## ORIGINAL RESEARCH

# Goal-Directed, Evidence-Based Care Reduces the Incidence of Perioperative Stress Injury

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#### ABSTRACT

**Objective** • This study aimed to investigate the clinical impact of goal-oriented, evidence-based nursing in preventing perioperative stress injuries.

**Methods** • A total of 380 patients undergoing surgery were allocated into either the control or study group. The study group received goal-oriented, evidence-based nursing, while the control group received routine nursing care. Various perioperative indicators, including operating time, position change time, intraoperative bleeding, and length of hospitalization, were assessed and compared between the two groups. Additionally, the Mini-Nutritional Assessment (MNA) score, Munro score, incidence of stress injuries, and nursing satisfaction rate were compared. Patients with perioperative pressure sores (PS) were further evaluated using the Pressure Ulcer Healing Score (PUSH), Braden Stress Injury Scale (Braden), visual analogue scale of pain (VAS), and wound healing time.

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#### INTRODUCTION

Pressure injury, also known as Pressure Sore (PS), is a common complication following surgery, including pressure ulcers. The emerging approach of goal-directed evidencebased care is designed to reduce the risk of postoperative pressure injuries. This study aims to compare the effectiveness of goal-directed evidence-based care and usual care in postoperative patients, evaluating multiple perioperative indicators and pressure injury incidence.

Hypoxia and ischemic injury caused by prolonged pressure on local tissues are the primary causes of this condition, characterized by a high incidence, easy recurrence, Results • The study group exhibited higher MNA levels during and after the operation, while Munro levels were lower compared to the control group (P < .05). The study group demonstrated a shorter length of stay and quicker body position changes than the control group. Incidence of pressure sores (PS) was lower in the study group, accompanied by higher nursing satisfaction. PS patients in the study group had lower VAS and PUSH scores, higher Braden scores, and shorter wound healing times than those in the control group. **Conclusion** • This study highlights the efficacy of goaloriented, evidence-based nursing in reducing perioperative stress injuries, advocating its adoption for improved care and patient outcomes. However, the single-center design limits generalizability, necessitating further validation. Ultimately, this approach signifies a step forward in nursing practice, promising better patient recovery and satisfaction. (Altern Ther Health Med. 2024;30(10):268-273).

and challenging clinical treatment, posing a threat to patients' physical and mental health.<sup>1</sup> Surgical patients, particularly those undergoing trauma or orthopedic procedures, are at a higher risk of perioperative pressure injuries, with an incidence ranging from 10% to 17.5%. Perioperative pressure injuries can significantly impact patients' quality of life, increase the risk of diffuse infection, and hinder postoperative recovery.<sup>2,3</sup> Goal-oriented nursing is a patient-centered, evidence-based concept advocating nursing intervention through research-supported measures to achieve established nursing goals, such as disease control, complication reduction, and prognosis improvement. <sup>4,5</sup> Despite limited clinical studies on goal-oriented, evidence-based nursing in preventing perioperative pressure injuries, it holds the potential to decrease the incidence of stress injuries. Therefore, this study aims to investigate the clinical value of goal-oriented, evidence-based nursing in preventing perioperative pressure sores.

To assess the effectiveness of goal-oriented evidencebased nursing, various assessment tools were employed, including the Mini-Nutritional Assessment (MNA) score for nutritional status, the Munro scale for pressure ulcer risk, and assessments for patients with pressure ulcers, such as the Pressure Ulcer Healing Score (PUSH), Braden Stress Injury Scale (Braden), visual analog scale of pain (VAS), and wound healing time.

This study explores the potential value of a goal-directed care model in preventing pressure injuries in postoperative patients. The model emphasizes developing individualized care goals based on each patient's unique needs, incorporating evidence-based care principles to reduce the risk of complications. The study evaluates the impact of this nursing model on various postoperative indicators, offering evidence for applying goal-oriented care to improve the quality of care, reduce complication risks, and enhance patient satisfaction.

### METHODS

### Patients

A total of 380 patients undergoing orthopedic surgery in our hospital from January 2020 to January 2022 were selected. This study has been approved by the Ethics Committee of Beihua University Affiliated Hospital (approval number: 2020010032), and all participants and their families have signed informed consent. Inclusion criteria consisted of: 1) Patients meeting the diagnostic criteria of limb or trunk fractures according to CNN Attention Guidance for Improved Orthopedics Radiographic Fracture Classification6. This includes clinical assessment for the presence of obvious fracture symptoms such as pain, deformation, swelling, or dysfunction, imaging evidence (usually X-rays, CT scans, or MRIs), and doctor's diagnosis made by experienced clinicians based on clinical symptoms and imaging results. 2) Patients eligible for surgical treatment of fractures;6 3) Patients aged  $\geq$ 18 years and  $\leq$ 70 years; 4) Patients fully informed of the treatment and nursing contents. Exclusion criteria included: 1) Presence of pressure injuries before surgery; 2) Primary skin complications with atopic dermatitis and systemic lupus erythematosus; 3) Patients with bone active infection; 4) Patients with mental or psychological diseases.

Patients were randomly assigned to either the study group (n=190) or the control group (n=190) using a computer-generated random number table. The randomization plan was developed before the study, outlining details of random number generation, grouping methods, and allocation procedures. Clear grouping rules were specified, involving thresholds for assigning participants to different groups. The randomization results were recorded and reported for future reference, ensuring a fair and scientific randomization process to minimize research bias and enhance the study's trustworthiness.

Nurse training content included detailed descriptions of objectives, courses, training materials, etc. It was crucial to specify the training method, the background and experience of the trainers, the duration of the training, and the evaluation method of training results. Additionally, it was clarified whether training occurred before, during, or after surgery, and if any other relevant training details were present.

### Methods

The control group received routine care. After the surgical plan was confirmed, the specialized nurses guided the patients to complete the preoperative examination and precautions, popularized the surgical knowledge and rehabilitation knowledge through health education, used the PS risk assessment tool to evaluate the patient's skin status and the risk of perioperative PS, told the patients to change their positions regularly before and after the surgery to avoid long-term compression of the same position, and used clean soft towels or hydrocolloid dressings for decompression protection of the position of the bone process on the side prone to compression.

The study group accepted goal-oriented evidence-based nursing: (1) Preliminary preparation: 1) Evidence-based data collection: the nurses in our department formed a goaloriented nursing group consisting of 5-6 nurses on a voluntary basis, led by the head nurse. Case study, patient investigation, expert consultation, literature analysis, and other methods were used to collect PS evidence-based nursing measures. The operation points of various evidence-based measures were fully discussed by brainstorming in the group meeting, referring to the Prevention and Treatment of Pressure Ulcer/ Injury: 2019 International Clinical Practice Guidelines.<sup>7</sup> The evidence-based nursing program was determined, the actual experience and feelings of nurses and patients were collected through the pre-implementation of the program. And the evidence-based nursing program was optimized and adjusted according to the suggestions or opinions nurses and patients gave. The evidence-based nursing program, including health education, psychological nursing, PS risk assessment, perioperative postural management, perioperative partial decompression protection, perioperative nutrition management and other contents, was determined. 2) Determination of guiding objectives: We collected the actual nursing demands of nurses and patients by visiting orthopedic nurses, operating room nurses, fracture surgery patients and other related personnel, and summarized the key problems that nurses and patients most wanted to solve. At the group meeting, according to the actual situation of the survey, combined with the nurses ' working environment, working scene, skills, nurses ' demands, patients ' demands, and other information, we determined' reducing the incidence of PS, promoting wound healing, and reducing psychological and economic burden ' as the nursing-oriented goal. (2) Goaloriented evidence-based nursing program: 1) Health education: orthopedic surgery and PS knowledge education should be carried out for patients and their families, and the possible related risks should be clearly explained to patients to improve their attention to PS prevention. 2) Psychological care: In the preoperative stage, we visited patients in advance and assessed the patient's psychological state, encouraged patients to respond positively through the typical successful case publicity, health knowledge popularization, attention transfer, family or friends social support, and other methods to eliminate patient anxiety, reduced the fear of disease. 3)

Perioperative PS risk assessment: micro nutritional assessment (Mini Nutrition Assessment, MNA)<sup>8</sup> and Munro Perioperative Adult Stress Injury Risk Assessment Scale<sup>9</sup> (Munro scale) were used to assess the risk of PS. Patients with preoperative MNA ≤23.5 points or Munro scale > 6 points were defined as patients at risk of PS. 4) Nutrition management: Before and after surgery, patients were told to eat a balanced, low-fat, high-quality protein, low-salt diet, avoid irritating food, ensure that the daily basic energy intake is not less than 32 kcal/kg, take the principle of eating less and more meals, and divided the food that met the daily energy supply needed into 3 to 6 portions to ensure the energy intake needs of patients and reduced the burden on the digestive system. 5) position management: 1. Preoperative: preoperative guidance was used to patients to maintain a reasonable rest and correct position, regular change of position to avoid long-term oppression of the same position if there was local pressure, skin red, swelling, pain, and other symptoms, timely inform the nurse. 2. Intraoperative: During surgery, operating room nurses should not only cooperate with doctors to complete the preparation of surgical supplies, instrument transfer, operating room environment care, aseptic operation care, and other basic nursing contents, but also conduct posture management for patients. According to the actual position of patients during surgery, appropriate positions should be selected to place disposable hydrocolloid dressings.3. Postoperative: Postoperative patients usually need to maintain a forced position to reduce wound pulling and promote wound healing. Nurses should carry out targeted postural management according to the patient's postural position, flexibly adjust the postural position according to the patient's comfort, limb movement ability, surgical location, skin tissue tolerance, and trauma size, shorten the bedtime in a single position as far as possible on the premise of ensuring incision safety and patient comfort. 6) Local decompression protection: Low resistance, clean, dry, and soft cloth was used as a cushion on the bed. Patients at risk of PS in the risk assessment should also be covered with hydrocolloid dressings based on soft cloth padding for further decompression and protection. Before and after the operation, the skin condition of the compressed side of the patient was examined every 2 ~ 3 h, and the patient was reminded to change the position or adjust the stress of the compressed position. The decompression protection liner was replaced regularly. For patients with PS precursor symptoms such as skin redness, swelling and pain, the time of position change was shortened, and the compression time of the same part was not more than 30 min, reducing the PS risk (Figure 2.).

#### Data collection

The two groups compared perioperative indicators, MNA scores, Munro scale scores, the incidence of pressure injuries, satisfaction with care, pressure ulcer healing score<sup>10</sup> (pressure ulcer scale for healing, PUSH), Braden pressure injury scale<sup>11</sup> (Braden scale), the visual analogue scale for

#### Figure 1. The process of the study.



Figure 2. The process of the study group accepted goaloriented evidence-based nursing



pain<sup>12</sup> (visual analog scale, VAS) and time to wound healing in patients with PS in both groups. Specifically, those included: (1) Perioperative indicators: the operative time, perioperative position change time, intraoperative blood loss (measured by volumetric method combined with clean gauze weighing method), and length of hospital stay were compared between the two groups. (2) PS risk indicators: MNA and Munro scores were compared between the two groups before, during, and after surgery. MNA was 30 points, Munro was 21 points before surgery, 42 points during surgery (including preoperative and intraoperative), and 48 points after surgery (including preoperative and intraoperative). MNA and Munro scores were negatively and positively correlated with the risk of PS in patients, respectively. (3) The incidence of PS: The incidence of PS was compared between the two groups. The diagnosis and classification of PS were based on the prevention and Treatment of Pressure Ulcer/ Injury: 2019 International Clinical Practice Guidelines.<sup>7</sup> Standards. (4) PS disease indicators: Braden scale, PUSH scale, VAS score, and wound healing time of patients with PS were compared between the two groups. There were 23 points in the Braden scale, 10 points in the VAS scale and 17

Table 1. the baseline of tw	o groups.
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	control group	study group	$t/\chi^2$	P value
Gender (male, %)	102(53.68%)	108(56.84%)	0.361	.548
Age (years)	45.23±5.76	45.18±5.85	0.086	.931
BMI (kg/m <sup>2</sup> )	21.05±1.74	21.20±1.83	0.840	.401
fracture to clinic visit time(hours)	7.35±1.26	7.42±1.33	0.540	.589
Fracture location				
upper limb	74	80	0.393	.531
lower limb	116	110		

**Table 2.** Comparison of perioperative indicators between the two groups  $(\overline{x \pm s})$ 

group	n	Operation time (min)	Position change time (min/ time)	Intraoperative blood loss (ml)	Length of hospital stay (days)
Research Group	190	62.15±4.61	35.15±4.15	183.21±7.24	6.53±0.53
Control group	190	61.78±4.72	47.44±6.26	184.16±7.41	9.59±0.87
t		0.773	22.555	1.264	41.404
P value		.440	<.001	.207	<.001

**Table 3.** Comparison of perioperative PS risk between the two groups  $(x \pm s, \min)$ 

			MNA		Munro scale			
group	n	preoperatively	Intraoperative	postoperatively	preoperatively	Intraoperative	postoperatively	
Research group	190	28.15±1.33	26.53±1.51	25.43±0.68	4.89±0.20	8.53±0.35	9.62±0.41	
Control group	190	28.08±1.29	24.15±1.32	22.75±0.57	4.91±0.18	9.66±0.47	12.43±0.55	
t		0.521	16.357	41.633	1.025	26.580	56.462	
P value		.603	<.001	<.001	.306	<.001	<.001	

points on the PUSH scale. The severity of patients' disease was positively correlated with VAS and PUSH scale scores but negatively correlated with Braden score. (5) Nursing satisfaction: Patients were invited to complete the nursing satisfaction questionnaire before discharge. According to the score, patients were divided into very satisfied (10 points), satisfied (8~9 points), general or not satisfied (< 8 points), and the satisfaction rate = (very satisfied + satisfied) number/ total number ×100%. Multiple assessment tools, such as MNA score, Munro score, and PS risk assessment, were used in the study to evaluate the patient's condition comprehensively. The tools were selected based on their application in previous studies and their feasibility in assessing specific indicators. The content and scoring criteria for specific instruments can be found in the relevant literature, and they are widely accepted standards. In practice, researchers are trained to ensure they use these tools correctly. This helps ensure the accuracy and comparability of results.

#### Statistical analysis

The study used Statistical Product and Service Solutions (SPSS) 22.0 (IBM, Armonk, NY, USA) to analyze the data. For age, body mass index, time, MNA, Munro, Braden, PUSH and VAS scores, *t* test was used for analysis. For gender, fracture site, PS incidence, and satisfaction with care,  $\chi^2$  tests were used. The statistical comparisons being made can be expressed more clearly when the variables analyzed by each test are specified. In the statistical analysis section, clearly indicate the significance level (e.g., *P* < .05) to illustrate the threshold used to determine statistical significance. This helps readers understand the credibility of the research results.

## RESULTS

## Comparison of baseline indicators between the two groups

There were 102 males (53.68%) in the control group and 88 females (46.32%). The average age was ( $45.23\pm5.76$ ) years, from 20 to 68 years. Body mass index 19-26 kg/m2, with an average of ( $21.05\pm1.74$ ) kg/m<sup>2</sup>. The time from fracture to clinic visit was 4-11 h, with an average of ( $7.35\pm1.26$ ) h. Fracture location was 74 cases (38.95%) of the upper limb and 116 cases (61.05%) of the lower limb. There were 108 males (56.84%) in the study group and 82 females (43.16%). The age ranged from 21 to 69 years, with an average of ( $45.18\pm5.85$ ) years. Body mass index 19-27 kg/m2, with an average of ( $21.20\pm1.83$ ) kg/m2; The time from fracture to

clinic visit was 3-12 h, with an average of  $(7.42\pm1.33)$  h. Fracture location was that 80 cases (42.11%) of the upper limb and 110 cases (57.89%) of the lower limb. There was no significant difference in general data between the two groups (Table 1.) (P > .05). The clinical significance of the presented results lies in the similarity of demographic and clinical characteristics between the control and study groups, ensuring a fair comparison in subsequent outcome analysis. The balanced distribution of gender, age, body mass index (BMI), time from

fracture to clinic visit, and fracture location between both groups indicates that any differences in outcomes can be attributed more confidently to the interventions under study, rather than to underlying demographic variability. This suggests that the findings of the intervention's effectiveness can be considered applicable to a broad population of patients with similar characteristics.

# Comparison of perioperative indicators between the two groups

There were no significant differences in operative time (t=0.773) and intraoperative blood loss (t=1.264) between the two groups (P > .05). The study group's body position change time (t=22.555) and hospital stay time (t=41.404) were shorter than those of the control group, as shown in Table 2. The clinical significance of these results lies in the fact that the implementation of the studied intervention did not negatively impact operative time or intraoperative blood loss, which are critical factors for patient safety and surgical efficiency.

## Comparison of PS risk indicators between the two groups

Before surgery, there were no significant differences in MNA (t=0.521) and Munro (t=1.025) between the two groups (P > .05). During operation, MNA (t=16.357) and Munro (t=26.580) of the study group were higher than those of the control group (P < .05). After surgery, MNA (t=41.633) in the study group was higher than that in the control group, while Munro (t=56.462) was lower than that in the control group (P < .05), as shown in Table 3. The improved perioperative MNA and Munro scores in the study group suggest that the nursing intervention may enhance patient

nutrition and reduce complication risks, potentially leading to better surgical outcomes and recovery.

### Comparison of the incidence of PS between the two groups

The incidence of PS in the study group (4.21% vs. 13.16%) was lower than that in the control group ( $\chi^2$ =8.495, *P* < .05), see Table 4.

## Comparison of disease indicators between the two groups of PS patients

Braden (t=5.067) of PS patients in the study group was higher than that in the control group, VAS (t=8.468) and PUSH (t=3.341) were lower than that in the control group, and wound healing time (t=8.971) was shorter than that in the control group (P < .05), as shown in Table 4.

#### Comparison of nursing satisfaction between the two groups

The nursing satisfaction rate of the study group (98.42% vs. 92.11%) was higher than that of the control group ( $\chi^2$ =7.057, *P* < .05), as shown in Table 4.

## DISCUSSION

Study results showed that patients who adopted goaloriented, evidence-based care significantly improved in multiple areas. First, they had significantly higher Mini-Nutritional Assessment (MNA) scores after surgery, indicating better nutritional status. Second, this group had lower Munro scores, suggesting a lower risk of pressure injury. Additionally, they achieved better results in length of stay and frequency of repositioning, which may mean faster recovery andlower medical costs. More notably, the incidence of pressure injuries was reduced and patient satisfaction was higher in the goal-oriented, evidence-based care group. Those patients who had pressure injuries showed significant improvements in pain scores, pressure injury healing time, and more.

These results emphasize the importance of goal-oriented, evidence-based care in postoperative patient care. By improving patients' nutritional status, reducing the risk of pressure injuries, accelerating recovery, and increasing patient satisfaction, this approach not only helps improve patient's quality of life but may also reduce healthcare costs for both healthcare providers and patients. Have a positive practical impact. These results provide a solid clinical rationale for adopting goal-directed, evidence-based care.

Pressure ulcers (PS) can cause significant physical and psychological burdens for patients and increase the treatment burden of healthcare providers.<sup>13-15</sup> Previous research has indicated that the incidence of PS in inpatients is high, especially in patients undergoing surgery.<sup>16,17</sup> Traditional perioperative care for the prevention of PS has focused on posture management and decompression protection. Still, the prevention and Treatment of Pressure Ulcers/injuries: 2019 International Clinical Practice Guidelines<sup>7</sup> highlights the importance of nutrition management and risk assessment in PS prevention. This study used different methods to carry **Table 4.** Comparison of the PS incidence, PS patients' diseaseindicators and nursing satisfaction between the two groups.

Items	Research group	Control group	P value
Incidence of PS	8/190=4.21%	25/190=13.16%	.004
i	6(3.16)	15(7.89)	
ii	2(1.05)	8(4.21)	
iii ~ iv	0	2(1.05)	
PS patients' disease indicators			
Braden (points)	19.20±0.99	16.35±1.48	<.001
VAS (points)	3.22±0.26	4.25±0.31	<.001
PUSH (points)	6.60±1.51	8.83±1.68	.002
Wound healing time (day)	9.78±1.43	18.20±2.51	<.001
Nursing satisfaction rate	187/190=98.42%	175/190=92.11%	.008
Fair or unsatisfactory	3(1.58)	15(7.89)	]
Satisfied	26(13.68)	43(22.63)	
Very satisfied	161(84.74)	132(69.47)	

out perioperative nursing intervention for patients undergoing orthopedic surgery. The results showed that goal-oriented, evidence-based nursing intervention improved perioperative MNA and Munro scores, reduced the incidence of PS, and shortened the time of body position change and hospital stay when compared to the control group.

Yap et al.<sup>18</sup> study has also shown that goal-oriented evidence-based nursing can improve the frequency of orthopedic surgery patients' postural change, reduce the risk of PS, and shorten the length of hospital stay. The study results demonstrated that patients receiving goal-oriented, evidence-based nursing intervention had a lower incidence of PS and lower pain scores compared to the control group. Additionally, the nursing satisfaction rate of the study group was significantly higher than that of the control group.

This study inevitably has some limitations, the most important of which is that although we made efforts to control for baseline differences between groups in the study design, we cannot completely rule out the influence of other potential confounding factors that were not considered. Although we adopted a randomized grouping method in data analysis, the possibility of patient self-selection still exists, which may have a certain impact on the results. In addition, our sample was from a single medical center, so there may be limitations to external validity, and future multicenter studies may be more helpful to verify the generalization ability of our results.

To more fully understand the long-term impact of goaldirected, evidence-based care in surgical patients, future studies could consider tracking patient recovery, including outcomes months or years after surgery. At the same time, more detailed research on the cost-effectiveness of these interventions is also a direction worthy of attention. Additionally, assessing patient quality of life and satisfaction in the immediate postoperative period will provide a more complete understanding of the actual impact of these care methods on patients.

In a clinical sense, this study provides a feasible goaloriented, evidence-based nursing intervention method for surgical patients, which can significantly reduce the incidence of pressure injuries and improve patients' recovery. By adopting these care methods, healthcare providers and institutions can more effectively prevent complications faced by patients during the postoperative period and improve the overall patient experience. Overall, despite some limitations, the results of this study provide strong support for improved surgical patient care. Future research should focus more deeply on the longterm effects and cost-effectiveness of these care approaches to more fully understand their actual value in clinical practice.

#### CONCLUSION

In conclusion, the application of goal-oriented, evidencebased nursing in perioperative care significantly improves outcomes, including reduced pressure injuries, enhanced patient satisfaction, and shorter postoperative recovery times. This approach holds clinical value, emphasizing the need for healthcare providers to adopt evidence-based practices in perioperative care for overall quality improvement. Moving forward, future research can explore additional dimensions of perioperative care, ensuring a sustained focus on optimizing patient outcomes.

#### ETHICAL COMPLIANCE

The ethics committee of Beihua University Affiliated Hospital approved this study. Signed written informed consent were obtained from all participants before the study.

#### DATA AVAILABILITY

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

#### CONFLICT OF INTERESTS

The authors declared no conflict of interest

#### AUTHORS' CONTRIBUTIONS

Xiaoqiu Yang: Conceptualization, Data curation, Investigation, Writing – original draft; Xuhui Huang: Conceptualization, Funding acquisition, Methodology, Writing – review & editing. All authors read and approved the final manuscript.

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