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Application of Joanna Briggs Institute physical restraint standards to critical emergency department patients following CONSORT guidelines

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Abstract

To explore the effect of Joanna Briggs Institute (JBI) physical restraint standards in improving physical restraint in critical and emergency department patients.

Enrolled 300 critical patients admitted in our hospital's emergency department from January to December 2019: 150 patients admitted January to June 2019 as control group and 150 patients admitted July to December 2019 as observation group. Routine restraints were applied in control group. Emergency department nurses in the observation group received thematic and practical JBI standardized training. This included pre-restraint assessment, principles of physical restraint, informed consent, using a restraint decision-making wheel, and alternatives to physical restraint. The incidence of restraint-associated adverse events (e.g., skin bruising, swelling) and restraint utilization rate were examined between 2 groups.

The incidence of adverse events and the restraint utilization rate were significantly lower in the observation group ($P < .05$).

The application of JBI physical restraint standards for emergency department patients can effectively reduce the incidence of adverse events and the restraint utilization rate.

Abbreviations: GCS = Glasgow Coma Scale, ICU = intensive care unit, JBI = Joanna Briggs Institute.

Keywords: critical patient, emergency department, Joanna Briggs Institute, nursing assessment, physical restraint standards

1. Introduction

Physical restraint refers to the usage of any physical or mechanical equipment, materials, or tools attached to or close to the body of patient, or the usage of facilities that restrict the patient's free physical movement, or restrict physical movement to a desired position or to prevent the patient from properly accessing the body.[1] The usage rate of physical restraint in intensive care unit (ICU) patients is about 28% to 37% in foreign countries,[2] and in China is about 39.4% to 45.7%.[3–5] Retrospective analysis of 316 critical patients in our department showed that the physical restraint usage rate was 51.26% from January 2018 to December 2018. Although physical restraint is commonly used in clinics, uniform standards are lacking. Additionally, as the main decision of whether to apply physical restraint to patients, nurses usually implement physical restraint based on work experience. Non-standard physical restraint occurs occasionally in clinics; this not only leads to a reduction in the satisfaction of patients and their families directly or indirectly, but also causes physical and psychological adverse reactions in patients.[6] Among 316 critical patients treated in our department from January 2018 to February 2018, 51.26% received physical restraint. Further inspection showed that the standard physical restraint rate was only 56.80%. Therefore, improvements in the rate of standard physical restraint are urgently needed to increase the satisfaction of patients and their families and to ensure the physical and psychological safety of patients.

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Key nursing technology construction of nurse-led targeted sedation strategy in severe patients (SWHLJS-202037).

This study was approved by the ethics committee of The First Affiliated Hospital of the Army Medical University. Collection and evaluation of relevant patient data was carried out with the informed consent of the patients or their families. All patients or family members were provided written consent to participate in this study. All relevant patient data were collected confidentially.

The authors have no conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are publicly available.

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The Joanna Briggs Institute (JBI) published physical restraint standards in July 2013.[7] To enable the standardized use of physical restraint by nurses, reduce adverse events caused by inappropriate physical restraint, and improve the standard application of physical restraint for critical patients, our department carried out standardized unified training of nursing staff according to the JBI standards, and clinically applied these standards. The results were satisfactory and reported below.

2. Materials and methods

2.1. General data

Participants were 300 critical patients admitted to the emergency department of The First Affiliated Hospital of the Army Medical University from January to December 2019. A total of 150 patients admitted from January to June 2019 were assigned to control group (92 males and 58 females; average age: 48.6 years); 150 patients admitted from July to December 2019 were assigned to observation group (90 males and 60 females; average age: 49.9 years). Inclusion criteria: (1) Glasgow Coma Scale (GCS) 4 to 15 points; (2) post craniocerebral injury, epilepsy, cerebral hemorrhage, and cerebral infarction; (3) aged 16 to 65 years. Exclusion criteria:

(1) patients with GCS:3 points;
(2) fracture, high paraplegia, and amputation;
(3) patients aged $\leq$16 or $\geq$65 years.

This study was approved by the ethics committee of The First Affiliated Hospital of the Army Medical University. Collection and evaluation of relevant patient data was carried out with the informed consent of the patients or their families. All patients or family members were provided written consent to participate in this study. All relevant patient data were collected confidentially.

2.2. Methods

This is a prospective cohort study. Routine restraints were applied in control group. Emergency department nurses in the observation group received thematic and practical JBI standardized training. This included pre-restraint assessment, principles of physical restraint, informed consent, using a restraint decision-making wheel, and alternatives to physical restraint. The incidence of restraint-associated adverse events (e.g., skin bruising, swelling) and restraint utilization rate were examined between 2 groups.

(1) Training methods:
    1. Thematic training. Two special training seminars on physical restraint were organized. All staff participated. Each seminar lasted 3 hours (a total of 9 hours).
    2. Case discussion. Three discussions on physical restraint-associated complications were organized. All staff participated. Each discussion lasted 3 hours (a total of 9 hours).
    3. Operation skill training. Operational experts in the department conducted standard restraint skill training for the general nursing staff. The training included restraint instrument selection, restraint patterns, restraint methods, and keeping restraint records. An examination was carried out to test the knowledge of nurses.
(2) The total training time was 5 weeks, from February 1, 2019 to March 8, 2019.
(3) The training content covered the duties of nursing staff, assessment and education before restraint, provision of informed consent for restraint, principles of physical restraint, restraint issues requiring particular attention, legal knowledge of restraint, humanistic care, effective sedation and analgesia, use of a restraint decision-making wheel, and alternatives to physical restraint.[8]

2.3. Assessment and education before restraint

Patients should be evaluated thoroughly before restraint,[9] patients or family members should be fully educated and informed. Written informed consents were obtained. The aim of assessment and education was

(1) to determine the patient's awareness; condition; physical activity; social, religious, cultural, and safety needs; and restraint history;
(2) to assess the need for restraints (e.g., the possible health and safety risks of not restraining);
(3) to evaluate the patient's skin condition and integrity;
(4) to assess risk factors of restraint;
(5) to determine the time of restraint; and
(6) to inform the patient or family members of the purpose and importance of the restraint, to obtain the consent of the patient and family members, and to obtain written consent for restraint.

2.4. The use of a physical restraint decision wheel and alternatives to physical restraint

The restraint decision wheel and its levels were shown in Figure 1. Moving from the center to the outer layer, the restraint decision wheel comprises of a behavior level, a device level, an independence level, and a restraint level.[10] The behavior level was divided into 3 levels. The restraint level was divided into restraint, no restraint, and other alternatives.[11,12] Alternatives of physical restraint were as follows:

(1) Usage of better methods to secure intubation and avoid patient self-extubation; active extubation to reduce the patient's discomfort; distracting the patient's attention and moving the pipe and equipment out of his or her direct vision by, for example, fixing the gastric tube over the forehead, fixing the catheter away from the fingers, and keeping the patient's hand engaged.
(2) Restriction of different parts according to differing patient conditions. When carrying out restraint, gentle action should be used, so that the restricted limb maintained a functional position with appropriate tightness; when the shoulder restraint belt was used for uncooperative patients, the underarm cushion cotton pad should be used to increase circulation; when the head of the bed was raised, the tightness of the restraint band should be adjusted to avoid compression of the brachial plexus nerve, and relaxation of the restraint should be based on the principle that the patient cannot injure themselves. Increased the bedside shift, evaluated the restricted limbs, and performed local massage and did functional exercise every 1 to 2 hours. Attention should be paid to the skin and blood circulation of the restraint site, and the restrained area should be released for a short time if necessary.
(3) Provide a comfortable, calm, and safe medical environment for patients. Allowed patients to feel and touch tubes under the guidance of medical staff, and identified all sources of patient restlessness or discomfort.[13,14]

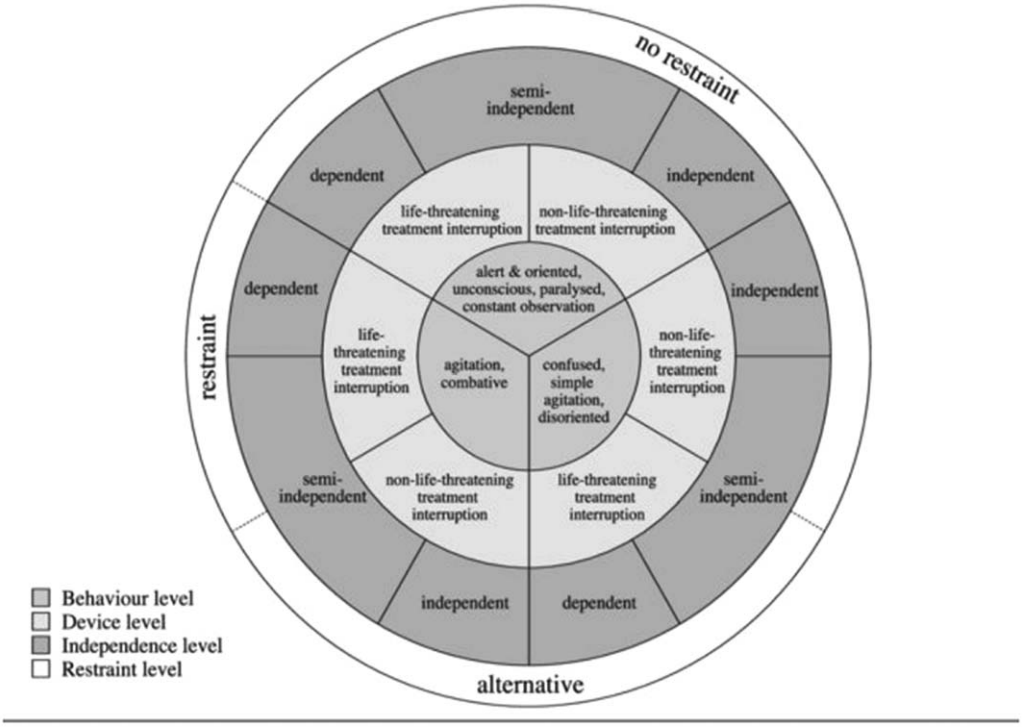

Figure 1. Restraint decision wheel and levels.

(4) Evaluated and alleviated the patient's anxiety and pain; provided time, space, and event orientation for patients; diverted patients' attention; optimized sedation and analgesia strategies; strengthened humanistic care; and provided psychological relief to patients, such as music therapy. If the patient's condition improving and they showed alertness and stable mood, removed the restraint as appropriate after communicating and explaining the procedure to the patient. Eliminated the patient's concerns and encouraged them to cooperate with further treatment and care.

2.5. Statistical methods

SPSS 23.0 software (IBM Corp., Armonk, NY) was utilized. Count data were described using percentages (%) and compared using the χ^2 test. The level of significant difference was indicated by $P < .05$.

3. Results

As shown in Table 1, there was a significant difference in the incidence of adverse events before and after the application of JBI physical restraint standards ($P < .05$). As shown in Table 2, there was a significant difference in the usage of physical restraint before and after the application of JBI physical restraint standards ($\chi^2 = 26.455$, $P < .05$).

4. Discussion

This study showed that JBI physical restraint standards training helped nurses to actively assess patients for restraint, and performed timely release of restraint in patients who did not require it.[15] Through the training, nurses improved their use of the JBI physical restraint standards, which included training on the usage of restraint decision wheel, the duties of nursing staff, had evaluation and education before restraint, obtained informed consent for restraint, the principles of physical restraint, restraint issues requiring particular attention, legal knowledge of restraint, humanistic care, effective sedation and analgesia, and the adverse effects of restraint. The understanding and mastery of physical restraint alternatives improved nurses' knowledge of the usage of physical restraints and actively and reduced patient restraint time.[16,17]

After applying the JBI physical restraint standards, the incidence of physical restraint-associated skin bruising, swelling, skin ulceration, and unplanned extubation was significantly reduced compared with that before training ($P < .05$), and the restraint usage rate was significantly reduced ($P < .05$). The

Table 1

Incidence of restraint-associated adverse events before and after training [case (%)].

Group	Case	Skin bruising	Swelling	Skin ulcer	Unplanned extubation
Control group	150	7 (4.7)	9 (6.0)	9 (6.0)	7 (4.7)
Observation group	150	1 (0.7)	2 (1.3)	2 (1.3)	1 (0.7)
χ^2 value		4.623	4.624	4.624	4.623
P value		0.032	0.032	0.032	0.032

Table 2

Usage of physical restraint before and after training.

Group (%)	Case	Restraint (case)	Restraint usage (%)
Control group	150	128	85.3
Observation group	150	88	58.7
χ^2 value		26.455	
P value		0.000	

percentage of standard physical restraint increased from 56.8% to 78.68%. Patients' emotional states were more stable and patients' confidence in overcoming their illnesses was enhanced through effective communication and explanation[18–20] by emphasizing to nursing staff the importance of observing body restraint areas, preventing restlessness in patients, proactively managing skin injuries, using alternative restraint methods as much as possible, providing humanized restraint nursing, and increasing their observations of and psychological responses to patients. Measures such as providing time, space, and event orientation for patients who wake up under anesthesia after surgery; use of massage; and distracting patients by asking them to hold items in their hands to reduce patients' anxiety, discomfort, and fear. In addition, the family members of patients expressed their understanding and support for humanized restraints. This helped to reduce disputes between doctors and patients, and improved the satisfaction of patients and their families.

The main limitation of this study was that the logistic regression was not performed to evaluate the differences between the 2 groups.

In summary, the physical restraint standards published by the JBI could effectively reduce the incidence of adverse events and the restraint utilization rate by improving the usage of standard physical restraint for critical patients in the emergency department. The restraint decision-making wheel had been incorporated into the department's quality management; nurses evaluated the necessity of restraint according to the behavior level, device level, and independence level. This ensured the scientific nature of restraint utilizing and standardized the restraint behavior of the nursing staff. Restraint is a common nursing measure for critical patients, especially for patients in the ICU. As patients and their families require more justification of restraint, we should clarify the indications for restraint and improve the standardization of restraint in future work. Assessment of the patient's condition combined with the JBI physical restraint standards may help to reduce the utilization of restraint and the incidence of adverse events caused by restraint. This will help to ensure the smooth implementation of safe practice in clinical nursing. About the limitations of this study, such as the limited of sample size, further in-depth discussion and research should be conducted on this topic.

Author contributions

Xiaoli Wen is responsible for the guarantor of integrity of the entire study, study concepts and design, definition of intellectual content, literature research, clinical studies, experimental studies, data acquisition and analysis, statistical analysis, manuscript preparation and editing; Wei Sun is responsible for the guarantor of integrity of the entire study, study design, definition of intellectual content, literature research, manuscript review; Yushu Wang is responsible for the guarantor of integrity of the entire study, study design, literature research, manuscript review; Dongmei Zeng is responsible for the guarantor of integrity of the entire study, literature research; Yanxia Shao is responsible for the guarantor of integrity of the entire study, literature research, clinical studies, experimental studies; Xiaoping Zhou is responsible for the literature research, clinical studies, experimental studies, data acquisition and analysis, statistical analysis. All authors read and approved the final manuscript.

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