The Risk Factors-Based Nursing Case Management Could Effectively Reduce the Incidence of Pressure Sores in Hospitalized Patients

Hong JIANG [1,2], Yanwen LIANG [1], Xinmei LIU [1], Donghong YE [1], Mengmiao PENG [1], Yun CHEN [3,4], Shuang CHEN [3,4], Wanying CHEN [3,4], Haiyan LI [1], *Shuyao ZHANG [3,4]

1. Department of Nursing, Guangzhou Red Cross Hospital ,Ji-Nan University, Guangzhou, 510220, P.R. China
2. Department of Nursing, Cancer Hospital of Shantou University, Medical College, Shantou, 515031, P.R. China
3. Department of Pharmacy, Guangzhou Red Cross Hospital, Ji-Nan University, Guangzhou, 510220, P.R. China
4. Clinical Pharmacy Research Center, Shantou University Medical College, Shantou, 515031, P.R. China

Corresponding Author: Email: yxoe7359@163.com

Abstract

Background: To explore the effects of risk factors-based nursing management on the occurrence of pressure sores in hospitalized patients.

Methods: From Jan 2018 to Jun 2018, 289 hospitalized patients were divided into pressure sores group [100] and control group [189] for retrospective analysis. Overall, 260 hospitalized patients from Jun 2018 to Dec 2018 were followed up for nursing intervention. Overall 130 patients received risk factors-based nursing case management were in the intervention group, whereas 130 patients who received routine nursing care were in the control group. The chi-square test and *t*-test were used to compare the count data and the measurement data between groups, respectively.

Results: Age, body weight and proportions of patients with impaired nutritional intake, diabetes or stroke in pressure sores group were higher than those in normal group (*P*<0.05). Hospital stay and operative time in pressure sores group was longer than those in normal group (*P*<0.05). The frequency of assistant activity in pressure sores group was significantly lower than that in control group (*P*<0.05).In addition, the score of uroclepsia in pressure sores group was lower than that in normal group (*P*<0.05). Patients in the intervention group showed lower risk for pressure sores and more satisfied than patients in control group (*P*<0.001).

Conclusion: Advanced age, high body weight, diabetes and stroke, long hospital stay, long operative time, poor nutritional status and severe uroclepsia were independent risk factors of pressure sores. Risk factors-based nursing case management can effectively reduce the occurrence and risk of pressure sores for hospitalized patients.

Keywords: Risk factors; Pressure sores; Hospitalized patients

Introduction

Pressure sores refers to soft tissue ulceration and necrosis caused by long-term compression of local tissues, blood circulation disorders, local persistent ischemia, hypoxia, and malnutrition, also

known as bedsores (1, 2). Pressure sores is prone to occur in the bone protruding parts, such as the appendix, ischial tuberosity, femoral greater trochanter and foot roots (3). The occurrence of pressure sores can increase the patient's pain, prolong hospital stay, increase medical costs, and increase the mortality rate of elderly patients by more than 4 times (4).

At present, many studies have shown that the incidence of pressure sores is high (5,6). Lahmann et al have investigated 8706 patients in 218 treatment institutions and showed that the incidence of pressure sores ranges from 5.0% to 12.5% (6). Jiang Qixia et al conducted a study of 39952 patients from 12 general hospitals in 9 cities and revealed the incidence of pressure sores was 1.58% (5). The high incidence of pressure sores in hospitalized patients seriously affect the prognosis of patients and satisfaction of nursing treatment, which urgently requires a reasonable and effective intervention model for related prevention.

In recent years, the risk factors-based nursing has been increasingly applied in clinical practice. Risk factors-based nursing refers to the systematic identification and assessment of the patient's nursing risk factors, and timely emergency nursing management for patients (7,8). Implementing risk factors-based nursing can improve the quality of nursing care, prevent and reduce adverse nursing events and improve nursing satisfaction (9, 10).

However, the risk factors are different for each hospitalized patient. Therefore, for patients with pressure sores, the high-risk factors should be evaluated and then individualized nursing modes should be carried out according to different risk factors of each patient. Case management is a flexible, systematic, and collaborative approach to providing and coordinating care for specific populations.

Here, the risk factors related to the occurrence of pressure sores in hospitalized patients were analyzed, and then evaluate the efficacy of the risk factors-based nursing case management in hospitalized patients to prevent the occurrence of pressure sores.

Materials and Methods

General information

This study was subjected to expedited review and approval by the Center's Ethics Committee. Then, a retrospective study of the medical records of 289 hospitalized patients (from 2018 Jan to 2018 Jun) was conducted in Cancer Hospital of Shantou University Medical College, China, which was the only non-profit grade III oncology hospital in eastern Guangdong and had 704 beds. According to the occurrence of pressure sores, these patients were divided into two groups, as pressure sore group (n=100) and normal group (n=189). Then the risk factors associated with pressure sores were compared between these two groups, including age, body weight, gender, hospital stay, operative time, assistant activity, nutrition, uroclepsia and the proportions of diabetes and stroke. Assistant activity were classified into three levels, thus few (without additional assistant activity except the routine assistant activity given by the nurse), some (with additional assistant activity some days except the routine assistant activity given by the nurse), and daily (with additional assistant activity every day except the routine assistant activity given by the nurse). Impaired nutritional intake referred to that the patients did not follow the nutritionist's instructions. Uroclepsia was assessed based on following: scores from no incontinence (patients without incontinence throughout hospitalization), occasional incontinence (patients with incontinence for several times throughout hospitalization), often-urinary incontinence (patients with incontinence everyday throughout hospitalization) and incontinence (patients with gatism everyday throughout hospitalization) were 4, 3, 2 and 1 respectively. The risk factors for pressure sores were associated by the comparison between pressure sores group and normal group.

Following that, 325 hospitalized patients (from 2018 Jun to 2018 Dec) received risk factors-based nursing case management, as intervention group. Before 2018 Jun, the 289 hospitalized patients received routine nursing, as control group.

Inclusion criteria include hospitalized for more than 24 h, age > 18 yr old. Exclusion criteria include psychiatric, pediatric. Rejection criteria include hemodynamic instability, medical advice, cannot turn over for skin examination.

Nursing management

The patients in control group were treated with traditional pressure sore nursing, including creating a roll card to reduce local tissue compression, keeping the sheets clean, voucher and dry, keeping skin clean and avoid fecal irritation, and nutrition and so on. The patients in intervention group were evaluated individually according to the risk factors. They received risk factors-based nursing case management. Nursing methods for risk factors-based nursing case management were as follows. First, a nursing risk management team of a head nurse and 6 responsible nurses was established, and then these nurses evaluated the risk factors associated with pressure sore individualized and propose specific preventive measures. Second, patients with risk factors were treated with individualized nursing management, including turning over, intermittent release of pressure, massage, tools for preventing pressure sores, improving malnutrition, and psychological health education.

Observation indicators

The intervention and control groups were compared based on the following variables: the occurrence of pressure sores and nursing satisfaction score. The incidence of pressure sores during hospitalization in both groups was calculated and the risk of pressure sores in patients was assessed using the Braden scale (11). The Braden scale is based on six indicators: sensory, activity, mobility, humidity, nutritional status, friction and shear. The first five items have a score of 1 to 4 points, and the sixth item has a score of 1 to 3 points. The sum of the score ranges from 6 to 23 points. With smaller score, the patient's condition was worse and the risk of pressure sores is higher. Fifteen to 18 is classified as low risk, 13 to 14

is classified as moderate risk, 10 to 12 is classified as high risk, and ≤9 is classified as extreme risk. Nursing satisfaction was assessed using Inpatient Care Work Satisfaction Scale (12), which included 8 dimensions, such as ward environment, nurse aesthetics, technical quality and safety, timely service, health education, humane care, service attitude, and admission education. Each dimension set 4 questions and the answers included very dissatisfied, dissatisfied, general, satisfied and very satisfied, referring 1 to 5 points respectively.

Statistical analysis

SPSS (Chicago, IL, USA) 17.0 statistical software (Shanghai Beka Information Technology Co., Ltd.) was used to analyze and process the data. The count data was represented by [n(%)]. The chi-square test was used to compare the count data between groups, and the measurement data were expressed as mean ± standard deviation ($\overline{x}$±sd). *t*-test was used to compare the measurement data between groups. A *P*-value of <0.05 is considered significant. All results of SPSS calculations were verified using Graph Prism 6.0 software.

Results

Associated factors with pressure sores

No statistical difference was observed in gender between the two groups (*P*> 0.05) (Table 1). Age, body weight and proportions of patients with impaired nutritional intake, diabetes or stroke in pressure sores group were higher than those in normal group (*P*<0.05). Hospital stay and operative time in pressure sores group was longer than those in a normal group (*P*<0.05). The frequency of assistant activity in pressure sores group was significantly lower than that in control group (*P*<0.05). Furthermore, the score of uroclepsia in pressure sores group was lower than that in normal group (*P*<0.05). Advanced age, high body weight, diabetes and stroke, a long hospital stay, long operative time, poor nutritional status and severe uroclepsia were independent risk factors of pressure sores.

Table 1: Associated factors with pressure sores were analyzed by the comparison between the pressure sores group and normal group [n(%)]or[x±sd]

Variable	Pressure sores group (n=10)	Normal group (n=189)	P
Age(yr)	53.99±11.54	41.89±10.24	<0.001
Body weight（Kg）	76.24±12.86	60.33±12.92	<0.001
Gender			0.7320
Male	35（35.00）	70（37.04）	
Female	65（65.00）	119（62.96）	
Hospital stay (day)	9.50±1.25	5.25±1.50	<0.001
Operative time (h)	9.00±1.344	5.00±1.50	<0.001
Assistant activity			<0.001
Few	25(25.00)	11(5.82)	
Some	37(37.00)	57(30.16)	
Daily	38(38.00)	121(64.02)	
Impaired nutritional intake	51(51.00)	23(12.17)	<0.001
Uroclepsia	2.02±0.51	3.51±0.48	<0.001
Diabetes	43（43.00）	54（28.57）	<0.001
Stroke	52（52.00）	32（16.93）	<0.001

Patients received risk factors-based nursing intervention care showed lower risk for pressure sores

No statistical difference was observed in the clinical data (age, body weight, gender, uroclepsia scores, proportions of patients with diabetes or stroke) between the intervention group and control group (*P*> 0.05), which proved that the two groups of patients were comparable (Table 2). After different nursing care, none of the patients in the intervention group suffered pressure sores, however, 23 patients (17.69%) in control group developed pressure sores (*P*<0.001) (Table 3). In addition, according to Branden scale, there were 10, 8, 17 and 95 patients in intervention group showed extreme, high, moderate and low risk for pressure sores, but there were 31, 35, 15 and 26 patients in intervention group showed extreme, high, moderate and low risk for pressure sores (*P*<0.001) (Table 3). These results showed that the patients received risk factors-based nursing intervention care showed lower occurrence and risk for pressure sores.

Table 2: Comparison of general clinical data between the intervention group and control group [n(%)]/[x±sd]

Variable	Intervention group (n=130)	Control group (n=130)	P
Age(yr)	49.25±11.28	50.79±10.96	0.2653
Body weight（Kg）	66.58±11.59	64.33±12.08	0.1266
Gender			0.6072
Male	46（35.38）	50（38.46）	
Female	84（64.62）	80（61.54）	
Uroclepsia	3.22±0.48	3.13±0.51	0.1441
Diabetes	51（39.23）	49（37.69）	0.7988
Stroke	23（17.69）	25（19.23）	0.7492

Table 3: Comparison of incidence of pressure sores and intractable pressure sores between intervention group and control group [n (%)]

Variable	Intervention group (n=130)	Control group (n=130)	P
Pressure sores	0 (0.00)	23 (17.69)	<0.001
Extreme risk	10 (7.69)	31 (23.85)	
High risk	8 (6.15)	35 (26.92)	
Moderate risk	17(13.08)	15(11.54)	
Low risk	95(73.08)	26(20.00)	

Patients received risk factors-based nursing intervention care showed higher satisfaction

In intervention group, very satisfied, satisfied, general satisfied, dissatisfied and very dissatisfied patients accounted for 58.46%, 23.08%, 13.08%, 0.77% and 0.00% respectively. In the control group, very satisfied, satisfied, general satisfied, dissatisfied and very dissatisfied patients accounted for 25.38%, 39.23%, 26.92%, 8.46% and 0.00% respectively. Thus, patients in intervention group showed more satisfied than patients in control group ($P<0.001$) (Table 4), suggesting that patients received risk factors-based nursing intervention care showed higher satisfaction.

Table 4: Comparison of nursing satisfaction between intervention group and control group [n (%)]

Variable	Intervention group (n=130)	Control group (n=130)	P
Very satisfied	76 (58.46)	33 (25.38)	<0.001
Satisfied	30 (23.08)	51 (39.23)	
General satisfied	17 (13.08)	35 (26.92)	
Dissatisfied	1(0.77)	11(8.46)	
Very dissatisfied	0(0.00)	0(0.00)	

Discussion

The occurrence of pressure sores is caused by the internal and external factors. Internal factors refer to malnutrition, metabolic disorders and decrease of resistance. And the external factor refer to the disorders of blood supply on local tissue resulted from external stimulation. Once the pressure sore occurs, it develops fast and is difficult to cure, which will increase the patient's pain and treatment costs. So far, most of the studies have focused on the nursing intervention for patients with pressure sores (11,13,14). There are few reports on risk factors-based nursing case management interventions for preventing the occurrence of pressure sores.

We found that advanced age, high body weight, diabetes and stroke, long hospital stay, long operative time, poor nutritional status and severe uroclepsia were independent the risk factors of pressure sores in our hospital, which was consistent with the conclusion reported in many other studies (13,15-18). Based on the risk factors for pressure sores, we have a nursing case management for every patients according to their own risk factors, called risk factors-based nursing case management. We found that after risk factors-based nursing care, none of the patients suffered pressure sores, however, 23 patients (17.69%) in control group developed pressure sores ($P<0.001$), which indicated that risk factors-based nursing case management can prevent the occurrence of

pressure sores effectively. In addition, patients received risk factors-based nursing intervention care showed lower risk for pressure sores. However, we also found that after risk factors-based nursing intervention care, 7.69% and 6.15% patients still have extreme and high risk for pressure sores, which recommended us that there are still some shortcomings. Based on a retrospectively analysis of the clinical data and the living conditions of the patients in the hospital, it is easy to speculate that the high risk is related to the disease of patients and the defective care of family members of the patients, who failed to follow the instructions of the nurses. Patients with irreversible loss of local tissue at admission, severely balanced dyscrasia and neurological patients with loss of sensation are difficult to prevent the occurrence of pressure sores (18). On the other hand, under the risk factors-based nursing case management, the care of patients needs nurses, family members and patients to cooperate to achieve the best efficacy. Nurse explain the hazards and risk factors of the pressure sore to the patient and the family members, and teach them how to do to prevent the occurrence of pressure sores.

In fact, in addition to the risk factors analyzed in this study, some other risk factors have been verified. For intensive care unit (ICU) patients, gender, time in ICU, continuous arterial blood pressure monitoring, edema, mean arterial pressure, lactate Lac, heart rate, Apache II score are risk factors of pressure sores (17-20). Intraoperative hypotension time and operative time are risk factors of pressure sores for injured patients (21). Income and pain are also independent risk factors of pressure sores (22). Furthermore, we need to analyze risk factors of different patients more comprehensively and develop proper risk factors-based nursing case management.

This study has several limitations owing to the limited experimental conditions. For example, the study used a small sample size just from our hospital, and other contingencies may have not been excluded. Hence, we will conduct a study including patients from different clinical department in different hospitals of different cities, continue to improve our future research to explore the effectiveness of risk factors-based nursing case management in preventing pressure sores in different areas. Moreover, to improve the quality of life of the patients, 23 patients with pressure sores received a risk-factor-based nursing intervention and treatment immediately upon the possibility of pressure sores.

Conclusion

Risk factors-based nursing case management can effectively reduce the occurrence and risk of pressure sores for hospitalized patients.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

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