Int J Clin Exp Med 2019;12(7):8782-8790
www.ijcem.com /ISSN:1940-5901/IJCEM0093431

Original Article

Postoperative comprehensive nursing care improved the prognosis and life quality of patients with minimally invasive retrograde intramedullary nail treatment for femur supracondylar fracture

Zhaoling Sun[1], Zhiyun Liu[2]

[1]*Department of Operation Room, Linyi City Chest Hospital, Linyi 276000, Shandong, China;* [2]*Department of Obstetrics and Gynecology, The Third People's Hospital of Linyi, Linyi 276000, Shandong, China*

Received March 6, 2019; Accepted May 13, 2019; Epub July 15, 2019; Published July 30, 2019

Abstract: Objective: To explore whether postoperative comprehensive nursing care improves the prognosis and life quality of patients undergoing minimally invasive retrograde intramedullary nail fixation for supracondylar fracture of the femur. Methods: A total of 128 patients with supracondylar fracture of the femur treated in our hospital were selected and randomly divided into Group A (receiving regular nursing care) and Group B (receiving comprehensive nursing care in addition to regular nursing care), with 64 patients in each group. After nursing care, we evaluated the anxiety, pains, postoperative complications, nursing satisfaction, and life quality of patients in the two groups. Results: The anxiety score of patients was significantly higher in Group A than that in Group B ($t = 24.720$, $P < 0.001$), and a similar difference was identified in pain scores ($t = 6.861$, $P < 0.001$) following nursing care. The annoyance rate of patients in Group A was significantly lower than that in Group B ($\chi^2 = 8.008$, $P = 0.004$); the total incidence rate of complications of Group A was higher than that in Group B ($\chi^2 = 4.571$, $P = 0.033$), and their nursing satisfaction was also lower than that in Group B ($\chi^2 = 3.905$, $P = 0.048$). Moreover, after nursing care, patients in Group A had poor psychological, physiological, and social relationship scores compared to their counterparts in Group B ($t = 8.055$ or 7.916, respectively, $P < 0.001$). The improved rate of life quality of Group A was lower than that in Group B ($\chi^2 = 9.627$, $P = 0.001$) and the excellent rate of knee joint function score of Group A was lower than that in Group B ($t = 9.046$, $P < 0.001$); Excellence rate of knee joint function of Group A was lower than Group B ($\chi^2 = 8.401$, $P = 0.003$). Conclusion: Following the treatment with retrograde intramedullary nails for patients with supracondylar fracture of the femur, comprehensive nursing care can mitigate negative emotions and pains with fewer postoperative complications and improved life quality.

Keywords: Minimally invasive retrograde intramedullary nail fixation, supracondylar fracture of the femur, comprehensive nursing care, prognosis, life quality

Introduction

The knee joint is the most complicated joint in the human body, and supracondylar fracture of the femur is a kind of severe distal femur fracture that involves the femoral lateral and median condyles simultaneously and is mainly caused by a high-power, violent crash, such as being crushed by heavy items, a car accident, or a falling injury [1, 2]. In recent years, continuous development in the economy, traffic, and industry, and accelerated aging have resulted in an increasing trend in the incidence rate of supracondylar fracture of the femur, reaching nearly 3% to 6% of all types of fracture [3, 4]. The femur supracondyle is the junction between the condyles and shaft of the femur and has a fragile cortex, which makes it more susceptible to fractures caused by high-power accidents, leading to severe damage and a high incidence of complications, like hypostatic pneumonia, pressure sores, deep vein thrombosis, joint adhesion or rigidity, or malunion.

Clinically, patients with supracondylar fracture of the femur are usually treated with surgery, including the minimally invasive retrograde intramedullary nail surgery [5, 6]. However, to

obtain a promising outcome in recovery of limb function, precise restoration and stable fixation are quite necessary, and individualized, thoughtful, and comprehensive postoperative nursing care shows significance for patient recovery. Comprehensive nursing care, first introduced by scholars in the USA, is a kind of nursing pattern that manages patients as a whole through application of a nursing management system, stipulation of the responsibility and philosophy of the nursing team, and establishment of standardized nursing procedures [7, 8]. The comprehensive nursing care pattern, a progressive procedure that is adjusted with disease progression, can be modulated according to the manifestations of patients [9]. Application of comprehensive nursing care has been frequently reported and has gained promising efficacy in ameliorating negative feelings, like anxiety and tension, and promoting the recovery of patients during treatment and after operation [8, 10].

Currently, few studies focus on the efficacy of comprehensive nursing care in the recovery of patients with supracondylar fracture of the femur after the minimally invasive retrograde intramedullary nail surgery. Thus, we aimed to explore the application value of comprehensive nursing care for these patients.

Methods and materials

General data

A total of 128 patients with supracondylar fracture of the femur treated in our hospital between May 2015 and May 2017 for minimally invasive retrograde intramedullary nail surgery were selected and randomly divided into Group A (received regular nursing care) and Group B (received comprehensive nursing care in addition to regular nursing care), with 64 patients in each group. Of these patients, 64 who received regular nursing care were enrolled in Group A while the other 64 received comprehensive nursing care in addition to regular nursing care were enrolled in Group B. In Group A, there were 46 male and 18 female patients with an age range of 26 to 59 years and an average age of 38.41 ± 4.83 years. For the fracture causes, there were 36 cases of car accident, 12 of falling injury, 5 of falling down, and 4 of other causes. In Group B, there were 42 male and 22 female patients with an age range of 24 to 61 years and an average age of 39.27 ± 4.09 years. For the fracture causes, there were 39 cases of car accident, 9 of falling injury, 3 of falling down, and 2 of other causes. This study was approved by the hospital Ethics Committee. Patients and their families were informed in advance of the study and signed informed consent.

Inclusion and exclusion criteria

Inclusion criteria were presence of a supracondylar fracture of the femur confirmed by pathological examination [11], and a schedule to undergo minimally invasive retrograde intramedullary nail surgery. Exclusion criteria were presence of severe contraindications of retrograde intramedullary nail surgery; complication with severe liver or kidney dysfunction, congenital heart disease, connective tissue diseases, or endocrine diseases; and mental disorder or familial mental diseases.

Methods

Routine nursing care: Baseline data of patients were collected and saved to fully understand the condition of the family and social culture of patients, and nursing care was performed appropriate to the condition of patients after surgery. During this, we closely monitored temperature, breathing, pulse, SaO_2, and blood pressure. Incisional drainage and blood exudation were also observed with the affected limb slightly elevated to about 30°; excessive exudation was immediately reported to the physician. We also monitored changes in distal blood supply to the affected limb to prevent swelling of the limbs and deep vein thrombosis in the lower limbs. Moreover, regular medication was given by infusion, and patients were guided to perform function exercise after surgery with medical dressings on the surgical incision changed daily.

Comprehensive nursing care: In addition to regular nursing care, we also carried out comprehensive nursing care for patients in Group B with the following procedures. 1). Health education. Nurses introduced knowledge regarding the supracondylar fracture of the femur to the patients and their families through a health brochure and reminded them of the precautions to be taken after the minimally invasive intramedullary nail surgery to promote their

Table 1. T baseline characteristics of included patients [n (%)] ($\bar{x}$ ± SD)

Category	Group A (n=64)	Group B (n=64)	t/χ^2	P
Gender			0.582	0.446
Male	46 (71.88)	42 (65.63)		
Female	18 (28.13)	22 (34.38)		
Age	38.41 ± 4.83	39.27 ± 4.09		
Glu (mmol/L)	5.91 ± 0.78	6.03 ± 0.47		
BMI (kg/m^2)	27.07 ± 3.43	27.93 ± 4.22		
Cause of fracture			0.703	0.402
Car accident	36 (56.25)	39 (60.94)		
Falling from high	12 (18.75)	11 (17.19)		
Fall injury	7 (10.94)	9 (14.06)		
Bruise	5 (7.81)	3 (4.69)		
Other	4 (6.25)	2 (3.13)		
Diabetes			0.368	0.544
Have	7 (10.94)	5 (7.81)		
No	57 (89.06)	59 (92.19)		
Hypertension			0.434	0.510
Have	6 (9.38)	4 (6.25)		
No	58 (90.63)	60 (93.75)		
Smoking			0.130	0.719
Have	25 (39.06)	27 (42.19)		
No	39 (60.94)	37 (57.81)		
Drinking			0.126	0.723
Have	35 (54.69)	33 (51.56)		
No	29 (45.31)	31 (48.44)		
Place of residence			0.308	0.579
City	40 (62.50)	43 (67.19)		
Rural	24 (37.50)	21 (32.81)		
Educational level			0.042	0.838
Primary school	3 (4.69)	4 (6.25)		
Middle school	8 (12.50)	5 (7.81)		
High school	17 (26.56)	22 (34.38)		
The University	36 (56.25)	33 (51.56)		
Operation time (min)	101.52 ± 26.82	97.61 ± 25.74	0.842	0.402
Anesthesia onset time (min)	105.73 ± 9.67	108.24 ± 9.08	1.514	0.133
Blood loss (ml)	431.67 ± 43.14	427.08 ± 19.73	0.774	0.440
Wound length (cm)	11.68 ± 1.32	11.25 ± 1.63	1.640	0.104
ICU dwell time (d)	7.36 ± 1.22	7.28 ± 1.38	0.348	0.729

compliance with postoperative treatment and nursing care. 2). Diet nursing. Following surgery, nurses decided the diet procedure considering the practical condition of patients and advised them to consume fresh and liquid food. Further, nurses paid more attention to the reasonability and nutrition of food and reminded patients to consume milk or food rich in vitamins and protein. 3). Psychological nursing care. Owing to the acute nature of the injury, patients with supracondylar fracture of the femur experience physiological and psychological pains and have difficulty with the transition of identity from that of a healthy person to that of a patient. In addition, physical dysfunction and limited regular activity make patients more susceptible to anxiety, dysphoria, pessimism, and terror. Thus, nurses communicated positively with the patients to be fully aware of their feelings and psychological needs to satisfy the mental needs of patients and establish a harmonious relationship with the patients. Following the surgery, patients and their families are eager to understand the efficacy as well as the time and degree of recovery, and, thus, nurses were required to answer these questions patiently and scientifically and encourage them with the successful cases to enhance the confidence of patients in treatment and minimize their bad feelings, thereby encouraging the patients to cooperate with the postoperative treatment. 4). Pain nursing. Changes in patient condition were observed in case of any swelling or pains in the affected limbs. If this occurred, nurses guided patients to perform relaxing therapy, like playing music, reading books, and taking deep breaths, thus distracting them; however, for any intolerable pains, oral administration of analgesics in reasonable doses were considered. 5). Rehabilitation nursing care. A rehabilitation program was stipulated particularly according to the practical condition of patients, and, if appropri-

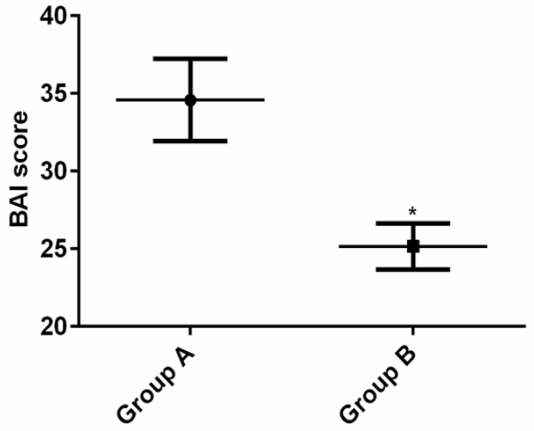

Figure 1. Pain scores after intervention in both groups. The anxiety score of group A was significantly higher than that of Group B (t = 24.720, $P < 0.001$). Note: *P < 0.001 compared with Group A.

ate, an isometric contraction training program of quadriceps femoris was considered on Day 1 after surgery in combination with passive functional rehabilitation of the knee joint using a CPM machine (1 time/d, 30 min/time) with the strength adjusted according to the tolerance of the patients. On day 3 and 4 after surgery, patients are advised to walk with assistance, and, gradually, exercises for the knee joint, hamstring muscles, and quadriceps femoris were added. While walking, patients used a walking aid to avoid accidental injuries. Patients with satisfactory recovery at the fracture site were advised to carry out partial weight-bearing exercises 2 months after the surgery, which gradually evolved into total weight-bearing exercises. Before the development of a bone scar, patients were absolutely prohibited from carrying out total weight-bearing exercises.

Outcome measures

Anxiety of patients was assessed using 21 questions about anxiety symptoms from Beck's Anxiety Inventory [12, 13] and was graded with 4 classes representing different patient statuses: no disturbance, 1 point; mild disturbance, 2 points; moderate disturbance, 3 points; and severe disturbance, 4 points. Anxiety and annoyance rate = (mild annoyance, moderate annoyance, and severe annoyance)/total number × 100%. Pains were evaluated using the visual analogue scale [14, 15], and the results were scored between 0 and 10 points. A higher score represented more acute pains.

In addition, we also assessed the incidence of complications (including infection, pressure sores and ankylosis), nursing satisfaction, and quality of life of patients after surgery. Nursing satisfaction was determined using the questionnaire [16] with a total possible score of 100 points: very satisfied, > 90 points; satisfied, 60 to 90 points; not satisfied, < 60 points. Nursing satisfaction was quantified using the following formula: Nursing satisfaction rate = (very satisfied + satisfied)/total cases × 100%. The life quality of patients was also evaluated using the quality of life scale of the World Health Organization [17]. The scale, based on the patients' psychological and physiological status and social relationships, had a total possible score of 60 points: Excellent, ≥ 51 points; improved, 41 to 50 points; good, 31 to 40 points; poor, 21 to 30 points; very poor, < 20 points. Improved rate: (excellent + improved + poor)/total × 100%.

One-year after surgery, patients were required to remove the internally fixed nails in the hospital, and the knee joint functions of patients in the two groups were assessed. The assessment criteria included [18] function (22 points), pains (30 points), muscular strength (15 points), motion range (15 points), flexion deformity (10 points), and instability (5 points). Score < 85 points stood for excellent recovery, between 60 and 69 points for improved recovery, and ≤ 60 points for poor recovery.

Statistical methods

SPSS 19.0 software (SPSS Inc., Chicago, IL, USA) was used for statistical analysis of the data in this study. Measurement data were expressed as means ± standard deviation while enumeration data were expressed as n (%). Chi-square test was performed for the intergroup comparison of the enumeration data while independent *t* test was performed for the intergroup comparison of the measurement data. $P < 0.05$ suggested that the differences had statistical significance.

Results

Baseline data of patients in the two groups

Between Groups A and B, comparisons of the clinical baseline data of patients, including gender, age, blood glucose (Glu), body mass index

Table 2. Comparison of anxiety results after intervention in both groups [n (%)]

Group	n	No annoyance	Mild annoyance	Moderate annoyance	Severe annoyance	Annoyance rate (%)
Group A	64	25 (39.06)	19 (29.69)	11 (17.19)	9 (14.06)	60.94
Group B	64	41 (64.06)	12 (18.75)	8 (12.50)	3 (4.69)	35.94
χ^2	-	-	-	-	-	8.008
P	-	-	-	-	-	0.004

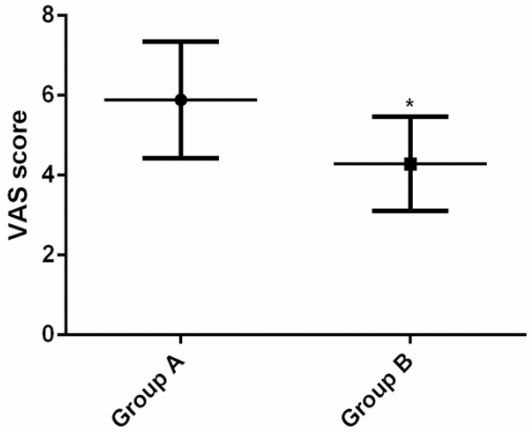

Figure 2. Anxiety scores after intervention in both groups. The pain score in Group A was significantly higher than that in Group B (t = 6.861, $P < 0.001$). Note: *P < 0.001 compared with Group A.

(BMI), fracture causes, diabetes, hypertension, smoking status, alcohol intake, residence, and education level and perioperative indicators, showed no statistically significant differences (all $P > 0.05$) (**Table 1**).

Anxiety score of patients in the two groups following intervention

Following intervention, patients in Group A gained an anxiety score of 34.58 ± 2.66 points, significantly higher than in Group B (25.16 ± 1.49) (t = 24.720, $P < 0.001$). After nursing care, the annoyance rate of Group A was lower than Group B ($\chi^2 = 8.008$, P = 0.004) (**Figure 1** and **Table 2**).

Pain score of patients in the two groups following intervention

Following intervention, patients in Group A gained a pain score of 5.89 ± 1.46 points, significantly higher than that in Group B (4.28 ± 1.18) (t = 6.861, $P < 0.001$) (**Figure 2**).

Comparison of the incidences of complications between the two groups after intervention

After intervention, in Group A, four patients had infection (6.25%), three had pressure sores (4.69%), and five had ankylosis (7.81%) with the total incidence of 18.75%. In Group A, one patient had infection (1.56%), two had pressure sores (3.13%), and one had ankylosis (1.56%) with the total incidence of 6.25%. Thus, the total incidence rate of complications in Group A was significantly higher than that in Group B ($\chi^2 = 4.571$, $P = 0.033$) (**Table 3**).

Nursing satisfaction rates of patients in the two groups after intervention

After intervention, of all patients in Group A, 24 were very satisfied with nursing care (37.50%), 32 were satisfied with nursing care (50.00%), and 8 were not satisfied (12.50%) with an overall satisfaction rate of 87.50%. In Group B, 35 patients were very satisfied with nursing care (54.69%), 27 were satisfied with nursing care (42.19%), and 2 were not satisfied (3.12%) with an overall satisfaction rate of 96.88%. Thus, patients in Group A were more satisfied with nursing care than their counterparts in Group B ($\chi^2 = 3.905$, $P = 0.048$) (**Table 4**).

Life quality of patients in the two groups after intervention

Following intervention, patients in Group A had lower psychological and physiological scores than those in Group B (t = 8.055, $P < 0.001$), and the social relationship score in Group A was also lower than that in Group B (t = 7.732, $P < 0.001$). Improved rate of life quality in group A was lower than group B ($\chi^2 = 9.627$, P = 0.001) (**Tables 5** and **6**).

Evaluation of the knee joint functions of patients in the two groups after intervention

In Group A, the score for knee joint functions of patients after intervention was 75.18 ± 6.12 points after nursing care, which was also remarkably lower than that in Group B (84.29 ± 5.24) (t = 9.046, $P < 0.001$). Excellent rate of

Table 3. Comparison of the incidence of complications after intervention in both groups [n (%)]

Group	n	Infection	Pressure sore	Joint stiffness	Incidence (%)
Group A	64	4 (6.25)	3 (4.69)	5 (7.81)	18.75
Group B	64	1 (1.56)	2 (3.13)	1 (1.56)	6.25
χ^2	-	1.873	0.208	2.798	4.571
P	-	0.174	0.648	0.094	0.033

Table 4. Comparison of nursing satisfaction results after two groups of interventions [n (%)]

Group	n	Very satisfied	Satisfaction	Not satisfied	Total satisfaction (%)
Group A	64	24 (37.50)	32 (50.00)	8 (12.50)	87.50
Group B	64	35 (54.69)	27 (42.19)	2 (3.12)	96.88
χ^2	-	-	-	-	3.905
P	-	-	-	-	0.048

Table 5. Comparison of quality of life outcomes after intervention in both groups (x ± SD)

Group	n	Psychological field	Physiological field	Social relationship
Group A	64	49.47 ± 6.28	45.21 ± 8.05	51.13 ± 7.22
Group B	64	56.83 ± 3.74	54.14 ± 4.08	58.21 ± 1.24
t	-	8.055	7.916	7.732
P	-	< 0.001	< 0.001	< 0.001

knee joint function in Group A was lower than that in Group B (χ^2 = 8.401, P = 0.003) (**Figure 3** and **Table 7**).

Discussion

Supracondylar fracture of the femur severely affects the health and life quality of patients while trauma brings about acute stress responses, altering the psychological and physiological status of patients [19, 20]. In light of the various complications following the supracondylar fracture of the femur, patients, without any appropriate or in-time treatment, may be susceptible to deformity, which further exacerbates the psychological health and life quality of patients [21]. Clinically, surgery is the major treatment method for supracondylar fracture of the femur, but the large trauma in regular surgery damages the suprapatellar bursa of the knee joint and results in a higher adhesion rate outside the joint, which gives rise to knee joint flexion dysfunction [22, 23]. However, in minimally invasive retrograde intramedullary nail surgery, needle delivery is guided using the arthroscope to guarantee the precise location and minimize the trauma, which can avoid damage to the accessory structure of the joint capsule and the possibility of postoperative intra-articular adhesion of the knee joint [24, 25]. Following surgical treatment, specific nursing care and guidance for rehabilitation are also necessary to eliminate the negative feelings of patients caused by trauma, thereby facilitating their recovery with positive emotion.

Traumatic fracture patients are tormented by anxiety and pains, which lead to resistance to treatment. Regular nursing care only aims for the recovery of patients and never focuses on the social and personal factors or the mental demands of patients let alone the efficacy of nursing care [26]. With the development of medical technique and the healthcare awareness of patients, the existing nursing care pattern can hardly satisfy patient demands, which, has gradually transformed the orientation of patients [27]. Comprehensive nursing care, first introduced in USA, clarifies the philosophy and responsibility of the nursing care protocol and establishes the nursing procedure in detail including nursing, education, and discharge plans for patients, which can be adjusted according to the disease progression to ensure the quality of nursing care. In this study, comprehensive nursing care was performed in addition to regular nursing care, through which patients were provided with health education, so as to possess a detailed understanding of the disease and treatment, to help remit negative feelings and maintain a positive attitude towards recovery. The study results showed that the anxiety score of Group A was significantly higher than that in Group B. The annoyance rate of Group A was obviously lower than that in Group B. The pain score of Group A was significantly higher than that in Group B, indicating that comprehensive nursing intervention can alleviate the bad mood and pain of patients. This result is similar to the

Table 6. Comparison of quality of life outcomes after intervention in both groups [n(%)]

Group	n	Good	Better	General	Difference	Very poor	Overall good rate (%)
Group A	64	20 (31.25)	12 (18.75)	15 (23.44)	14 (21.88)	3 (4.69)	73.44
Group B	64	39 (60.94)	12 (18.75)	9 (14.06)	3 (4.69)	1 (1.56)	93.75
χ^2	-	-	-	-	-	-	9.627
P	-	-	-	-	-	-	0.001

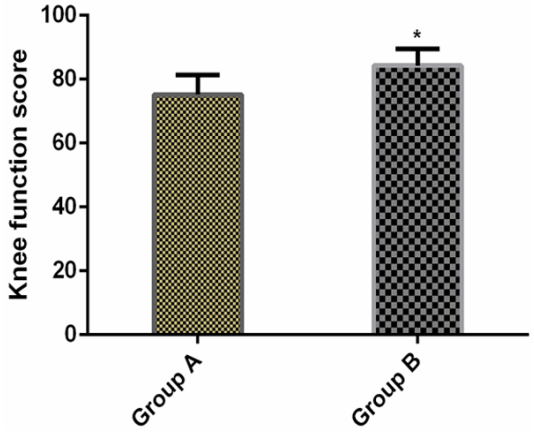

Figure 3. Evaluation of knee function after intervention in both groups. The knee function score of Group A was significantly lower than that of Group B after intervention (t = 9.046, $P < 0.001$). Note: *P < 0.001 compared with Group A.

study result proposed by Johansson et al. [28]. Patients with hip fractures received nursing care during hospitalization can alleviate their psychological stress and pain, which may be because the targeted psychological intervention can improve patient's psychological problems during the nursing process, thus to enable the patient to keep a good and positive attitude towards their disease, and cooperate with the treatment to relieve pain. After minimally invasive retrograde intramedullary nail surgery, the patients are instructed to have proper diet and do some rehabilitation exercises for the affected limb according to their actual situation so as to achieve the recovery of the patient's physical function, improving the clinical treatment effect. Postoperative complications and quality of life are key indicators for measuring treatment outcomes [29]. In this study, the total incidence of complications in Group A was significantly higher than that in Group B after nursing care and the life quality of Group A was significantly lower than that in Group B, indicating that comprehensive nursing intervention can reduce the incidence of postoperative complications and improve patients' quality of life. Shyu et al. [30] proposed that the implementation of comprehensive nursing interventions for elderly patients with hip fractures has shown that this model of care can improve the quality of life of patients after surgery. In order to study the effect of comprehensive nursing on knee function, patients were evaluated by the use of the knee function questionnaire during our one-year follow-up. The results showed that the excellent rate of knee function in Group A was significantly lower than that in Group B, indicating that comprehensive nursing intervention can promote the recovery of knee joint function. This may be because comprehensive nursing intervention can improve the patient's psychological state and enable patients to actively cooperate with the treatment, thus promoting the recovery of the patient's physical function, improving the clinical treatment effect and the prognosis of the patient. The nursing satisfaction questionnaire was used to conduct a survey. The results showed that the nursing satisfaction of Group A was significantly lower than that of Group B after nursing care. Therefore, comprehensive nursing intervention has obvious benefits for the prognosis of patients.

Participants were screened according to the inclusion and exclusion criteria of this study, and the differences in gender, age, Glu level, BMI, fracture causes, smoking status, alcoholic intake, residence, and education between the two groups showed no statistical significance. However, owing to the limitations of this study, we failed to clarify whether comprehensive nursing care is suitable for other fractures. Thus, in future studies, we will consider more types of fractures to provide a reference for application of comprehensive nursing care in clinical practice.

In conclusion, following the treatment with retrograde intramedullary nails for patients with supracondylar fracture of the femur, comprehensive nursing care can promote the recovery

Table 7. Comparison of excellent results of knee joint function after intervention in both groups [n (%)]

Group	n	Excellent	Good	Can	Difference	Total excellent rate (%)
Group A	64	25 (39.06)	20 (31.25)	16 (25.00)	3 (4.69)	70.31
Group B	64	32 (50.00)	26 (40.63)	5 (7.81)	1 (1.56)	90.63
χ^2	-	-	-	-	-	8.401
P	-	-	-	-	-	0.003

of knee joint functions of patients and mitigate the negative emotion and pains with fewer postoperative complications and improved life quality. Thus, it is worth promoting in clinical practice.

Acknowledgements

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Disclosure of conflict of interest

None.

Address correspondence to: Zhiyun Liu, Department of Obstetrics and Gynecology, The Third People's Hospital of Linyi, Linyi 276000, Shandong, China. Tel: +86-18769966216; E-mail: zhiyunzyl@163.com

References

[1] Malik AL, Siddique M, Niazi NS and Niazi SNK. Outcome of locking compression plate in supracondylar fracture of distal femur by minimally invasive plate osteosynthesis. Pakistan Journal of Medical & Health Sciences 2015; 9: 31-33.

[2] Donnelly KJ, Tucker A, Ruiz A and Thompson NW. Managing extremely distal periprosthetic femoral supracondylar fractures of total knee replacements - a new PHILOS-ophy. World J Orthop 2017; 8: 809-813.

[3] Auston D, Donohue D, Stoops K, Cox J, Diaz M, Santoni B and Mir H. Long segment blocking screws increase stability of retrograde nail fixation in geriatric supracondylar femur fractures: eliminating the "Bell-clapper Effect". J Orthop Trauma 2018; 32: 559-564.

[4] Swentik A, Tucker M and Jones T. Percutaneous application of a medial plate for dual plate stabilization of supracondylar femur fractures. J Orthop Trauma 2018; 32: e31.

[5] Gan G, Teo YH and Kwek EBK. Comparing outcomes of tumor prosthesis revision and locking plate fixation in supracondylar femoral periprosthetic fractures. Clin Orthop Surg 2018; 10: 174-180.

[6] K HM and A N. Outcome of retrograde interlocking Nail in supracondylar femur fracture. Journal of Pakistan Orthopaedic Association 2018; 30: 04-07.

[7] Hopman P, De Bruin SR, Forjaz MJ, Rodriguezblazquez C, Tonnara G, Lemmens LC, Onder G, Baan CA and Rijken M. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: a systematic literature review. Health Policy 2016; 120: 818-832.

[8] Y H and T BZ. American association of clinical endocrinologists and American college of endocrinology-clinical practice guidelines for developing a diabetes mellitus comprehensive care plan-2015. Endocrine Practice 2015; 21: 1-87.

[9] Association AD. Standards of medical care in diabetes - 2015 abridged for primary care providers. Clinical diabetes: a publication of the American Diabetes Association 2015; 33: 97.

[10] D C, V K and J D. Patient risk factors do not impact 90-Day readmission and emergency department visitation after total ankle arthroplasty: implications for the comprehensive Care for Joint Replacement (CJR) bundled payment plan. JBJS 2018; 100: 1289-1297.

[11] Konan S, Sandiford N, Unno F, Masri BS, Garbuz DS and Duncan CP. Periprosthetic fractures associated with total knee arthroplasty: an update. Bone Joint J 2016; 98-B: 1489.

[12] Phan T, Carter O, Adams C, Waterer G, Chung LP, Hawkins M, Rudd C, Ziman M and Strobel N. Discriminant validity of the hospital anxiety and depression scale, beck depression inventory (II) and beck anxiety inventory to confirmed clinical diagnosis of depression and anxiety in patients with chronic obstructive pulmonary disease. Chron Respir Dis 2016; 13: 220-228.

[13] Bardhoshi G, Duncan K and Erford BT. Psychometric meta - analysis of the english version of the beck anxiety inventory. Journal of Counseling & Development 2016; 94: 356-373.

[14] Nair AV, Shamsuddin K, John PS, Hämäläinen JA and Kurien MA. Correlation of visual analogue scale foot and ankle (VAS-FA) to AOFAS score in malleolar fractures using Indian language questionnare. Foot Ankle Surg 2015; 21: 125-131.

[15] Julián-Castellote G, García-Sanz V, Montiel-Company JM, Almerich-Silla JM and Bellot-Arcís C. A comparative study of aesthetic perceptions of malocclusion among general practice dentists, orthodontists and the public using a visual analogue scale (VAS) and the IOTN-AC. J Clin Exp Dent 2016; 8: e584-e589.
[16] Albashayreh AI, Alrawajfah OM, Alawaisi H, Karkada S and Alsabei SD. Psychometric properties of an arabic version of the patient satisfaction with nursing care quality questionnaire. J Nurs Res 2018; 1.
[17] Snell DL, Siegert RJ, Surgenor LJ, Dunn J and Hooper GJ. Evaluating quality of life outcomes following joint replacement: psychometric evaluation of a short form of the WHOQOL-Bref. Qual Life Res 2016; 25: 51-61.
[18] Ardern CL, A Ö, Sonesson S, Gauffin H, Webster KE and Kvist J. Satisfaction with knee function after primary anterior cruciate ligament reconstruction is associated with self-Efficacy, quality of life, and returning to the preinjury physical activity. Arthroscopy 2016; 32: 1631-1638, e3.
[19] Vestermark GL, Odum SM and Springer BD. Early femoral condyle insufficiency fractures after total knee arthroplasty: treatment with delayed surgery and femoral component revision. Arthroplasty Today 2018; 4: 249-253.
[20] Rahman WA, Vial TA and Backstein DJ. Distal femoral arthroplasty for management of periprosthetic supracondylar fractures of the femur. J Arthroplasty 2016; 31: 676-679.
[21] Hoellwarth JS, Fourman MS, Crossett L, Goodman M, Siska P, Moloney GB and Tarkin IS. Equivalent mortality and complication rates following periprosthetic distal femur fractures managed with either lateral locked plating or a distal femoral replacement. Injury 2017; 49: 392-397.
[22] Matlovich NF, Lanting BA, Vasarhelyi EM, Naudie DD, Mccalden RW and Howard JL. Outcomes of surgical management of supracondylar periprosthetic femur fractures. J Arthroplasty 2016; 32: 189-192.
[23] M Kinen TJ, Dhotar HS, Fichman SG, Gunton MJ, Woodside M, Safir O, Backstein D, Willett TL and Kuzyk PR. Periprosthetic supracondylar femoral fractures following knee arthroplasty: a biomechanical comparison of four methods of fixation. Int Orthop 2015; 39: 1737-1742.
[24] Raju KP, Madhuchandra P, Pawankumar KM and Shrinidhi IS. Functional outcome of type a and type c supracondylar fractures of femur treated by retrograde intramedullary nailing technique. International Journal of Orthopaedics Sciences 2017; 3: 769-775.
[25] D VR, G C and Sangepu A. Supracondylar fracture femur T reated with intramedullary nail: a prospective study. Journal of Evolution of Medical and Dental Sciences 2015; 4: 11352-11361.
[26] De VA, Cramm JM, van Wijngaarden JD, Bakker TJ, Mackenbach JP and Nieboer AP. Understanding implementation of comprehensive geriatric care programs: a multiple perspective approach is preferred. Int J Health Plann Manage 2016; 32: 608.
[27] Maniya OZ, Mather RC 3rd, Attarian DE, Mistry B, Chopra A, Strickland M, Schulman KA. Modeling the potential economic impact of the Medicare comprehensive care for joint replacement episode-based payment model. J Arthroplasty 2017; 32: 3268-3273, e4.
[28] Johansson I, Bååth C, Wilde-Larsson B and Hall-Lord ML. Acute confusion states, pain, health, functional status and quality of care among patients with hip fracture during hospital stay. International Journal of Orthopaedic and Trauma Nursing 2013; 17: 120-130.
[29] Jones CA and Suarez-Almazor ME. Patient expectations and total knee arthroplasty. JCOM 2017; 24.
[30] Shyu YI, Liang J, Tseng MY, Li HJ, Wu CC, Cheng HS, Chou SW, Chen CY, Yang CT. Comprehensive and subacute care interventions improve health-related quality of life for older patients after surgery for hip fracture: a randomised controlled trial. Int J Nurs Stud 2013; 50: 1013-1024.