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The Application of Checklist Management in the Risk Management of Clinical Teaching for Chronic Wound Care in Burn and Plastic Surgery

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Abstract: *Objective:* To explore the application effect of checklist management in the clinical teaching risk management of chronic wound care in the burn and plastic surgery department. *Methods:* 80 nursing students who interned in our department from January 2022 to December 2023 were divided into the control group (40 students, using the traditional teaching mode) and the observation group (40 students, implementing the checklist management teaching mode) according to the teaching time sequence. The theoretical knowledge and operational skills assessment scores, the incidence of nursing risk events, and the teaching satisfaction of the two groups were compared respectively. *Results:* The theoretical knowledge score (91.3 ± 5.2 points) and operational skills score (90.5 ± 4.8 points) of the observation group were both higher than those of the control group (82.4 ± 6.3 points and 78.6 ± 7.1 points), and the differences were statistically significant ($P < 0.05$); the incidence of nursing risk events in the observation group (5.0%) was lower than that in the control group (20.0%), and the difference was statistically significant ($P < 0.05$); the teaching satisfaction rate of the observation group (97.5%) was higher than that of the control group (75.0%), and the difference was statistically significant ($P < 0.05$). *Conclusion:* The application of checklist management in the clinical teaching of chronic wound care in the burn and plastic surgery department can effectively improve the comprehensive skills of nursing students, reduce the incidence of nursing risk events, and enhance teaching satisfaction, which is worthy of clinical promotion.

Keywords: Checklist management; Burn and plastic surgery department; Chronic wound; Clinical teaching; Risk management

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1. Introduction

The management of chronic wounds in burn and plastic surgery is a complex task involving dressing changes, infection control, and local anatomical identification, which has always been a key and challenging area in clinical nursing education. Tang et al. (2025) found that the traditional single teaching method in burn and plastic surgery nursing education is no longer sufficient to meet the needs of comprehensive ability training for intern nurses [1]. Common problems among intern nurses include weak awareness of operational norms and insufficient risk identification ability. Given the characteristics of the specialty, such as the variable state of wounds, the vulnerability of patients, and the high risk of wound infection, intern nurses are more prone to assessment omissions, operational deviations, and even nursing

risk events during independent operations, and the stability of teaching quality needs to be improved.

2. Materials and methods

Checklist management originated from the fields of aviation and surgical safety. By standardizing complex procedures into checklists that can be verified item by item, it effectively reduces the safety risks caused by human omissions. Zeng et al. (2015) pointed out that checklist management has broad application prospects in nursing and can standardize nursing behaviors and reduce nursing defects [2]. Foreign studies have also shown that introducing systematic teaching tools in clinical nursing education can significantly improve interns' mastery of clinical skills and reduce operational errors [3]. In terms of risk management education, Padash et al. (2023) confirmed that clinical risk management training for nursing students can effectively enhance their patient safety competence, and structured intervention is an important means to improve teaching effectiveness [4]. In addition, Yang et al. (2024) combined checklist-based teaching management with a two-way evaluation system and achieved positive results in clinical nursing teaching practice [5]; Liu et al. (2023) also systematically reviewed the research progress of checklist-based teaching methods in undergraduate nursing education and concluded that this method has obvious advantages in improving teaching quality [6]. Based on the above background, this study takes chronic wound care in burn and plastic surgery as the entry point and introduces checklist management into the clinical teaching risk management system, aiming to explore a new path for specialized nursing teaching that is both practical and safe.

2.1. General information

A total of 80 nursing students who participated in clinical internships in the burn and plastic surgery department of our hospital from January 2022 to December 2023 were selected and divided into a control group (n = 40) and an observation group (n = 40) based on the order of their internships. Inclusion criteria: full-time undergraduate or junior college students majoring in nursing; first-time internship in this department; voluntary participation in this study. Exclusion criteria: those who withdrew from the internship halfway; those with severe communication disorders. There were no statistically significant differences in general data such as age, gender, education level, and teaching duration between the two groups ($P > 0.05$, see **Table 1**), making them comparable.

Table 1. Comparison of general data of intern nurses in the two groups

Item control	Group (n = 40)	Observation group (n = 40)	χ^2/t	*P* Value
Age (years, mean ± SD)	21.3 ± 1.2	21.5 ± 1.1	0.79	0.432
Gender (male/female, n)	12/28	13/27	0.05	0.819
Education (junior college/undergraduate, n)	18/22	17/23	0.05	0.819
Teaching Duration (months, mean ± SD)	3.1 ± 0.4	3.0 ± 0.5	1.01	0.316

2.2. Teaching methods

The control group adopted the traditional teaching mode, where the teaching instructor arranged operational demonstrations, on-the-job observations, and exit examinations according to the department's routine. The teaching content was mainly oral instruction and experience sharing, without a unified operational procedure standard.

The observation group implemented a teaching mode based on checklist management, based on the control group, with the following specific measures:

(1) Construction of a specialized nursing teaching checklist system. The head nurse of the department, in collaboration with associate chief nurses, wound care specialists, and senior teaching nurses, developed the "Teaching Checklist for Chronic Wound Care in the Burn and Plastic Surgery Department" (hereinafter referred to as the "Teaching Checklist") after repeated discussions. The checklist covers six major modules: wound assessment, aseptic technique,

dressing change norms, secretion sampling, instrument handling, and risk prevention, with a total of 32 verification items. Each item is presented in a "yes/no" format, accompanied by notes and risk warnings, requiring nursing students to check each item before and after each operation.

(2) The teaching checklist is implemented in three phases over 12 weeks. In the first phase (weeks 1–4), the teaching nurse demonstrates the procedures, and the nursing students observe and learn by referring to the checklist. In the second phase (weeks 5–8), the students perform the operations independently under the supervision of the teaching nurse, who explains the risk items before each operation, and the students self-assess and fill out the checklist after each operation. In the third phase (weeks 9–12), the students operate independently, and the teaching nurse conducts a two-way evaluation based on the checklist, providing targeted reinforcement training for weak items.

(3) A dynamic risk early warning mechanism is established. The teaching nurse summarizes the checklist verification records weekly, identifies high-frequency error items, and provides feedback at the morning meeting. Real cases are used to organize case discussions, guiding the nursing students to internalize the checklist thinking into operational habits. When there are signs of nursing risk events, the department's special review process is immediately triggered, and the teaching nurse provides one-on-one guidance to the relevant nursing students.

2.3. Observation indicators

(1) Assessment Scores: This includes the theoretical knowledge test (out of 100 points, covering wound anatomy, dressing change principles, infection control, etc.) and the operation skills assessment (out of 100 points, scored based on the items on the teaching checklist) before leaving the department.

(2) Nursing Risk Incidents: The number of risk incidents, such as dressing change errors, insufficient infection control, and missed reporting of patient conditions, during the internship period will be counted.

(3 Teaching Satisfaction: A self-made questionnaire by the department will be used to assess the satisfaction of the interns before leaving the department, with three levels: very satisfied, satisfied, and dissatisfied. The satisfaction rate is calculated as (very satisfied + satisfied) / total number of people × 100%.

2.4. Statistical methods

SPSS 26.0 software was used to process the data. Measurement data were expressed as mean ± standard deviation (SD), and the independent sample *t*-test was used for comparison between groups; count data were described by frequency and percentage, and the χ^2 test was used for comparison between groups. $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of assessment scores between the two groups of nursing students

The theoretical knowledge score (91.3 ± 5.2 points) and operation skills score (90.5 ± 4.8 points) of the observation group were both higher than those of the control group (82.4 ± 6.3 points and 78.6 ± 7.1 points, respectively), and the differences were statistically significant ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of assessment scores of interns in the two groups (Points, mean ± SD)

Group	n	Theoretical Knowledge (Points, mean ± SD)	Operation Skills (Points, mean ± SD)
Control Group	40	82.4 ± 6.3	78.6 ± 7.1
Observation Group	40	91.3 ± 5.2	90.5 ± 4.8
t		8.74	9.52
P value		< 0.05	< 0.05

3.2. Comparison of the occurrence of nursing risk incidents between the two groups

The incidence of nursing risk incidents in the observation group (5.0%) was significantly lower than that in the control group (20.0%), and the difference was statistically significant ($\chi^2 = 4.114$, $P = 0.043$), as shown in **Table 3**.

Table 3. Comparison of occurrence of nursing risk incidents in the two groups [n(%)]

Group	n	Medication change operation error	Insufficient infection control in the hospitall	Omission in reporting of patient condition observation	Total number of risk events	Occurrence rate (%)
Control Group	40	4	3	1	8	20.00
Observation Group	40	1	1	0	2	5.00
χ^2	—	—	—	—	4.114	—
P value	—	—	—	—	0.043	—

3.3. Comparison of teaching satisfaction between the two groups

The teaching satisfaction rate of the observation group (97.5%) was higher than that of the control group (75.0%), and the difference was statistically significant ($P = 0.003$), as shown in **Table 4**.

Table 4. Comparison of teaching satisfaction in the two groups [n(%)]

Group	n	Very Satisfied	Satisfied	Not Satisfied	Satisfaction Rate (%)	*P* value
Control Group	40	16 (40.0)	14 (35.0)	10 (25.0)	75.00	0.003
Observation Group	40	27 (67.5)	12 (30.0)	1 (2.5)	97.50	

4. Discussion

The care of chronic wounds in burn and plastic surgery departments is a weak link in the specialized skills training of nursing students due to the numerous operation steps and scattered risk factors. The results of this study show that the theoretical knowledge and operation skills scores of the observation group were significantly higher than those of the control group before leaving the department, confirming the positive value of checklist management in the training of nursing students' skills. The reason for this is that the teaching checklist solidifies the key technical nodes scattered in each operation process in a list form, providing a basis for each practical operation of the nursing students and effectively shortening the transition period from theory to practice. Alizadeh-Taghiabad et al. (2023) proposed in their study on the standard for the frequency of dressing changes for burn wounds that establishing clear and quantifiable operational standards is a key prerequisite for shortening the learning curve and improving the quality of operations, which is highly consistent with the functional positioning of the checklist items in this study [7]. Additionally, Gillespie et al. (2023) confirmed through a prospective study that nurse-led wound care education without structured content support will show significant fluctuations in educational outcomes with changes in the operational scenarios; using a checklist as a framework can effectively ensure the consistency and completeness of educational content [8].

In this study, the incidence of nursing risk events in the observation group (5.0%) decreased by 75% compared to the control group (20.0%), and the difference was statistically significant. The checklist management fundamentally shifts the risk prevention and control to the front end - before each dressing change, nursing students must confirm each item on the checklist, including the establishment of a sterile barrier, the completeness of wound assessment records, and the proper disposal of operational waste. Any omissions will be intercepted by the checklist mechanism. Purabdollah et al. (2023) pointed out in their scoping review that the cultivation of clinical competence among nursing students not only depends on knowledge accumulation but also on the continuous reinforcement of safe behaviors in real clinical environments, and structured operation checklists are an effective carrier for this reinforcement process [9]. Padash et al. (2023) also found that

systematically embedding risk management concepts into nursing student training can improve their ability to identify and respond to patient safety situations, which is consistent with the design concept of the dynamic risk warning mechanism in this study. For risk management in specialized nursing teaching to shift from passive response to active prevention and control, checklist-based and process-oriented teaching tools are indispensable.

The improvement in the teaching satisfaction of nursing students reflects the positive role of checklist management in the teaching relationship. When the assessment dimensions are clear and the expected goals are visible, the learning anxiety of nursing students decreases; when teaching instructors evaluate according to a unified checklist standard, it also reduces the inconsistency of subjective scoring, making nursing students more accepting of the assessment results. Onarici et al. (2021) confirmed through a randomized controlled trial that introducing a structured intervention model in the teaching of burn patient care plans improved the skill mastery and subjective satisfaction of nursing students, which is consistent with the conclusion of this study [10]. Bobbink et al. (2022) also found in the evaluation of a blended learning project for wound care among undergraduate nursing students that when students can obtain clear operational path guidance, their self-efficacy and course satisfaction significantly increase [11]. Parker et al. (2022) further suggested that an integrated multi-professional perspective framework for wound care education helps nursing students establish a more complete clinical thinking, which provides a direction for the iterative optimization of checklist content in the future [12].

5. Conclusion

In conclusion, introducing checklist management into the risk management system for clinical teaching in chronic wound care in burn and plastic surgery is not only a beneficial supplement to the traditional teaching model but also a practical path for ensuring the quality of specialized nursing education. Future studies can appropriately expand the research scale to further verify the long-term effects and application boundaries of checklist management.

Disclosure statement

The authors declare no conflict of interest.

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