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Developing an innovative approach for anticipatory care of post-traumatic delirium (PTD) through the views of nurses: a comprehensive study

Jinru Li
961 Hospital of PLA Joint Logistic Support Force
Junsheng Qi
Third Military Medical University Southwest Hospital Department of Pharmacy
Ying Cao
Third Military Medical University Southwest Hospital Department of Pharmacy
Yushu Wang
Third Military Medical University Southwest Hospital
Jin Gao
The 958th Army Hospital of the Chinese People's Liberation Army
Juanjuan Wu
People's Liberation Army General Hospital of Central Theater command
Li Luo
961 Hospital of PLA Joint Logistic Support Force
Qin Shu
1320184546@tmmu.edu.cn

Third Military Medical University (Army Medical University)

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Abstract

Objectives

To analyze and construct the framawork of the current cognition of Chinese trauma nurses regarding nursing interventions for preventing post-traumatic delirium(PTD).

Methods

The sample of this descriptive, cross-sectional study included 210 trauma caregivers in emergency departments and ICUs. Data were collected with a questionnaire between March 24 and April 30, 2024.

Results

A total of 210 valid questionnaires were distributed to trauma nurses in emergency departments and ICUs across 13 units in China, yielding 208 valid responses, resulting in a collection rate of 99.05%. The average score for the trauma nurses' understanding of each evidence item was 4.38±0.89. Exploratory factor analysis identified four dimensions, accounting for a cumulative variance contribution rate of 72.30%. These dimensions included "physical health and mobility," "pain and psychological care," "thinking and cognitive care," and "complication prevention." The mean cognitive attitude scores for each dimension were 4.51±0.85, 4.63±0.70, 4.24±0.96, and 4.26±0.92, respectively.

Conclusion

The cognition of Chinese trauma nurses regarding the evidence items of preventive nursing measures for PTD encompasses four dimensions, reflecting their comprehension of core nursing issues related to delirium prevention. This represents a sophisticated manifestation of trauma nurses' nursing philosophies for PTD patients and may aid in the development of training courses for PTD predictive nursing capabilities.

Relevance To Clinical Practice

Focusing on dimensions constructed by trauma caregivers’ cognitive,, further kn-owledge education are recommended to enhance their adherence.

What does this paper contribute to the wider global clinical community?

This study is the first multicenter survey to explore the cognition of Chinese trauma nurses regarding anticipatory care for post-traumatic delirium(PTD), and the four-dimensional framework established herein can directly inform PTD nursing training programs in China.

(2)This study's dimensions enable nursing managers to comprehend trauma nurses' cognition and attitudes regarding nursing interventions for preventing post-traumatic delirium, identify potential

deficiencies in delirium clinical care, and create specialized training programs for clinical trauma nurses to improve their delirium management skills.

(3)New nurses may utilize the dimensions established in this study to acquire and perfect evidence-based nursing interventions aimed at preventing post-traumatic delirium.

1. INTRODUCTION

Post-traumatic delirium (PTD) is an acute neuropsychiatric disorder triggered by a combination of individual, pathological, and environmental factors after trauma. Cognitive impairment frequently occurs in the early post-trauma phase, necessitating substantial nursing intervention and associated with elevated mortality rates[1,2]. The primary characteristic is extended perplexity, accompanied by or without behavioral signs, anxiety, paranoia, delusional distortions, and hallucinations. Factors influencing PTD encompass, but are not restricted to, age, gender, and recent alcohol consumption history. The key indicators of delirium in the trauma population encompass the Acute Physiologic Assessment and Chronic Health Evaluation (APACHE) scores, Injury Severity Score (ISS), length of artificial breathing, number of surgical procedures, and elevated transfusion requirements[3].

The research indicates that the prevalence of post-traumatic delirium (PTD) remains high[3,4], possibly associated with insufficient investigation into PTD anticipatory care strategies[5], discrepancies in trauma caregivers' perceptions[6] and attitudes towards these measures, inadequate training[7], and cognitive-behavioral dissociation[8].

The current PADIS (Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU)guidelines[9] advocate for the implementation of the ABCDEF clustering strategy for delirium management; nevertheless, clinical outcomes are suboptimal owing to variances in human, material, and other organizational resources across hospitals. The ABCDEF clustering strategy lacks explicit nursing measures, necessitating that nurses gather and retain extensive information from various sources, thereby potentially elevating the cognitive load required for effective information processing. Cognitive overload can adversely affect caregiver performance and the quality of care delivered to patients[10]. Research conducted by Meghani S et al[11] and Morandi A et al.[12] corroborates the assertion that over fifty percent of nurses failed to incorporate the method into their regular practice. Moreover, the ABCDEF clustering technique does not explicitly delineate nursing actions aimed at preventing PTD. Nurses frequently depend on personal experience or inclination to administer delirium care in this context.[13].Ultimately, factors such as educational background, training experience, and job variations result in considerable disparities among trauma caregivers in their comprehension of the significance of nursing interventions aimed at preventing PTD[11]. This, in turn, influences their willingness to engage in self-directed learning and training, culminating in marked differences in their capacity to deliver predictive care for PTD[14].

Research indicates that individuals' conduct frequently derives from their view of reality and their comprehension of their own perceptions and beliefs. These perceptions and understandings influence their judgments and assessments, thereby impacting human behavior[15,16]. This study posits that trauma nurses' perceived attitudes toward nursing interventions aimed at preventing PTD may influence their adherence to these measures and their overall effectiveness. A comprehensive understanding of the intrinsic aspects of trauma nurses' perceptions regarding evidence-based practices for PTD prevention could facilitate the development of targeted training strategies to enhance optimal nursing interventions.

2. AIMS

The objective of this survey is: (1) To examine the current understanding of trauma nurses regarding anticipatory care measures for post-traumatic delirium (PTD). (2) To examine the aspects of trauma nurses' perceptions regarding anticipatory care measures for PTDs, to attain a comprehensive understanding of their views and attitudes towards such care, and to guide the creation of a competency-based training curriculum for anticipatory care for PTDs.

3. MATERIALS AND METHODS

3.1 Summary of Evidence for PTD Anticipatory Care Protocols

This study employed the PIPOST methodology, as proposed by the Fudan University Center for Evidence-Based Nursing, to formulate evidence-based questions[17].

The research team used the "6S" evidence resource pyramid model[18], A comprehensive top-down search of the BMJ Best Practice, UpToDate, World Health Organization, Joanna Briggs Institute, National Institute for Health and Care Excellence, Scottish Intercollegiate Guidelines Network, Guidelines International Network, Cochrane Library, Registered Nurses’Association of Ontario, PubMed, Embase, EBSCO, CNKI, WanFang database, SinoMed, Yi Maitong Guidelines Network and other databases was performed utilizing a subject term combined free word search employing keywords (trauma OR traumatic OR posttraumatic OR injury OR wounded OR burn OR fracture) AND (delirium) AND (care OR nursing OR intervention). The search period extends from the database's inception until February 2024.

The research team independently evaluated the methodological quality of the selected studies utilizing the JBI quality assessment tool[19] to finalize the included literature, while team members meticulously compiled a list of evidence for completing the PTD anticipatory care measures on an article-by-article basis.

3.2 Nurses' views and perceptions regarding nursing evidence for the prevention of PTD

Research tools The research team employed the supplied evidence-based inventory of nursing interventions designed to prevent PTD to formulate a questionnaire, crafted through group discussion, for the Trauma Caregivers Cognitive Attitudes regarding nursing interventions aimed at anticipatory

nusing of PTD. It comprises three principal components:(1) A description of the study's objectives and contextual background; (2) A questionnaire gathering fundamental demographic information from nurses; (3) Evaluate nurses' comprehension of the elements of the evidence checklist for nursing interventions aimed at preventing PTD. A 5-point Likert scale was employed to assess nurses' evaluations of their understanding on each evidence entry, with scores ordered from highest to lowest: A score of 5 signifies paramount importance, whereas a score of 1 denotes minimal significance. The Cronbach's alpha value of the questionnaire is 0.985, with individual item coefficients ranging from 0.827 to 0.969, indicating a strong correlation among the indicators, good reliability, and excellent internal consistency. In addition to reliability, content validity was verified by 6 experts in critical care nursing and evidence-based nursing. The scale-content validity index (S-CVI) was 0.91, and the item-level content validity index (I-CVI) for each item ranged from 0.84 to 0.95, confirming that items accurately reflect the core content of PTD anticipatory care.

Implementation of investigations The stratified purposive selection approach was employed to pick trauma nurses from emergency departments and ICUs throughout 13 units in China, including Beijing, Shanghai, Guangzhou, Shandong, Chongqing, Heilongjiang, Liaoning, Yunnan, Gansu, and Hubei, as survey respondents from March 24 to April 30, 2024. Stratified purposive sampling was adopted to ensure representation across regions and clinical settings, with stratification based on hospital level and geographic to reduce selection bias. Inclusion criteria: (1) Positions in Critical Care Medicine and Emergency Department; (2) Minimum of 5 years of professional experience; (3) Pertinent expertise in managing patients with post-traumatic delirium. Exclusion Criteria: (1) Not engaged in post-traumatic delirium care within the past three months; (2) Incapable of participating in the survey owing to travel or similar reasons.All participating nurses provided informed consent and engaged voluntarily.

Thisformula $n = Z^2_{\alpha/2} \cdot \sigma^2 / \delta^2$ was uesd to determine the minimum sample size required for the study

with α set at 0.05, confidence interval ($Z_{\alpha/2}$) at 1.96, allowable error (δ) at 0.20, and the overall standard deviation (σ) at 1.18. It turned out that 134 participants were needed. Considersing a 10% attrition rate,this study required at least 148 participants.The final sample size of 210 (208 valid responses) exceeded the calculated minimum of 148, accounting for a 10% attrition rate, which ensured sufficient statistical power to detect meaningful factor structures via exploratory for analysis.

Data collection and quality control The researcher communicated with the chief nurse of the pertinent department at each hospital, elucidated the study's objective, importance, and methods, and upon securing approval, disseminated the link to the electronic questionnaire. The questionnaires included standardized instructions, while the researchers clarified any queries from respondents to guarantee accurate data collection. All nurses provided electronic informed consent after understanding the study purpose ,risks and withdrawal rights. While, to mitigate social desirability bias, the questionnaire included a cover statement emphasizing that there are no ‘right or wrong’ answers, and responses were anonymous. Each IP address is restricted to a single entry, with all fields save the extra ones designated

as necessary. Upon collection and organization of the questionnaires by two researchers, the data underwent re-evaluation, leading to the exclusion of questions that included uniform responses or were completed in under 200 seconds, as they were deemed invalid.

Statistical analysis The statistical processing was conducted using SPSS version 27.0.Measurement data was presented as mean ± standard deviation. Count data variables are represented as frequency and constituent ratio.Group comparisons were conducted using two independent samples t-tests or ANOVA, with statistical significance defined as $P<0.05$. Exploratory factor analysis(EFA) was employed to discern the categories of nursing measures, adhering to the following criteria for common factor selection: factor eigenvalues>1; loadings for each factor≥0.4; a difference exceeding 0.3 between the loadings of the same nursing measure on two factors; and the assignment of the same nursing measure to multiple factors was based on the highest loadings. Factor analysis loadings were obtained by principal component analysis, and factor rotation was employed to identify symptom clusters utilizing the maximum variance method. The significance level is $\alpha = 0.05$. Missing data were minimal (< 1% of total responses) and handled via listwise deletion, as the proportion was below the 5% threshold for negligible impact on results.

4. RESULTS

4.1 Summary of Evidence for PTD Anticipatory Care Protocols

The initial search yielded 3023 papers, selected based on the subsequent evaluation criteria.The inclusion criteria were: (1) Participants were adult trauma patients; (2) Research concentrated on interventions related to traumatic delirium; (3) The study types encompassed guidelines, evidence summaries, systematic reviews, best practices, expert consensus, randomized controlled trials, quasi-experimental studies, and cohort studies; (4) The languages permitted were English and Chinese.The exclusion criteria included: (1) Duplicate publications; (2) Revisions to guidelines or expert consensus; (3) Inaccessibility of full text; (4) Insufficient quality evaluation.Subsequent to an independent assessment conducted by three authors and a panel discussion, 15 papers were finally included as sources of evidence (Figure 1), as detailed in Table 1.Subsequent to group brainstorming, a total of 52 entries of evidence were cataloged (Table 2).

Table 2 Content of PTD Anticipatory Care Measures

Entry	Evidence content	Source Literature
Suggestion therapy	Use verbal or nonverbal means to induce patients to be submissive and passive in accepting medical advice	[2],[5]
Music therapy	At least one hour of soothing music per shift	[5],[8],[14]
Touch therapy	20 min gentle back massage every night between 6:00-8:00 pm	[5]
Relaxation therapy	Train the patient 2-3 times a day in effective breathing styles, such as lip-contraction breathing and abdominal breathing	[14]
Aromatherapy	22:00-06:00 3 ml of 100% pure lavender oil in a glass jar next to the bed	[5],[10]
Cognitive behavioral therapy	Pain education for patients to change their expectations and coping with pain	[2],[5]
Supportive psychotherapy	Recognize and value the patient's suffering and provide continuous support and encouragement in the form of persuasion, inspiration, encouragement, empathy, comfort, and diversion	[2],[5]
Operant behavioral therapy	Reinforcement of positive behavior with verbal compliments or other rewards preferred by the patient	[2],[5]
Hypnosis therapy	Hypnosis on admission or immediately after extubation and mental alertness, at least 15 min per session, at least 3 sessions of hypnosis	[5]
Distraction techniques	Distract the patient by playing TV, showing familiar pictures, etc.	[2],[5]
Supplementary analgesia medication	Assessment of pain and use of appropriate analgesics, non-opioids whenever possible	[2],[6]
Surgical pain management	Promote gentle handling by nurses	[7]
Appropriate restraint	Carefully consider risks and implications before initiating/maintaining use of restraints; remove catheters, limb restraints, and other immobilizing devices as early as possible if condition permits	[2],[9]
Avoidance of bed falls	Recognize and treat underlying causes or complications, such as falling out of bed	[1]
Avoidance of general falls	Recognize and treat underlying causes or complications, such as falling	[1]
Preventing of pressure sores	Recognize and treat underlying causes or complications, such as pressure ulcers. Prevent skin breakdown, improve incontinence	[1],[6]

Frequent verbal communication	Encourage frequent verbal reassurance from someone familiar to the patient, the nurse can ask the patient about their feelings and experiences, explain and address their concerns , and approach the patient with a low voice, medium tone of voice, and short clear sentences	[12],[14], [15]
Frequent eye contact	Use frequent eye contact with patients and actively listen to them	[15]
Appropriate physical contact	Encourage frequent touching by people familiar with the patient to reduce disruptive behaviors, and healthcare professionals can gently clean the patient's face and hands with a wet tissue to build rapport with the patient	[5],[6]
Patient Communication	Encourage patients to share their experience	[1]
Assistance for better social support	Encourage family members to visit the patient and involve them in the patient's daily care	[12]
Reasonable visitation	Flexible family visits as needed	[11]
Active exercise	With a RASS score of -2 to 1, patients are encouraged to perform 10-20 min of active range of motion exercises in bed each day; patients are encouraged to move around as soon as possible after surgery	[12],[13]
Passive activities	With a RASS score of -5 to -3, the patient is helped to perform passive range of motion exercises 10 times per day for each joint.	[12]
Temperature and humidity regulation	Maintain a comfortable temperature by adjusting the room temperature to 24-26°C	[7]
Time/space indication	Provides clear logo, 24-hour clock and calendar	[13]
Sound and noise management	Reduction of calls and machine alarms (24:00-06:00), healthcare workers talking quietly, use of earplugs to minimize noise, provision of earplugs at night	[2],[14]
Low-level nighttime illumination	Turn off ward headlamps and common area lights around 10 p.m. if possible, drop curtains, and use dim bedside lighting for patient care	[2]
Keep the air circulating	Open the windows during the day.	[11]
Protecting privacy	Provides privacy by closing equipment into compartments (doors, curtains) creating a calm and private environment	[15]
Rationalization of ward layout	Allow more space between beds to increase natural light	[8]

Reinforcement of turning and back patting	For comatose patients, help them change positions every 2 hours	[12]
Encouraging of coughing	Encourage patients to cough up sputum to minimize the risk of aspiration pneumonia	[6]
Hygiene	Keeping the ear canals clean during daily care	[12]
Pipeline care	Avoid unnecessary catheter insertion and optimize the location of necessary tubing	[12],[13]
Wound care	Wound care after s urgery	
Mechanical ventilation care	For patients on ventilators, adjust to assisted ventilation mode at night (24:00-6:00); for patients who need noninvasive ventilation (NIV) to improve sleep, use NIV-specific ventilators or standard ICU ventilators	[5]
Nutritional care	Encourage patients to drink water and make sure they consume enough fluids to drink food	[1],[13]
Work and rest regularly	Provide clear scheduling	[12]
Creating a sleep environment	Provide a quiet and good sleeping environment	[10]
Use of audio-visual aids	Ask if the patient wears eyeglasses, hearing aids, etc. at home and encourage the use of assistive devices for visual and/or hearing impairments	[5],[12]
Centralized care operations	Avoid nursing or medical practices during sleeping hours (24:00-6:00), such as unnecessary tests and blood collection	[2],[4],[6], [13]
Sleeping aid	Oral melatonin or 8 mg of ramelteon, if needed, at night.	[3],[5],[12]
Memory training	Introduce cognitive stimulation activities (e.g., reminiscing) by asking the patient about previous experiences, current activities, and attempting to connect the past to the present	[13],[15]
Attention training	2 cognitive training sessions per day, each consisting of 5-10 items, with exercises including digit spanning forward, matrix puzzles, real-world practice assessments, digit spanning backward, immediate noun list recall, immediate story recall, alphanumeric sequences, and pattern recognition sequences.	[11]
Execution training	Use matching games, e.g. mark items from a list that belong in a refrigerator	[15]
orienteering	When checking in or taking vital signs, ask the patient for orientation of place, person and time; give the patient a 24-hour clock and calendar	[5],[12]
Comprehension training	When RASS- 2 to 1 score, provide 5 min of cognitive practice, 2 times a day, with practice including reading bus schedules,	[12]

Language training	Encourage reading newspapers, books, etc. with family members	[14]
Abstract thinking skills training	Encourage patients to work with their families on crossword puzzles, jigsaw puzzles	[5],[14]
Daily life skills training	Patient performs daily ADL training (eating or simulated eating, grooming, bathing, dressing, and toileting) until all ADL tasks can be performed under supervision	[5],[14]
Visual construction skills training	Show the patient cards of different colors and shapes and ask the patient to name the colors and shapes they see, 2 imes a day	[5],[14]

4.2 The existing cognitive framework and attitudes of trauma nurses toward evidence-based practices for preventing post-traumatic distress (PTD).

Two hundred ten valid surveys were distributed, and two hundred eight valid questionnaires were collected, resulting in an effective rate of 99.05%. The survey participants were predominantly female (92.8%), possessed a bachelor's degree (86.5%), held a middle or senior professional position (61.1%), and had over 10 years of work experience (74.0%). Table 3 illustrates the overall condition of the survey participants.

Table 3 Participant Characteristics (n=208)

Characteristic		n(%)
Sex	Male	15(7.2)
	Female	193(92.8)
Age(years)	≤26	4(1.9)
	26~	42(20.2)
	31~	69(33.2)
	36~	38(18.3)
	≥40	55(26.4)
Highest Education level	Tertiary and below	11(5.3)
	Bachelor's degree	180(86.5)
	Master's degree or above	17(8.2)
Title	Elementary	81(38.9)
	Intermediate	108(51.9)
	Associate Senior and above	19(9.2)
Working Section	Emergency department	73(35.1)
	ICU	135(64.9)
Working Experience(years)	≤10 years	54(26.0)
	10~	119(57.2)
	20~	28(13.5)
	≥30	7(3.3)

The mean score of the cognitive and attitudinal responses of the interviewed trauma nurses regarding each evidence item was (4.38±0.89). With the exception of the "aromatherapy" score of 3.82±1.1, all other item values exceeded 4.00 (Table 4).

We examined items from the questionnaire.Thirteen items were deleted because they did not meet the criteria for corrected item-total correlation.The remaining 39 items were analyzed using EFA .The KMO measure of sampling adequacy(0.943), Bartlett's test of sphericity ($\chi 2 = 8873.366$, $p < .001$), indicating that the data set was appropriate for EFA.The findings revealed four extracted factors with eigenvalues greater than 1 (Fig. 2), explaining 72.300% of the total variance. Four dimensions were derived from the reference study: "physical health and mobility," "pain and psychological care," "thinking and cognitive care," and "complication prevention"(Table 5). The average scores of cognitive attitudes across the four dimensions were 4.51±0.85, 4.63±0.70, 4.24±0.96, and 4.26±0.92, respectively.

5. DISCUSSION

5.1 The meaning of an evidence summary about nursing interventions to prevent PTD.

This study is the first to systematically summarize PTD anticipatory care evidencde via a rigorous evidence-based process and construct a cognitive dimension framework for Chinese trauma nurses, filling the gap of limited evidence-based tools for PTD nursing training in China. Prior research on anticipatory nursing measures for PTD has predominantly concentrated on qualitative and quantitative methodologies. The Family Member Voice Redirection (FAMVR) nursing intervention, designed by Johnson G U through qualitative research methodologies, may facilitate the exploration of novel nursing strategies for preventing post-operative delirium (PTD)[34].Tonna,J E et al.[35] employed quantitative research methodologies to assess the efficacy of a non-pharmacological sleep-wake clustering strategy in mitigating delirium in trauma patients, offering a significant reference for nursing research on the prevention of PTD. Nonetheless, the absence of an evidence-based summary results in a deficiency of comprehensive nursing advice strategies for the prevention of PTD in clinical settings. Trauma nurses possess varying degrees of expertise on numerous original studies, leading to disparities in their capacity to identify and implement nursing interventions to avoid PTD[13].

This study encompassed comprehensive database searches, rigorous screening, and quality evaluation via evidence-based methodologies, resulting in a succinct summary of the evidence for anticipatory care techniques related to PTD. The methodological quality of the chosen studies was independently evaluated using the JBI quality assessment tool, producing scientifically reliable results that can inform the training and practice of trauma nurses, augment their capacity to implement nursing interventions to prevent PTD in trauma patients, and enhance treatment outcomes for these patients.

5.2 Cognition and attitude characteristics of trauma nurses on evidence-based nursing interventions to avoid PTD

This study adhered rigorously to item discrimination analysis and factor analysis methodologies during the dimension development procedure. The p-value for all items in the discrimination analysis is <0.01, signifying that the questionnaire effectively distinguishes between items, accurately identifies nuanced distinctions, and possesses a high level of validity and reliability. The exploratory factor analysis results indicated that the cumulative contribution rate of the factors attained 70.882%, signifying that the extracted factors adequately encompass the majority of the original variables with substantial representation and dependability.

Exploratory factor analysis identified four variables of nurses' cognitive attitudes toward evidence-based nursing measures for preventing PTD: "physical health and mobility," "pain and psychological care," "cognitive and thinking care," and "complication prevention."

Factor loadings of the first dimension varied between 0.564 and 0.815, indicating strong endorsement by trauma nurses of measures pertaining to "Physical Health and Activity". In this context, mechanical

ventilation management, reinforcement of repositioning and back patting, and promotion of coughing are essential interventions to ensure the patient's airway patency. The management of various tubes, including stomach tubes and urinary catheters, is essential for guaranteeing nutritional intake and reducing urinary retention. Appropriate nutritional consumption supplies the body with energy and vital nutrients; Wound treatment and hygiene are essential for preserving normal skin function. The optimization of ward layout, regulation of temperature and humidity, management of sound and noise, and provision of low-level nighttime lighting create a conducive treatment environment for patients. The execution of these measures facilitates sufficient sleep and preserves the stability of the patient's internal environment, consistent with the physiological health aspect of the 14 fundamental human needs delineated by Henderson[36]. Active and passive exercise as rehabilitative intervention enhances patient prognosis and mitigates the incidence of delirium by addressing bed-ridden immobility, a risk factor that hinders mobility and expends energy[9]. Simultaneously, early physical exercise enhances respiratory function, augments cardiorespiratory fitness, and facilitates the release of neurotransmitters from the brain, so improving sleep quality[37]. In summary, trauma nurses prioritize "physical health and mobility" in their nursing interventions to prevent PTD, emphasizing the necessity for a patient-centered approach that considers diverse susceptibility factors, including nutrition, hygiene, respiration, sleep, and exercise. This is a crucial aspect for the training of new trauma nurses.

The elements encompassed in the second dimension closely resemble the findings of the PTD study on postoperative patients[38]. Non-pharmacological pain management strategies can enhance psychological well-being by promoting bodily relaxation and alleviating tension and anxiety. Furthermore, psychological stress influences the patient's pain perception, establishing a strong connection between pain and psychology. Clinical research have demonstrated that certain indicators of pain alleviation correlate with indicators of psychological care. Cognitive Behavioral Therapy (CBT) and Relaxation Therapy have demonstrated efficacy in alleviating pain, while also serving as beneficial interventions for mitigating patients' anxiety and sadness[39]. This section elucidates that trauma nurses frequently integrate pain management with psychological therapy. Future anticipatory nursing training programs for post-traumatic stress disorder can include both elements to successfully augment the competence of trauma nurses in "pain and psychological care" and enhance the efficacy of PTD prevention.

The third component corresponds with previous evidence suggesting that cognitive decline may trigger delirium by increasing inflammatory factor levels[40]; thus, suitable cognitive care can alleviate PTD[41]. Literature research indicates that the trauma nurses surveyed concur that "cognitive nursing" is a crucial nursing strategy for preventing PTD. Nursing management ought to develop a specialized training program for "Thinking and Cognitive Care" practices tailored to the institution's current circumstances, while concurrently enhancing relevant systems to incentivize nurses' active engagement in learning and augment their cognitive training competencies.

The surveyed trauma nurses demonstrated a robust consensus, attaining a cognitive attitude score above 4.6 concerning the fourth component. This aligns with the Bu F[42] study, indicating that patients

who suffered from bed falls, falls, pressure sores, or chronic pain had a markedly increased frequency of delirium. Preventing pressure sores had the highest score in this area, likely due to the sensitivity of pressure ulcers as a quality indicator for trauma care[43]. The lowest score was attributed to Reasonable Restraint. This may be attributed to the increased likelihood of restraints being employed in wards with low nurse-patient ratios to ensure the safety of patients undergoing mechanical ventilation, sedation, and analgesia, hence reducing incidents such as inadvertent extubation. Nonetheless, due to the absence of explicit recommendations about restraint use in the PADIS guidelines, nurses frequently perceive it as a standard nursing practice and remain oblivious to the detrimental effects of excessive restraint[44]. This may lead to diminished evaluations of appropriate constraint. Consequently, the training of trauma nurses in the principles and techniques of "reasonable restraint" should be actively reinforced to improve their proficiency in this area. Adjuvant drug analgesics are included in this context likely due to their association with considerable adverse effects and potential for addiction.Opioid-induced respiratory depression may result in hypoxemia, hypercapnia, and more detrimental respiratory occurrences in patients.[45] It is recommended that nursing staff should do a good job of pre-medication assessment, fully understand the adverse effects of drugs, accurately grasp the indications for medication, and do a good job of monitoring the effects of drugs and adverse effects.

5.3 Guidelines for organizing training programs focused on nursing evidence to prevent PTD

Cognitive Behavioral Theory posits that individuals' perceptions and beliefs can affect their behavior and decision-making processes[46]. The disparities in educational qualifications and practical training among trauma nurses, along with inadequate resources (including personnel, materials, or time), management hierarchy, and institutional limitations, have resulted in significant variations in the knowledge and attitudes of trauma nurses regarding nursing interventions to prevent PTD. Cognition significantly influences attitude formation; thus, acquiring knowledge through learning enhances attention, thereby affecting behavior and practice[14]. The four cognitive dimensions provide a targeted framework for nursing managers to develop training modules. Appropriate hospitals or departments must formulate training programs that align with the cognitive and attitudinal attributes of trauma nurses, grounded in evidence-based practice. This should consider the heightened awareness of the four dimensions and 39 evidence items, alongside the diminished awareness of other items among nurses, to enhance the capacity to prevent PTD in critically ill trauma patients. The influence of management parameters on the execution of nursing interventions to avoid PTD must be thoroughly assessed, the viable bed-to-nurse ratio should be comprehensively analyzed.[47] and adequate clinical resources must be ensured[48]. Conversely, managers must continually enhance their cognitive abilities, devise management strategies that align more closely with clinical treatment, and inspire caregivers to adopt more sophisticated anticipatory care in PTD[49].

Limitations:The study recognizes multiple limitations that require consideration. The sample size is significantly limited and lacks adequate diversity. Secondly, there is a lack of empirical validation of clinical patient outcome measures, which is essential for establishing a correlation between the

perceptions of trauma nurses and actual patient outcomes. Additionally, our survey is maily administered online, thus there may be some potential for social desirability bias where nurses have reported more positive attitudes toward evidence-based measures than their actual practice. Future research should focus on increasing the sample size and integrating pertinent clinical outcome variables to solve these concerns. This approach enables a more thorough investigation of the relationship between the cognitive framework of trauma nurses and the clinical outcomes they affect. This information would be essential for nursing administrators and educators in improving trauma care and education.

CONCLUSION

Examining trauma nurses' perceptions of anticipatory care measures for post-traumatic delirium (PTD) and analyzing the facets of these perceptions can enhance comprehension of their attitudes toward anticipatory care for PTD, thereby serving as a crucial reference for the formulation of a training curriculum focused on anticipatory care competencies for PTD.

Nursing administrators and trauma nurses can develop a comprehensive PTD anticipatory care plan based on this dimension, so boosting the overall care of trauma patients and improving their quality of life.

Abbreviations

PTD:post-traumatic delirium

APACHE: Acute Physiologic Assessment and Chronic Health Evaluation

ISS :Injury Severity Score

EFA:Exploratory factor analysis

CBT:Cognitive Behavioral Therapy

Declarations

Ethics approval and conset to participate

Ethics Approval was required and approved for this paper–Southwest Hospital Human Research Ethics Unit:(A)KY2024074. Before accessing the questionnaire, all potential participants were presented with an electronic information sheet describing the purpose and procedures of the study, the confidential and anonymous handling of their data, and their right to withdraw at any time. Informed consent to participate was obtained from all participants; completion and electronic submission of the questionnaire were taken to indicate provision of informed consent.

Consent for publication

Not applicable. This manuscript does not contain any individual person's data in any form.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to the protection of research participants' privacy and confidentiality but are available from the corresponding author on reasonable request.

Competing interests

The authors have no conflict of interest.

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None

Authors' contributions

Jinru Li: Data curation (equal); formal analysis (equal); investigation (equal); project administration (equal); writing – original draft (lead). Junhseng Qi: Data curation (equal). Ying Cao:formal analysis (equal).. Yushu Wang:investigation (equal). Jin Gao: Data curation (equal).Juanjuan Wu:investigation (equal).. Li Luo: writing – review and editing (equal). Qin Shu: project administration (equal); writing – review and editing (equal).

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Tables

Tables 1, 4 and 5 are available in the Supplementary Files section.

Figures

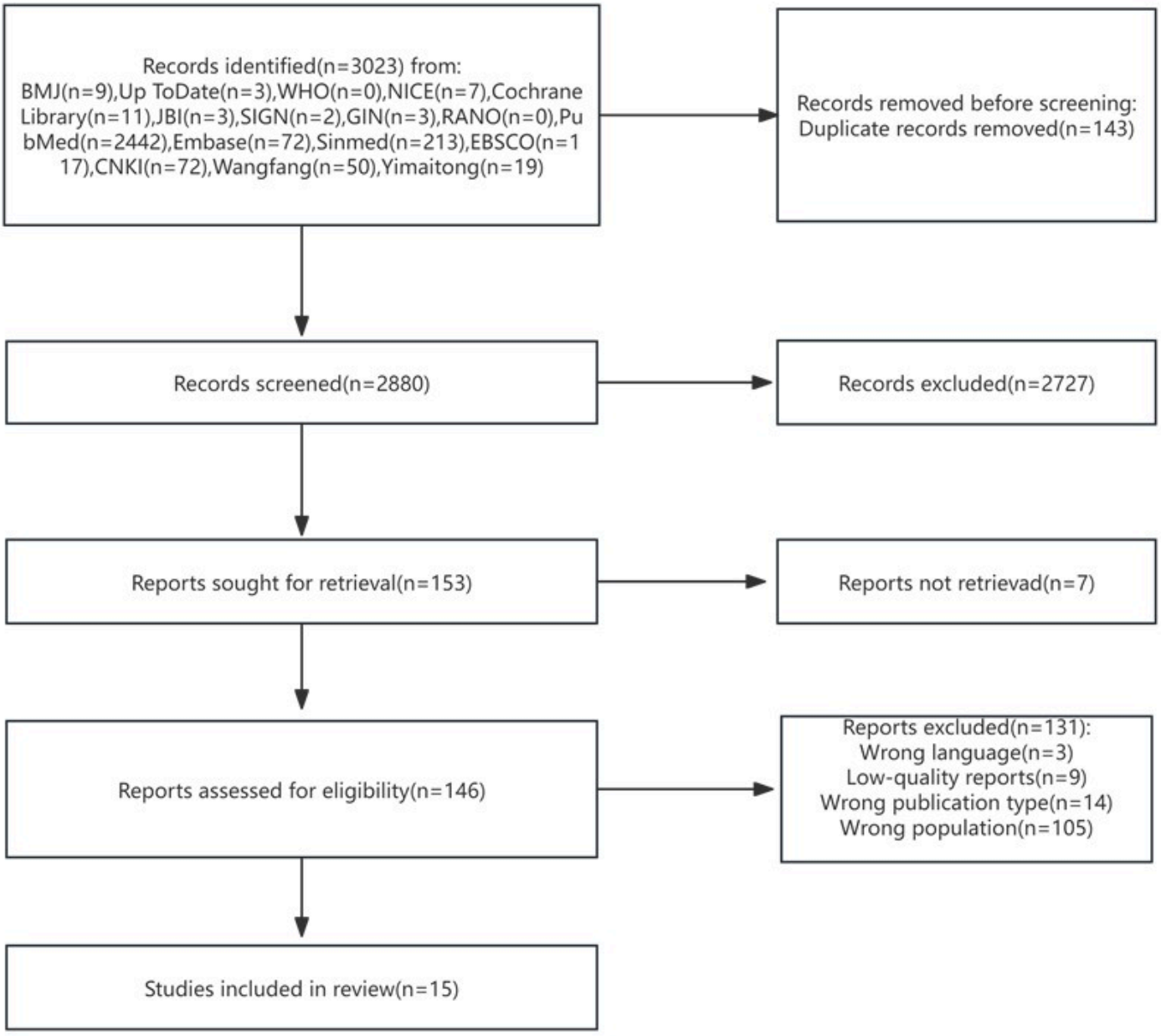


Figure 1

Flow diagram of study selection

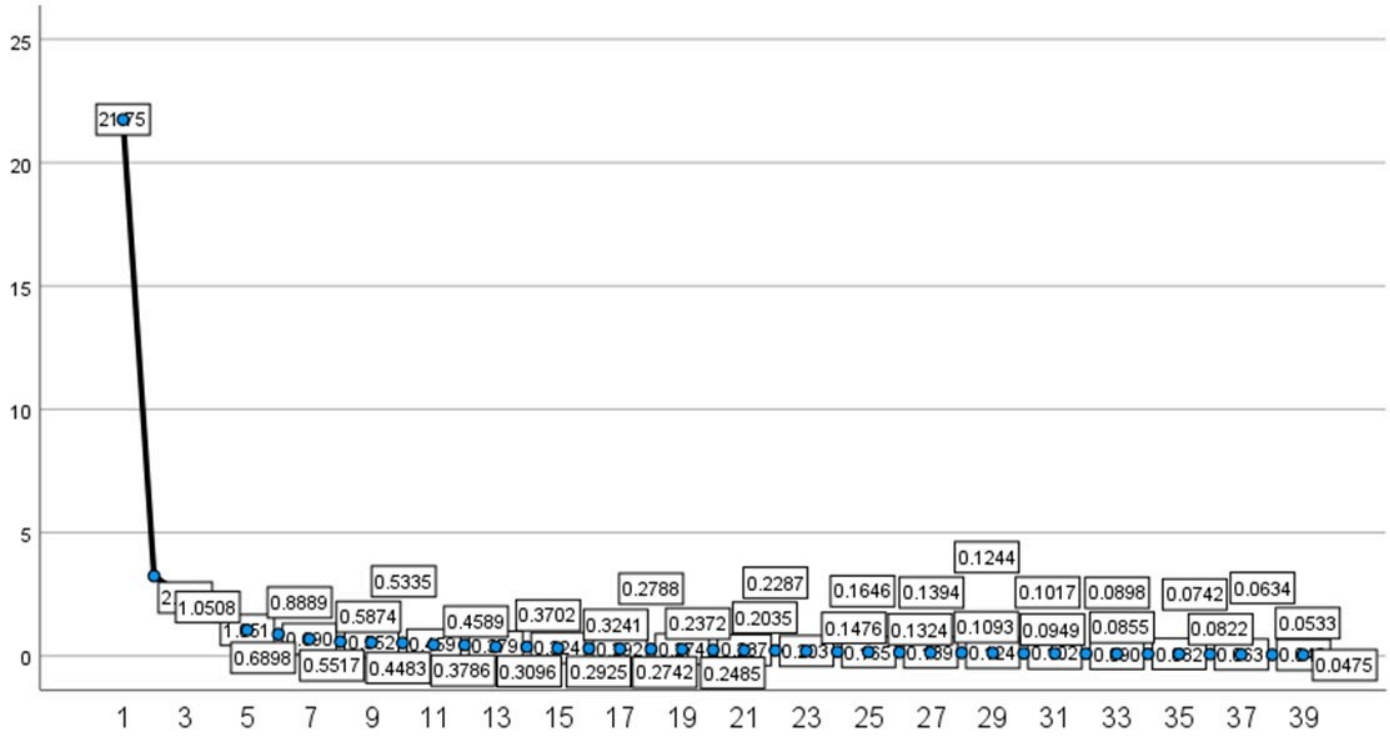


Figure 2

39-entry factor analysis of the gravel plot

Supplementary Files

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