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Original Article

Application of clinical nursing pathway reduced the incidence of bedsores and improved rehabilitation in senile bedridden patients

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Abstract: Objective: This study aimed to explore the effects of clinical nursing pathway (CNP) in gynecological bedridden patients and its impact on the incidence of bedsores. Method: 150 patients (Braden score <18 points) were randomly divided into the study group (n=75) and control group (n=75). Conventional care was performed in the control group, and CNP, which required regular scoring as well as effective dietary and psychological guidance, was performed in the study group. The incidence of bedsores, the cure rate, the surface pressure of the compression site, changes in skin temperature, and patients' satisfaction with the nursing care provided were observed. Results: There was no significant difference between the study group and the control group in terms of gender, age, alcohol consumption, smoking, body mass index, etiology, and alanine aminotransferase and aspartate aminotransferase levels (all P>0.05). The incidence of bedsores was significantly lower (χ^2=4.701, P=0.048) but the cure rate of bedsores was significantly higher (χ^2=5.304, P=0.027) in the study group than in the control group. The skin temperatures of the scapula and the appendix (t=4.778, P<0.001; t=3.530, P<0.001) and surface pressure of the scapula and the appendix (t=2.641, P=0.009; t=2.299, P=0.022) were significantly lower in the study group than in the control group. The satisfaction rate of the study group with the nursing care provided was significantly higher than that of the control group (χ^2=8.027, P=0.008). Conclusion: The application of the CNP nursing intervention model in gynecological bedridden patients reduced the incidence of bedsores, the epidermal temperature and surface pressure of the compressed parts, and improved patients' bedsores, and satisfaction with nursing care.

Keywords: Clinical nursing pathway, geriatrics, bedridden patients, hemorrhoids, nursing satisfaction

Introduction

Due to physical weakness, patients on prolonged bed rest tend to have limited activity. Hence, it is often difficult for the patient to change his or her position while on bed, and the local tissues of the body are under pressure for a long time. The affected region of the body will receive insufficient blood supply, which can lead to local tissue necrosis as a result of hypoxic-ischemic tissue injury and nutrient deficiency [1, 2]. The incidence of bedsores in hospitalized elderly patients can reach up to 10% and commonly affects the humerus, ischial tuberosity, femur trochanter, root bone, and other parts [3]. The development of hemorrhoids aggravates the condition and cause other complications. In severe cases, the patient may even die [4]. With the increasing number of elderly individuals in the society, many geriatric patients require treatment and bed rest, which increases the incidence of bedsores in such population [5]. Therefore, the search for effective nursing pathways is particularly important for prevention, treatment, and prognosis of bedsores in elderly patients.

The clinical nursing pathway (CNP) is a new quality management approach that provides an effective inpatient-centered care for specific patients based on a standard care program [6]. The care schedule and standards are set for special patients, so that the care provided by the nursing staff can be clinically justified and well documented. Special personnel perform the verification work, to reduce mistakes while

providing patient care, improve quality of care, and satisfaction of patients and their families; this will allow the patient's body to recover, promote the early discharge of patients, speed up the clinical bed turnover rates, and allow more patients to receive timely treatment.

At present, several studies have reported the clinical application of CNP, which indicates that the nursing model plays a major role in improving the hospitalization rate of patients with various diseases. However, a few studies have reported on the specific application of CNP in geriatric bedridden patients. To further analyze the significance of CNP application in gynecological bedridden patients, this study aimed to implement CNP in gynecological bedridden patients, to provide a feasible clinical nursing model for prevention, treatment, and prognosis of acne bedsores in elderly bedridden patients.

Materials and methods

Normal information

The clinical medical records of 150 bedridden patients admitted in Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology (Braden score <18 points) were prospectively analyzed [7]. These patients were randomly divided into a study group (n=75) and control group (n=75). The study group comprised 38 male and 37 female patients, with an age range of 61-80 years and an average age of 66.47±3.52 years. Among them, 19 had stroke, 15 had diabetes, 23 had hypertension, and 18 had chronic renal failure. The control group comprised 53 male and 22 female patients, including 30 patients with hypertension and 16 with chronic renal failure.

Inclusion and exclusion criteria

Inclusion criteria: Patients with no hemorrhoids upon admission and aged ≥65 years were included in the study. The patients and their family members were informed of the procedure of the study and signed a full informed consent form. Exclusion criteria: Patients with severe liver and kidney dysfunction, connective tissue disease, endocrine and metabolic diseases, and hematopoietic system diseases; and those with open injuries in the shoulder, back, lumbosacral region, and other regions were excluded.

Routine care

In the control group, the following routine measures were taken: the patient's clothes and beddings were often replaced, the ward was kept clean and tidy, the ventilation was instructed, the patient and family members were instructed to follow the recommended diet and to take the medications on time, the patient was given massage therapy on a regular basis, and the patient was informed of the schedule of his or her regular follow-up care when discharged from the hospital.

CNP

A research group implemented CNP with holistic care as the vertical axis, including assessment, diagnosis, planning, implementation, and evaluation, and time as the horizontal axis. Specific measures: The patient was admitted to the hospital on the 1st day to assess the risk factors, monitor the changes in vital signs of high-risk patients, and provide timely treatment for primary disease. Patients were repositioned on bed more frequently; local pressure was reduced; a soft support pillow was applied; the bed was lowered when patient was moving; the bed was kept flat; the medications were properly administered, and shear and friction were reduced. The appropriate skin decompression tools were used, such as ice packs in summer and sponge mattresses in winter. The nursing staff provided the patients with relevant knowledge about bedsores and its treatment methods, gave support and encouragement to them, and helped them eliminate negative emotions such as anxiety and depression. The Braden scores were given by examining six criteria: perception, humidity, activity, mobility, nutrient intake, friction and shear. Each aspect has 4 points and a total score of 24 points. The higher the score, the higher risk of bedsores. Pressure ulcer score classification: 15 to 18 points suggest a mild risk; 13 to 14 points suggest a moderate risk; 10 to 12 points suggest a high risk; <9 points suggest extreme risk. On the 2nd day of admission, the nursing staff verified and gave a confirmation. On the 3rd day, an effective dietary guidance was implemented. The occurrence of bedsores was related to the intake of patients' nutrition. In the elderly bedridden patients, due to their limited activities, gastrointestinal motility slowed down; the nutri-

ent intake was reduced; the digestion and absorption capacity was reduced, and the malnutrition and immunity were easily reduced, resulting in hemorrhoids. Patients were given high protein, high calorie, and cellulose-rich foods; they were given small but frequent feedings; they were asked to avoid spicy and cold foods, and their nutritional balance was maintained. On the 4th day, the Braden score was obtained and the nursing plan was adjusted in a timely manner. Therefore, it is necessary to give necessary nutritional support to elderly bedridden patients. Patients with extreme risk (Braden scores <9) were assessed once a day; those with high-risk risk were evaluated once for 2 days; those with moderate-risk were evaluated twice a week, and those with mild-risk low-risk patients were evaluated once a week. The skin condition of the patient's compression site was assessed. If the color of skin around the compression site did not return to normal, massage therapy was discontinued, and the Amp patch film was applied to treat skin tissue damage. If the patients' skin had bruises, pus, and ulceration, a complex iodine solution was used. Saline was used to disinfect and rinse the patient's skin using sterile technique to maintain skin moisture. If an infection occurred, A moist exposed burn cream was applied and the site was covered with a sterile dressing. In patients with blisters, a local disinfection was performed; the exudate was aspirated, and the site was covered with a dressing. In patients who had an infected wound with a purulent discharge, mupirocin ointment was applied. With regard to the nursing process and treatment, healthcare providers communicated with patients and their families, encouraged patients, gave targeted psychological guidance, and understood the specific conditions of the patients. At discharge, patients at risk of bedsores were informed of the methods of preventing hemorrhoids, including diet, rest, and psychological guidance, to improve patients' self-care ability.

Outcome measures

The incidence and cure rates of bedsores in the study group and the control group as well as the surface pressure and skin temperature of the compression site were evaluated. The patient's epidermal temperature and body surface pressure were measured after one week of nursing care. The skin temperature of the scapula and appendix was measured by a non-contact infrared thermometer (Shanghai Senxi Electronic Technology Co., Ltd., China). The subjects were placed in a medical bed and a pressure gauge (Shanghai Boxun Medical Bio Instrument Co., Ltd., China) was placed in the patient's scapula and appendix for testing. The subjects took 3 positions, and selected a pressure gauge with a balloon. Each measurement site was measured 3 times, and the average value was obtained in mmHg.

Cure rate: Patients' bedsores wounds healed well; bedsores wounds improved significantly and wound exudates decreased significantly; bedsores wounds did not change or worsened (Efficient rate = (healing + improvement)/total number of cases × 100%). The nursing satisfaction survey was used to investigate the level of satisfaction of the two groups. The survey included questions regarding patient care, willingness to answer questions, and provision of early reminders to evaluate the satisfaction of patients and their families. Patients with 60 points or below were classified as "dissatisfied", 60 to 79 points are classified as "basically satisfactory", 80 to 90 points are classified as "satisfied", and 90 points or above are classified as very satisfactory. A higher score indicated a higher level of patient satisfaction (care satisfaction = (number of very satisfied cases + number of satisfied cases)/total number of cases × 100%).

Statistical analysis

Statistical analysis was performed using SPSS, version 20.0 (Beijing Sitron Weida Information Technology Co., Ltd.). Measurement data are expressed as mean±standard deviation (x±sd), Comparison of measurement data between groups was performed using an Independent Samples t Test. The percentage of count data was used, and the data between groups were compared using a chi-square test. A P value of <0.05 implied a significant difference.

Results

Baseline data

There was no statistically significant difference between the study group and the control group in terms of gender, age, alcohol consumption,

Table 1. Baseline data of the study and control groups [n (%)]/($\bar{x}$ ±sd)

Category	Research group (n=75)	Control group (n=75)	t/χ^2	P
Gender			0.758	0.486
Male	48 (64.00)	53 (70.67)		
Female	27 (36.00)	22 (29.33)		
Age	66.47±3.52	65.96±4.71	0.648	0.518
Drinking			1.192	0.337
Yes	32 (42.67)	28 (37.33)		
No	43 (57.33)	47 (62.67)		
Smoking			1.645	0.272
Yes	24 (32.00)	17 (22.67)		
No	51 (68.00)	58 (77.33)		
BMI (kg/m^2)	26.15±3.42	26.74±2.95	1.131	0.259
Cause			1.111	0.774
Stroke	19 (25.33)	14 (18.67)		
Diabetes	15 (20.00)	15 (20.00)		
Hypertension	23 (30.67)	30 (40.00)		
Chronic renal failure	18 (24.00)	16 (21.33)		
ALT (U/L)	57.14±11.37	59.24±10.25	1.188	0.236
AST (U/L)	17.43±6.59	19.08±6.79	1.510	0.133

Table 2. Comparison of the incidence of bedsores between the study group and the control group

Group	Case (n)	Number of occurrences	Incidence (%)	χ^2	P
Research group	75	11	14.67	4.701	0.048
Control group	75	22	29.33		

Table 3. Cure rates of the study group and the control group [n (%)]

Group	Case (n)	Cure	Better	Not getting better	Cure rate (%)
Research group	11	3 (27.27)	7 (63.64)	1 (9.09)	90.91
Control group	22	4 (18.18)	7 (31.82)	11 (50.00)	50.00
χ^2	-	-	-	-	5.304
P	-	-	-	-	0.027

smoking, body mass index, etiology, alanine aminotransferase (ALT) level, and aspartate aminotransferase (AST) level (all P>0.05) (**Table 1**).

Incidence of bedsores in the study group and the control group

A total of 11 (14.67%) cases of bedsores occurred in the study group, and 22 cases (29.33%) of bedsores occurred in the control group. The incidence of bedsores in the study group was significantly lower than that in the control group (χ^2=4.701, P=0.048) (**Table 2**).

Bedsores cure rates between the study group and the control group

In the study group, 3 cases were cured (27.27%), 7 cases were improved (63.64%), and 1 case did not improve (9.09%). The cure rate was 90.91%. In the control group, 4 cases were cured (18.18%), 7 cases were improved (31.82%), and 11 cases did not improve (50.00). The cure rate was 50.00%. The cure rate of bedsores in the study group was significantly higher than that in the control group (χ^2=5.304, P=0.027) (**Table 3**).

Epidermal temperature changes in the compression site of the study group and the control group

In the study group, the skin temperature of the scapula was 33.2±2.0°C and that of the appendix was 32.2±2.1°C; In of the control group, the skin temperature of tibia was 34.8±2.1°C and that of the appendix was 33.5±2.4°C. The skin temperatures of the scapula and the appendix in the study group were significantly lower than those in the control group (t=4.778, P<0.001; t=3.530, P<0.001) (**Figure 1A**, **1B**).

Changes in body surface pressure at the compression site of the study group and the control group

The study group had a scapula surface pressure of 43.2±8.4 mmHg and appendix surface

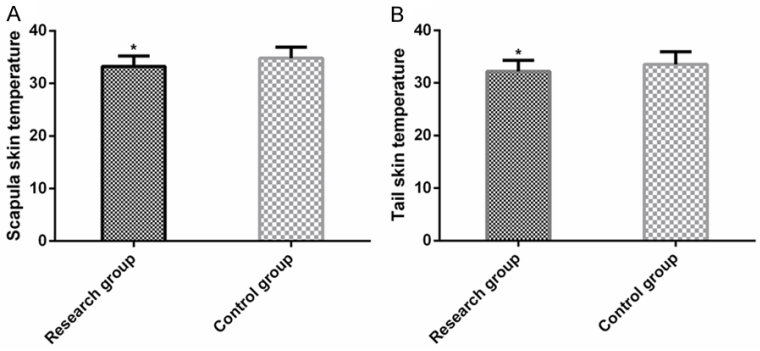

Figure 1. A, B: Comparison of epidermal temperature results between the study group and the control group. Note: *P<0.05 compared with the control group.

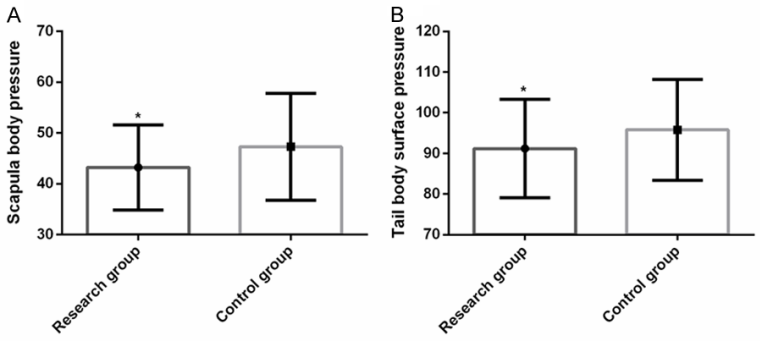

Figure 2. A, B: Comparison of body surface pressure results between the study group and the control group. Note: *P<0.05 compared with the control group.

pressure of 91.2±12.1 mmHg. On the contrary, the control group had a scapula surface pressure of 47.3±10.5 mmHg and appendix surface pressure of 95.8±12.4 mmHg. The scapula surface pressure and the appendix surface pressure in the study group were significantly lower than those in the control group (t=2.641, P=0.009; t=2.299, P=0.022) (**Figure 2A**, **2B**).

Satisfaction of the study group and control group with the nursing care provided

In the study group, 63 patients were very satisfied with the treatment (84.00%), 12 patients were satisfied (12.00%), and 3 patients felt normal (4.00%); the average satisfaction rate was 96.00%. In the control group, 53 patients were very satisfied with the treatment (70.67%), 8 patients were satisfied (10.67%), 11 patients felt normal (14.67%), and 3 patients (4.00%) were unsatisfied; the average satisfaction rate was 81.33%. The satisfaction rate of the study group with the nursing care provided was significantly higher than that of the control group (χ^2=8.027, P=0.008) (**Table 4**).

Discussion

With the increase of the aging population, the number of critically ill diseases in the elderly patients is increasing, which has led to an increase in the number of bedridden patients in the geriatric department. Due to the presence of a disease, the patients may experience various discomforts for a longer period. In severe cases, the patients' physical performance tend to decline and may lose the ability to change positions while in bed. Prolonged bed rest increases the pressure on the skin around the affected regions and loses its moisture. This can lead to hypoxic-ischemic tissue injury, resulting in skin softness, ulceration, and necrosis, which has a serious impact on quality of patients' life [8, 9]. Patients who had been bedridden for a longer period of time develop various diseases, negative emotions, become unconfident in the treatment, and have insufficient intake of nutrients; these factors will increase the incidence of bedsores [5, 10]. Studies have shown that effective nursing pathway management can improve prognosis of bedridden patients, and reduce the incidence of bedsores [11]. The provision of health education to patients and their families was not timely, which increased the incidence of hemorrhoids, financial burden of patients, and workload and psychological stress of the nursing staff [12, 13]. CNP is a new type of nursing intervention model which provides a fast and efficient management. Most of its constituent members are the backbone of the nursing staff of the department, jointly formulating every detail of CNP, ensuring the dynamics and continuity of nursing care during the nursing process, and taking the previous nursing work experience and evidence-

Table 4. Comparison of nursing satisfaction between the study group and the control group [n (%)]

Group	Case (n)	Very satisfied	Satisfaction	General	Not satisfied	Satisfaction (%)
Research group	75	63 (84.00)	9 (12.00)	3 (4.00)	0 (0.00)	96.00
Control group	75	53 (70.67)	8 (10.67)	11 (14.67)	3 (4.00)	81.33
χ^2	-	-	-	-	-	8.027
P	-	-	-	-	-	0.008

based nursing as the ideological guidance. In conjunction with the management model of the hospital nursing department, a supervision team was established [14]. The implementation of CNP involves the use of the Braden scoring method to evaluate the patient's condition and establish an bedsores report form and evaluation form. It also involves recording of the nursing points and method of treatment [15]. In this mode of care, young care workers can grow rapidly through systematic learning, and experienced senior care workers can give correct and positive guidance, reducing arbitrariness and blindness in work. This can improve the job responsibility, predictive ability, and preventive awareness of the nursing staff; reduce mishandling and omission in nursing work; improve work efficiency; and reduce disputes between doctors, nurses, and patients in the nursing process [16].

After applying the CNP nursing model to the research group, the results of this study showed that the incidence of bedsores in the study group was significantly lower than that in the control group; the cure rate of bedsores in the study group was significantly higher than that in the control group; the skin temperature and body surface pressure of the study group were significantly lower than those of the control group. The satisfaction rate of the study group with nursing care provided was significantly higher than that of the control group, suggesting that the application of CNP in geriatric patients can reduce the incidence of hemorrhoids, reduce the epidermal temperature and surface pressure of the compression site, and improve the therapeutic effects of hemorrhoid treatments and patients' satisfaction. This finding is similar to those of previous studies, where the use of integrated care programs can significantly reduce the incidence of hospital-acquired pressure ulcers in intensive care units [17]. Comprehensive nursing mainly focuses on the nursing procedure, formulates the systematization of nursing procedures, interlocks and overall coordination, and can formulate corresponding nursing plans according to the specific conditions of patients [18]. CNP is an effective inpatient nursing model. The patient develops a standardized nursing schedule that allows the nursing staff to be clinically relevant and well documented. Previous studies and this study all have shown that this model of care can reduce the incidence of edsores, but the study included in this study is different from previous studies. Whether CNP can reduce the incidence of acquired pressure ulcers in intensive care unit patients will be clarified in future research. In this study, the participants were strictly screened based on the inclusion and exclusion criteria. There was no significant difference between the study group and the control group in terms of gender, age, presence or absence of alcohol consumption, presence or absence of smoking, body mass index, etiology, ALT, or AST, which ensured the rigor and reliability of the study. This study had some limitations. For example, whether the CNP nursing intervention model is applicable to other departments remained unclear; the research time is limited. In future research, the research time should be extended and CNP should be applied in different departments of the hospital. The nursing intervention model provides further evidence for the conclusion of this study.

In summary, the application of CNP in gynecological bedridden patients can reduce the incidence of bedsores, reduce the epidermal temperature and surface pressure of the compressed parts, improve the therapeutic effects of bedsores treatments, and improve patients' satisfaction with the nursing care provided. Thus, CNP application is worthy of clinical application.

Disclosure of conflict of interest

None.

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