80; -6.85]) and units with less than 12 beds (beta -1.81 [95%CI: -0.18; -3.44]) were the variables that significantly modified the intention score.

Discussion

This study shows that ICU nurses' level of intention to use physical restraints was moderate and was determined by intrapersonal, patient and environmental factors (38).

Regarding nurses' attitudes, although nurses agreed on the hazards of using restraints, their confidence in physical restraints as safety equipment to avoid unplanned removal of life-support devices and to provide professional safety for nurses remained high (39,40). This finding might be due to the prioritisation of the consequences derived from patient self-extubation and the paucity of RCTs, providing strong evidence for the lack of effectiveness of using physical restraints for this purpose (12,41). A more favourable attitude towards using physical restraints was particularly relevant in the afternoon and night shifts and in nurses with temporary contracts. This result might reflect two considerations: first, in these shifts, there are fewer nurses, and they might resort to using physical restraints as a substitute prevention intervention; and second, the involvement in nursing care and organisational decisions by nurses with temporary contracts might be lower than nurses with full and part-time contracts (21,42). However, a relationship between attitudes and years of clinical experience was not found, as was reported in previous studies (43).

Regarding subjective norms, nurses did not perceive that others expected them to use restraints, but when they did use them, they faced no strong disapproval. This phenomenon could reinforce the results about perceived behavioural control when nurses stated their own confidence and ease in making the decision to use physical restraints. These findings support the idea that nurses recognised themselves as the primary decision-makers in the use of physical restraints (41,42). However, both a low perception

of disapproval and a high perception of self-efficacy could be considered barriers for the uptake of current guideline recommendations to minimise the use of physical restraints (44).

A lower level of nurses' intentions to use physical restraints was observed in nurses who received previous training on physical restraint use (25,27) and in **nurses who worked** in units that provided 'toolkits' to manage analgo-sedation doses, alternatives to restraints, and instruments to improve team-shared decisions. In a survey comparing sedation practices across Europe, Nordic nurses reported significantly smaller ICUs, higher staffing ratios, greater inter-professional collaboration and lower use of restraints compared to non-Nordic nurses (15). **In our context, nurse-to-patient ratios ranged from 1:2 to 1:4 and ICU nurses frequently cite staff-shortages and high workload as enablers of PR use (37). This rationale should be taken into consideration given that, in medical-surgical units, nursing skill mix was inversely correlated with restraint use (45).**

Nurses perceived that the patient's cooperation, the pharmacological management of agitation and family presence were control factors that may reduce physical restraint use (46). In this regard, a recent study reported that the complete performance of the ABCDEF bundle was associated with greater restraint-free care (33). Similar results were reported by Shehaby et al. (47) showing a reduction in physical restraint use in more cooperative patients treated with dexmedetomidine and by Burry et al. (24) with the use of a sedation protocol. Moreover, the use of analgesics has been documented as a protective factor against restraints (21,29). **In the literature, relatives are identified both as a barrier and a trigger of patient's agitation (42,48). Future research should probably explore the effects of both family presence and nurses' management of the patients' analgo-sedation on physical restraint use.**

From our perspective, having clear policies regarding this issue and providing companionship at the bedside could influence nurses' **intentions because they would feel more support when caring for agitated patients.**

Limitations

First, the selection of a convenience sample from hospitals limits the generalisability of the results. Second, the correlation between nurses' level of intention and actual behaviour has not been evaluated, an aspect that limits the practical application of the results and that is reserved for future research. Third,

the relationship between nurses' intentions and the characteristics of ICU patients cannot be established because this information was not available for the study. Fourth, the relationship between nurses' intention and nurse-to-patient ratio cannot be demonstrated due to a high number of participants on a rotation shift. Finally, although relationships between variables have been established, causality cannot be drawn due to a non-experimental design.

Conclusion

Critical care nurses have moderately favourable attitudes towards restraints, low perception of social pressure, and neutral perception of control of the behaviour. Their intentions to use physical restraints is moderate and is influenced by intrapersonal, patient and contextual factors. Nurses with previous training on restraints and who work in units with organisational policies and alternatives to restraints demonstrated lower levels of intention to use them.

The identification of factors that influence nurses' intentions to use physical restraints can help in tailoring multi-component interventions that should include, in addition to educational programmes, persuasion techniques, strategies gaining active commitment from other health-care professionals, clear policies from organisations, an increase of nurses' courage against the behaviour, and alternatives to minimise physical restraint use. Implementation research might be useful in designing quality improvement projects and for monitoring them. Future studies should demonstrate whether tailoring multi-component interventions will change physical restraint practice.

OTHER INFORMATION

Ethical considerations

Clinical Ethics Committees at 5 hospitals approved the study (PR183/15). The other centres waived the need to obtain permission to conduct the study as it had approval from other centres. Nurses were informed that the anonymity and confidentiality of their answers were guaranteed. If an individual answered the questionnaire, participant consent was deemed as given. Only the researchers had access to the data.

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Figure captions

Figure 1. Theory of Planned Behaviour (Ajzen, 1991)

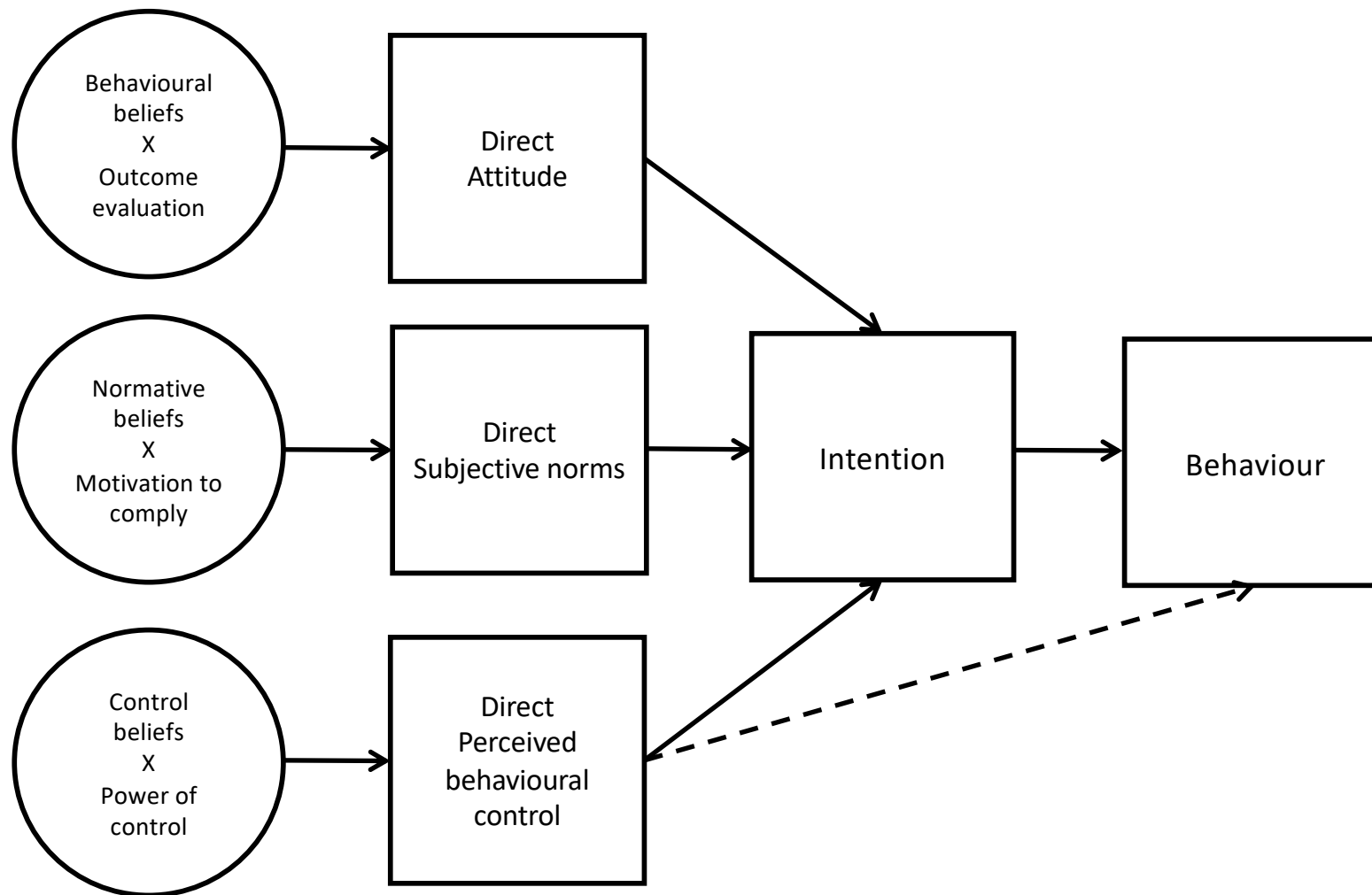


Figure 1. Theory of Planned Behaviour (Ajzen, 1991)

Table 1: Hospital, patient and unit characteristics

Hospital	n (%)	Hospital type	Unit type	N° of beds	Patients with PR/ Patients assessed	Intubated patients with PR/ Intubated patients assessed	Nurse-to-patient ratio	Family policy	PR protocol (ICU patients)	Informed consent form request for PR use	PR prescription and documentation		Analgo-sedation protocol	Nurses' autonomy in managing analgo-sedation
											P	D		
Hospital 1 Nurses employed that met inclusion criteria (n=60)	42	Public University hospital	General	18	7/16	7/12	1:2/1:3 (NS)	Restricted	No	No	No	Yes	No	Yes, sometimes
	(70%)		Burns unit	6	0/4	0	1:2/1:3(NS)	Restricted	No	No	No	Yes	No	Yes, sometimes
Hospital 2 (n=90)	72	Public University hospital	General	14	1/9	1/5	1:2	Flexible	Yes	Yes, verbal and written Yes, verbal and written	No	Yes	Yes	Yes, always
	(80%)		Coronary	15	0/14	0/2	1:3	Flexible	Yes		No	Yes	Yes	Yes, sometimes
Hospital 3 (n=30)	25	Public Regional university-affiliated	General	14	1/11	1/4	1:2 (MS) 1:3(AS;NS)	Restricted	No	No	No	No	No	No, never
	(83.3%)													
Hospital 4 (n=25)	21	Private University affiliated	General	12	0/8	0/3	1:2	Flexible	No	No	Yes	Yes	Yes	No, never
	(84%)													
Hospital 5 (n=55)	25	Public Regional university-affiliated	General	16	3/14	3/11	1:2/1:3(NS)	Flexible	No	Yes, verbal and written	No	Yes	Yes	Yes, sometimes
	(45.4%)													
Hospital 6 (n=8)	7	Private University affiliated	General	8	1/6	1/2	1:4	Flexible	No	No	No	Yes	No	No, never
	(87.5%)													
Hospital 7 (n=6)	6	Private University affiliated	General	6	0/5	0/3	1:3	Flexible	No	Yes, only verbal	No	No	No	Yes, sometimes
	(75%)													
Hospital 8 (n=86)	52	Public University hospital	General	18	1/16	1/14	1:2	Restricted	Yes	No	No	Yes	Yes	No, never
			Surgical	9	0/8	0/2	1:2/1:3(NS)	Restricted	No	No	No	No	No	No, never
	(60.5%)		Coronary	8	0/9	0	1:3	Restricted	Yes	No	No	Yes	No	No, never
Total n=360	250				14/120	14/58								

MS: morning shift; AS: afternoon shift; NS: night shift; P: prescription; D: documentation; PR: physical restraints

Table 2. Characteristics of the sample and correlation between direct TPB predictors and socio-demographic and professional factors

Variables				Attitude			Subjective norms			PBC			Intention		
	Mean (SD)	n 250	(%)	n 234	Mean (SD)	p-value	n 250	Mean (SD)	p-value	n 249	Mean (SD)	p-value	n 247	Mean (SD)	p-value
Age (n=244)	36.8 (9.5)														
▪ 22-29		67	27.5												
▪ 30-35		61	25.0												
▪ 36-43		56	22.9												
▪ 44-61		60	24.6												
Gender															
▪ Male		38	15.2												
▪ Female		212	84.8												
Academic degree									0.01						
▪ Diploma in nursing		105	42.0				105	4.42 (2.83)	F						
▪ Bachelor's in nursing		35	14.0				35	6.29 (3.36)	cohen						
▪ Postgraduate course		71	28.4				71	4.63 (2.65)	=0.22						
▪ Master		31	12.4				31	4.71 (2.77)							
▪ Other		8	3.2				8	6.00 (4.00)							
Years of professional experience (n=247)	10.7 (8.4)								0.05			0.05			
▪ 1-10		143	57.9				143	5.28 (3.12)	F		142	11.44 (4.63)	F		
▪ 11-20		71	28.7				71	3.93 (2.35)	cohen		71	11.97 (4.51)	cohen		
▪ 21-40		33	13.4				33	4.48 (2.72)	=0.21		33	13.70 (5.32)	=0.16		
Contract						0.02			0.007						
▪ Full time		103	41.2	97	17.20 (4.89)	F	103	4.41 (2.85)	F						
▪ Full time (non-permanent)		61	24.4	57	18.25 (3.97)	cohen	61	4.66 (2.83)	cohen						
▪ Part time (weekends)		25	10.0	23	18.48 (4.47)	=0.27	25	4.12 (2.30)	=0.24						
▪ Temporary		57	22.8	54	19.93 (3.78)		57	5.93 (3.08)							
▪ Other		4	1.6	3	13.00 (5.57)		4	7.00 (4.76)							
Shift						0.01						<0.001			0.05
▪ Morning shift		44	17.6	40	16.35 (5.11)	F				44	12.30 (4.50)	F	43	11.91 (3.96)	F
▪ Afternoon shift		42	16.8	38	19.34 (3.75)	cohen				41	14.44 (5.11)	cohen	42	13.67 (4.35)	cohen
▪ Night shift		48	19.2	46	19.83 (3.78)	=0.27				48	12.63 (4.33)	=0.30	48	13.13 (3.20)	=0.18
▪ Rotation		116	46.4	110	17.70 (4.49)					116	10.50 (4.48)		114	12.08 (3.70)	
Previous PR training courses															0.03
▪ Yes		63	25.2										63	11.62 (4.08)	d
▪ No/No answer		187	74.8										184	12.83 (3.68)	cohen
															=0.32

PBC: perceived behavioural control; PR: Physical restraint

Table 3. Descriptive statistics of nurses' direct attitudes, subjective norms, PBC and intention

Attitude	n	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	Mean (SD)
1. In my opinion, the use of PR in intubated patients is <i>unsafe/safe</i>	242	1.7	3.7	8.3	12.4	21.9	45.5	6.6	5.12 (1.33)
2. In my opinion, the use of PR in intubated patients is <i>unnecessary/necessary</i>	241	2.5	6.6	13.3	26.6	22.8	25.3	2.9	4.48 (1.38)
3. In my opinion, the use of PR in intubated patients is <i>harmful/beneficial</i>	236	2.1	11.9	20.8	28.4	20.3	14.8	1.7	4.04 (1.35)
4. In my opinion, the use of PR in intubated patients is <i>unacceptable/acceptable</i>	235	3.4	9.4	8.5	25.5	16.6	28.1	8.5	4.61 (1.57)
Direct attitude (range: 4-28)	234								18.15 (4.50)
Subjective norms									
1. I use PR in intubated patients, because professionals with whom I work think that they must be used	250	49.2	15.6	8.4	17.2	6.8	2.4	0.4	2.26 (1.52)
2. I am expected to use PR in intubated patients	250	48.0	14.0	4.0	15.6	7.6	6.8	4.0	2.57 (1.90)
Direct subjective norm (range:2-14)	250								4.83 (2.95)
Perceived behavioural control									
1. I am confident that I can apply PR in intubated patients if I decide to	250	16.8	9.2	7.6	12.0	13.2	22.0	19.2	4.38 (2.14)
2. It is easy for me to make the decision to apply PR in intubated patients.	250	10.8	15.6	16.4	9.6	16.0	20.8	10.8	4.10 (1.93)
3. The decision to use PR in intubated patients is entirely up to me.	249	26.5	16.1	11.2	10.0	15.7	13.3	7.2	3.41 (2.04)
Direct PBC (range: 3-21)	249								11.88 (4.76)
Intention									
1. Scenario 1: Post-surgical intubated patient with light sedation	248	28.2	24.6	12.5	6.9	10.1	10.5	7.3	3.06 (1.99)
2. Scenario 2: Restlessness tracheotomised patient (non-agitated)	247	14.6	20.6	17.4	10.5	21.5	11.7	3.6	3.53 (1.77)
3. Scenario 3: Intubated patient with agitation and hyperactive delirium	248	2.0	1.2	4.4	2.0	12.5	41.5	36.3	5.92 (1.29)
Intention (range: 3-21)	247								12.52 (3.81)

PBC: perceived behavioural control

Table 4. Correlation between direct TPB predictors and context-related factors

Variables	Attitude			Subjective norms			PBC			Intention		
	n (234)	Mean (SD)	p-value Effect size	n (250)	Mean (SD)	p-value Effect size	n (249)	Mean (SD)	p-value Effect size	n (247)	Mean (SD)	p-value Effect size
Hospital			<0.001			<0.001			<0.001			<0.001
▪ Hospital 1	39	18.05 (5.24)	F cohen=0.34	42	6.76 (3.30)	F cohen=0.33	42	10.40 (4.98)	F cohen=0.40	41	14.41 (3.87)	F cohen=0.53
▪ Hospital 2	67	17.87 (4.47)		72	4.42 (2.82)		72	10.78 (4.37))		72	10.44 (2.67)	
▪ Hospital 3	24	20.33 (3.81)		25	5.12 (2.80)		25	14.20 (4.10)		24	15.42 (3.62)	
▪ Hospital 4	19	17.37 (2.81)		21	4.86 (3.35)		20	12.25 (4.80)		21	13.57 (3.85)	
▪ Hospital 5	24	15.92 (4.36)		25	3.40 (1.71)		25	11.24 (3.70)		25	10.00 (3.00)	
▪ Hospital 6	7	15.14 (6.20)		7	4.29 (2.36)		7	10.00 (3.42)		7	11.00 (2.77)	
▪ Hospital 7	6	14.50 (3.33)		6	5.00 (3.22)		6	6.33 (2.94)		6	9.33 (3.93)	
▪ Hospital 8	48	19.88 (3.62)		52	4.42 (2.60)		52	14.52 (4.59)		51	13.96 (3.20)	
Hospital type			0.014									
▪ Private	32	16.34 (3.93)	d=0.47									
▪ Public	202	18.44 (4.52)	[0.10;0.85]									
Family policy			<0.001			0.04			<0.001			<0.001
▪ Flexible	123	17.09 (4.37)	d=0.51	131	4.31 (2.74)	d=0.37	130	10.85 (4.32)	d=0.46	131	10.84 (3.21)	d=1.06
▪ Restricted	111	19.33 (4.36)	[0.25;0.77]	119	5.39 (3.06)	[0.12;0.62]	119	13.00 (4.99)	[0.21;0.71]	116	14.42 (3.55)	[0.79;1.33]
Informed consent form for PR			0.005			0.004			<0.001			<0.001
▪ Yes	97	17.18 (4.48)	d=0.38	103	4.20 (2.64)	d=0.37	103	10.63 (4.26)	d=0.45	103	10.27 (2.81)	d=1.17
▪ No	137	18.85 (4.40)	[0.11; 1.64]	147	5.27 (3.07)	[0.11; 0.62]	146	12.75 (4.92)	[0.2; 0.71]	144	14.13 (3.62)	[0.89;1.44]
PR protocol												0.005
▪ Yes										108	11.75 (3.47)	d=0.36
▪ No										139	13.12 (3.97)	[0.11;0.62]
Analgo-sedation protocol						0.004						<0.001
▪ Yes				146	4.36 (2.75)	d=0.39				145	11.60 (3.55)	d=0.61
▪ No				104	5.48 (3.10)	[0.13;0.64]				102	13.83 (3.80)	[0.35;0.87]
Nurse's autonomy in analgo-sedation management			0.024			<0.001			<0.001			<0.001
▪ Yes, as routine	110	17.35 (4.25)	F	118	4.28 (2.75)	F	117	11.13 (4.68)	F	118	10.91 (3.21)	F
▪ Yes, sometimes	69	18.54 (4.87)	cohen=0.18	73	6.05 (3.20)	cohen=0.27	73	11.37 (5.08)	cohen=0.25	71	14.32 (4.06)	cohen=0.41
▪ No, never	55	19.27 (4.27)		59	4.41 (2.55)		59	13.98 (4.68)		58	13.60 (3.28)	

PR: Physical restraint

**INFORME DEL COMITÉ ÉTICO DE INVESTIGACIÓN CLÍNICA
SOBRE ENMIENDAS POR CAMBIO ADMINISTRATIVO
A PROYECTOS DE INVESTIGACIÓN**

El Comité Ético de Investigación Clínica del Hospital Universitari de Bellvitge, mediante el procedimiento de evaluación rápida de la documentación contemplado en las Normas de Funcionamiento Interno del Comité, ha evaluado la siguiente documentación presentada sobre el proyecto de investigación con nuestra ref. **PR183/15**, titulado:

**“ESTUDIO DE LOS FACTORES VINCULADOS A LA INTENCIÓN DE USAR
CONTENCIONES FÍSICAS EN LAS UNIDADES DE CUIDADOS INTENSIVOS”:**

- Enmienda administrativa por cambio de título. (Anterior: CONOCIMIENTOS, ACTITUDES Y PRÁCTICAS ENFERMERAS SOBRE EL USO DE CONTENCIONES FÍSICAS EN LAS UNIDADES DE CUIDADOS INTENSIVOS).

Presentada por Sra. Gemma Vía Clavero del Servicio de Medicina Intensiva del Hospital Universitari de Bellvitge, como promotora e investigador principal, ha acordado dar INFORME FAVORABLE a la documentación mencionada.

Que la composición actual del Comité Ético de Investigación Clínica es la siguiente:

Presidente	Dr. Francesc Esteve Urbano	Médico-Medicina Intensiva
Vicepresidente	Dra. Pilar Hereu Boher	Médico-Farmacología Clínica
Secretario	Dr. Enric Sospedra Martínez	Farmacia-Farmacia Hospitalaria
Vocales:	Dr. Josep M ^a Arnau de Bolós	Médico-Farmacología Clínica
	Dra. María Berdasco Menéndez	Bióloga-miembro no sanitario
	Dr. Enric Condom Mundo	Médico-Anatomía Patológica
	Dr. Xavier Corbella Virós	Médico-Medicina Interna
	Sra. Consol Felip Farrás	Miembro laico-Docencia Investigación
	Dr. José Luis Ferreiro Gutiérrez	Médico-Cardiología
	Dra. Ana María Ferrer Artola	Farmacia-miembro sanitario
	Dr. Xavier Fulladosa Oliveras	Médico-Nefrología
	Dra. Margarita García Martín	Médico-Oncología Médica
	Dra. Laura Lladó Garriga	Médico-Cirugía General Digestiva
	Sra. Sonia López Ortega	Graduado Social-Atención Usuario
	Sra. Gemma Martínez Estalella	Enfermera-Enfermería
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	Dr. Ricard Ramos Izquierdo	Medicina-Cirugía Torácica
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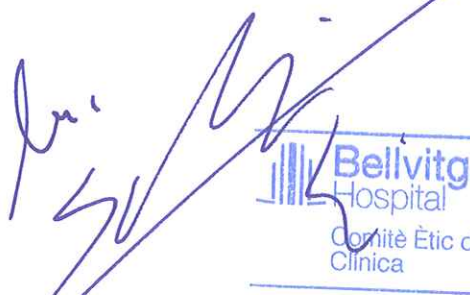
Dra. Nuria Sala Serra
Dr. Petru Cristian Simon

Bióloga-miembro no sanitario
Médico-Farmacología Clínica

Que este Comité cumple la legislación española vigente para este tipo de proyectos, así como las normas ICH y las Normas de Buena Práctica Clínica.

Que la Sra. Gemma, Martínez Estalella como investigadora colaboradora en el proyecto de investigación, no participó en las deliberaciones correspondientes.

Lo que firmo en L'Hospitalet de Llobregat a 26 de Septiembre de 2016



Dr. Enric Sospedra Martínez
Secretario del CEIC

Author Agreement Statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

Signed by all authors as follows:

Gemma Via-Clavero: Conceptualization; Formal analysis; Funding acquisition; Investigation; Methodology; Writing-original draft; Writing- review and editing. Give final approval of the version to be published.

Joan Guàrdia-Olmos: Data curation; Formal analysis; Supervision; Writing- review and editing. Give final approval of the version to be published.

Anna Falcó-Pegueroles: Methodology; Writing- review and editing. Give final approval of the version to be published.

Diana Gil-Castillejos: Data curation; Investigation; Writing- review and editing. Give final approval of the version to be published.

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Factors associated with nurses' intention to use physical restraints in intubated patients

INFORMATION SHEET

Dear colleague

I am writing to you to tell you about the study I am carrying out and to invite you to participate by responding to the following questions. The use of physical restraints in intubated patients is a varied practice that is influenced by multiple factors. The main purpose of the present study is to determine the factors associated with a nurse's intention to use physical restraints in intubated patients based on the Theory of Planned Behaviour. The study specifically aims to record your point of view about this practice.

The questions are arranged into five sections.

- **Section I:** Attitudes towards the use of physical restraints.
- **Section II:** Subjective norms about the use of physical restraints.
- **Section III:** Perceived behavioural control regarding the use of physical restraints.
- **Section IV:** Simulated clinical scenarios for each context to assess the intention to use physical restraints
- **Section V:** Sociodemographic and professional data.

The project has been approved by the Clinical Research Ethics Committee (PR183/15). It will not take you longer than 20 minutes to answer the questions. Your participation is completely voluntary. The data obtained will be treated in a confidential and anonymous manner, in accordance with the provisions of Organic Act 15/1999, of 13 December, on Personal Data Protection. In all cases, you may exercise your rights to access, modify, oppose to and cancel your data, for which purpose you must contact the principal investigator.

Please read each question carefully and answer in the way that is most appropriate for you and your experience. There are no right or wrong answers. Before you return the questionnaire, please make sure that you have answered all the questions. If you have any enquiries in relation to either the questionnaire or your participation, please contact the person responsible for the investigation in your centre.

Thank you very much for collaborating

Section I: Attitudes towards the use of physical restraints in intubated patients.

Each question in this section refers to **using physical restraints (mittens, wrist restraints, chest restraint...) in intubated patients during their stay in the ICU.**

The responses employ a seven-point rating scale, which has to be interpreted as follows.

Example: In my opinion, wearing a seat belt when travelling in a car is:

Unsafe	1 Extremely	2 Quite	3 Slightly	4 Indistinct (Neither safe nor unsafe)	5 Slightly	6 Quite	7 Extremely	Safe
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If you think that wearing a seat belt when travelling in a car is quite safe, you must draw a circle around number 6.

Please read the following statements carefully and draw a circle around the number that best describes your opinion about each question.

In my opinion, the use of physical restraints in intubated patients is...	1. Unsafe	1	2	3	4	5	6	7	Safe
	2. Unnecessary	1	2	3	4	5	6	7	Necessary
	3. Harmful	1	2	3	4	5	6	7	Beneficial
	4. Unacceptable	1	2	3	4	5	6	7	Acceptable
5. If I use physical restraints in an intubated patient, I will prevent self-extubation.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
6. If I use physical restraints in an intubated patient, I will prevent self-removal of catheters/tubes.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
7. If I use physical restraints in an intubated patient, I will prevent falls.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
8. If I cannot permanently monitor an intubated patient, I will feel more relieved when they are wearing physical restraints.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

9. If I use physical restraints, I will have more time to perform my tasks.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
10. Whenever a patient is undergoing a weaning or an awakening trial, it increases the use of physical restraints.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
11. If I use physical restraints, the intubated patient becomes more agitated.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
12. The use of physical restraints in an intubated patient can cause skin injuries.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
13. The use of physical restraints in intubated patients upsets me.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
14. I am more likely to use physical restraints if the patient is undergoing a weaning or an awakening trial.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
15. In my opinion, preventing self-extubation is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
16. In my opinion, preventing self removal of catheters and probes is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
17. In my opinion, preventing intubated patients from falling is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
18. In my opinion, feeling relieved whenever I cannot monitor an intubated patient, is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
19. In my opinion, having more time to perform my tasks is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
20. In my opinion, if an intubated patient becomes more agitated due to the use of physical restraints, it is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
21. In my opinion, if physical restraints injure a patient's skin, it is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable
22. In my opinion, if using physical restraints in intubated patients makes me feel unease, it is...	Extremely undesirable	1	2	3	4	5	6	7	Extremely desirable

Section II: Subjective norms about the use of physical restraints in intubated patients.

23. I use physical restraints in intubated patients because professionals with whom I work think that they must be used.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
24. I am expected to use physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
25. My nursing colleagues disapprove of me using physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
26. My unit supervisor disapproves of me using physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
27. My doctor colleagues disapprove of me using physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
28. Patients' relatives disapprove of me using physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
29. My nursing colleagues' approval of my practice towards the use of physical restraints is important to me.	Not at all	1	2	3	4	5	6	7	Very much
30. My nursing supervisor's approval of my practice towards the use of physical restraints is important to me.	Not at all	1	2	3	4	5	6	7	Very much
31. My doctor colleagues' approval of my practice towards the use of physical restraints is important to me.	Not at all	1	2	3	4	5	6	7	Very much
32. Patients' relatives' approval of my practice towards the use of physical restraints is important to me.	Not at all	1	2	3	4	5	6	7	Very much

Section III: Perceived behavioural control regarding the use of physical restraints in intubated patients.

33. I am confident that I could use physical restraints in intubated patients if I decide to.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
34. It is easy for me to make the decision to use physical restraints in intubated patients.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
35. The decision to use physical restraints in intubated patients is entirely up to me.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
36. When an intubated patient cooperates, it reduces the use of physical restraints.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
37. Family presence at the bedside reduces the use of physical restraints in an intubated patient.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
38. Pharmacological management of agitation avoids having to use physical restraints in an intubated patient.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
39. The reassessment of the patient's medical situation reduces the use of physical restraints.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
40. Communication between the multidisciplinary team reduces the use of physical restraints in an intubated patient.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
41. I am more likely to use physical restraints if the intubated patient cooperates.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
42. I am more likely to use physical restraints if a family member is accompanying the patient.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
43. I am more likely to use physical restraints if I can administer a drug to manage the patient's agitation.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
44. I am more likely to use physical restraints if I reassess the patient's clinical status.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
45. I am more likely to use physical restraints if the patient's clinical status is discussed among the multidisciplinary team.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Section IV: Simulated clinical scenarios: Intention to use physical restraints.

Scenario	Intention to use physical restraints.
Scenario 1: A 65-year-old male with a past medical history of high blood pressure under treatment and dyslipidemia, who is admitted to the ICU (private room) following a coronary artery triple bypass. Upon admission, he has an orotracheal tube connected to mechanical ventilation, a central venous catheter in the subclavian artery, radial arterial line, nasogastric tube, urinary catheter, temporary pericardial pacing wires and chest tubes connected to a suction system. The patient's haemodynamic status is stable, and sedation is progressively titrated in order to start weaning. The patient is able to open his eyes to verbal stimulation for less than 10 seconds (RASS-2) and responds to information with his head (yes/no).	Would you use physical restraints in this scenario? In no case <u> 1 </u> <u> 2 </u> <u> 3 </u> <u> 4 </u> <u> 5 </u> <u> 6 </u> <u> 7 </u> In all cases
Scenario 2: A 28-year-old male with a past medical history of smoking (one packet a day) and moderate alcohol abuse, who is admitted to the ICU (private room) with severe traumatic brain injury. During the previous two weeks, he has been administered analgo-sedation with midazolam and morphine. In the last week and coinciding with the discontinuation of the sedation, antipsychotic drugs were necessary and he was administered haloperidol. The patient is currently intubated with a tracheostomy tube and nasogastric tube. No central venous catheters or arterial lines have been inserted. The patient does not connect with his surroundings, he is calm, but he continuously moves his arms and legs.	Would you use physical restraints in this scenario? In no case <u> 1 </u> <u> 2 </u> <u> 3 </u> <u> 4 </u> <u> 5 </u> <u> 6 </u> <u> 7 </u> In all cases

Scenario 3:

A 78-year-old female with a past medical history of diabetes mellitus and virus-related liver cirrhosis, who was admitted to the ICU (private room) five days ago with a diagnosis of hepatorenal syndrome. She has an orotracheal tube connected to mechanical ventilation and a peripheral intravenous central catheter (PICC), without the need to administer vasoactive drugs. She was calm throughout the day shift but during the night shift she presented acute confusion with lack of attention (CAM-ICU positive), aggressiveness and she tried to get out of bed. The nurse informed the doctor on call of the patient's clinical status, who prescribes an antipsychotic drug. The patient continues to be confused and has psychomotor agitation.

Would you use physical restraints in this scenario?

In no case 1 2 3 4 5 6 7 In all cases

For international publication purposes, the questionnaire was translated from Spanish to English by a professional translator and back-translated by an independent native speaker.

Section V: Sociodemographic data:

Hospital:

Unit:

SOCIODEMOGRAPHIC DATA

1. Age:

2. Sex: Male ☐ Female ☐

3. Academic qualification (mark the highest)

Diploma in Nursing ☐ Bachelor's Degree in nursing ☐ Other bachelor Degree ☐ Postgraduate Degree ☐ Official Master's Degree ☐
Doctoral studies ☐

PROFESSIONAL DATA

4. Type of ICU.

General (medical-surgical) ☐ Medical ☐ Surgical ☐ Coronary ☐ Resuscitation ☐ Trauma ☐ Step-down unit ☐

Other.....

5. Years of experience in critical care:

6. Type of contract: Regular employment ☐ Full time temporary contract ☐ Part time contract (weekends) ☐ Temporary ☐

Other.....

7. Work shift: Morning ☐ Afternoon ☐ Night ☐ Rotating ☐

8. Do you combine your healthcare work with any other of the following activities?

Management ☐ Teaching ☐ Research ☐ No, I only perform healthcare work ☐

9. Have you received a specific physical restraint training course? (conference/workshop/course/session)

Yes ☐ No ☐ Don't know/No reply ☐

Supplementary data file 2. Scoring key for PR-TPB questionnaire

Construct measured	Question numbers	Response format	Items requiring reverse scoring	Items requiring multiplication	Range
Subscale Attitude					
Direct attitude (4 items)	1-4	+1 to +7			4-28
Behavioural beliefs 9 items	5-13	+1 to +7	11,12,13	Indirect attitude (8 composite items) 5x15; 6x16; 7x17; 8x18; 9x19; 10x14; 11x20; 12x21; 13x22	9-441
Outcome evaluations 9 items	14-22	+1 to +7			
Subscale Subjective norm					
Direct subjective norms (2 items)	23-24	+1 to +7			2-14
Normative beliefs 4 items	25-28	+1 to +7	25,26,27,28	Indirect subjective norm (4 composite items) 25x29; 26x30; 27x31; 28x32	4-196
Motivation to comply 4 items	29-32	+1 to +7			
Subscale Perceived behavioural control					
Direct perceived behavioural control (3 items)	33-35	+1 to +7			3-21
Control beliefs (5 items)	36-40	+1 to +7	36,37,38,39,40	Indirect perceived behavioural control (5 composite items) 36x41; 37x42; 38x43; 39x44; 40x45	5-245
Power of control (5 items)	41-45	+1 to +7			
Subscale Intention					
Intention scenarios (3 items)	Scenario 1,2,3	+1 to +7			3-21

Supplementary data file 3. Descriptive statistics of behavioural beliefs

[illegible]

Supplementary data file 4. Descriptive statistics of normative and control beliefs

Normative beliefs	n	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	Mean (SD)
My nursing colleagues disapprove of me using PR in intubated patients (reverse scored)	250	0	0.8	1.6	13.6	6.0	20.4	57.6	6.16 (1.20)
My nursing colleagues' approval of my practice towards the use of PR is important to me	250	16.0	9.2	6.8	27.2	18.8	15.2	6.8	3.96 (1.81)
1.Composite item (range 1-49)	250								24.33 (12.31)
My nursing supervisor disapproves of me using PR in intubated patients (reverse scored)	250	0.8	1.2	1.6	17.6	6.4	18.8	53.6	5.98 (1.36)
My nursing supervisor's approval of my practice towards the use of PR is important to me	249	14.5	8.0	7.6	22.9	19.3	20.5	7.2	4.15 (1.83)
2.Composite item (range 1-49)	249								24.52 (12.34)
My doctor colleagues disapprove of me using PR in intubated patients (reverse scored)	250	0.4	1.6	3.6	14.4	9.2	20.8	50.0	5.93 (1.36)
My doctor colleagues' approval of my practice towards the use of PR is important to me	249	13.7	8.8	6.8	23.3	22.5	18.9	6.0	4.13 (1.78)
3.Composite item (range 1-49)	249								24.14 (12.03)
Patients' relatives disapprove of me using PR in intubated patients (reverse scored)	250	0.4	4.0	9.6	26.0	14.4	22.4	23.2	5.10 (1.49)
Patients' relatives' approval of my practice towards the use of PR is important to me	250	6.8	4.8	6.0	9.6	23.2	31.2	18.4	5.05 (1.71)
4.Composite item (range 1-49)	250								25.20 (11.30)
Indirect subjective norms (range: 4-196)	248								98.36 (41.06)
Control beliefs									
When an intubated patient cooperates, it reduces the use of PR (reverse scored)	248	64.1	24.2	5.6	1.6	1.6	0.8	2.0	1.63 (1.19)
I am more likely to use PR if the intubated patient cooperates	250	63.6	22.0	3.6	3.2	2.4	2.8	2.4	1.77 (1.42)
1.Composite item (range 1-49)	248								3.17 (4.08)
Family presence at the bedside reduces the use of PR in an intubated patient (reverse scored)	249	32.1	37.3	14.1	7.6	4.0	2.8	2.0	2.31 (1.41)
I am more likely to use PR, if a relative is accompanying the patient	249	45.0	34.9	10.0	6.4	1.6	1.2	0.8	1.92 (1.16)
2.Composite item (range 1-49)	248								4.70 (4.51)
Pharmacological management of the patient's agitation avoids PR use in an intubated patient (reverse scored)	250	38.8	41.2	14.4	4.0	1.6	0	0	1.88 (0.91)
I am more likely to use PR, if I can administer a drug to manage the patient's agitation	250	43.2	32.4	11.6	4.0	3.6	3.2	2.0	2.10 (1.43)
3.Composite item (range 1-49)	250								4.23 (3.81)
The reassessment of the patient's medical condition reduces the use of PR (reverse scored)	249	38.6	42.2	12.9	4.4	2.0	0	0	1.89 (0.93)
I am more likely to use PR, if I reassess the patient's medical condition	249	32.5	33.3	10.0	11.2	5.6	6.0	1.2	2.47 (1.56)
4.Composite item (range 1-49)	248								4.95 (4.47)
Communication within the multidisciplinary team reduces the use of PR in an intubated patient (reverse scored)	248	27.0	33.1	20.2	12.1	5.2	1.6	0.8	2.44 (1.30)
I am more likely to use PR if I can discuss the patient's situation among the multidisciplinary team	250	29.6	31.2	8.4	14.0	8.8	5.2	2.8	2.68 (1.68)
5.Composite item (range 1-49)	248								6.92 (6.19)
Indirect PBC (range: 5-245)	244								23.97 (16.10)

PBC: perceived behavioural control