Original Article
Effects of evidence-based nursing on compliance behavior and quality of life of elderly patients after artificial femoral head replacement

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Abstract: Objective: This study aims to analyze the effects of evidence-based nursing (EBN) on compliance behavior and quality of life of elderly patients after artificial femoral head replacement (AFHR). Methods: Eighty-six elderly patients with femoral neck fracture (FNF) were included in the study, and randomized into a control group (routine nursing) and a study group (EBN) according to random number table. The two groups of patients were compared in terms of postoperative recovery, compliance behavior, complications, quality of life and nursing satisfaction. Results: The anal exhaust time, time to get out of bed and hospitalization time in the study group were significantly shorter than those in the control group. Compared with the control group, patients in the study group had significantly higher compliance behavior, quality of life and nursing satisfaction, and significantly lower incidence of complications (all P < 0.05). Conclusion: EBN for elderly patients with FNF during AFHR can shorten the patients' treatment time, improve their cooperation, compliance behavior and nursing satisfaction, and reduce the incidence of complications, as well as improve their quality of life.

Introduction

Femoral neck fracture (FNF) is a common disease accounting for 3.58% of all fractures and mostly seen in the elderly. Most elderly patients have fragile sclerotin and low reaction ability, so they are easy to develop FNF after subjected to external forces [1, 2]. The disease is currently treated by artificial femoral head replacement (AFHR), but the patients usually need to stay in bed for a long time after operation and suffer from various complications, which significantly prolong their treatment time and are not conducive to their rehabilitation [3]. Traditional nursing is single, fixed and passive, which lacks initiative and neglects mental nursing. Therefore, it easily leads to nurse-patient disputes and cannot meet patients' needs.

Evidence-based nursing (EBN), also called "empirical nursing", is the sublimation and reform of traditional nursing. It follows evidence, combines clinical experience and research findings with patients' wishes, and provides nursing services to meet patients' needs in a specific field based on the best scientific basis. Therefore, it is more scientific, targeted and reasonable. In a study by Wang Qi, the incidence of complications in the observation group (EBN) is 5.48%, significantly lower than that in the control group (routine nursing, 16.44%) [4]. This finding suggests that EBN is safe and can reduce the incidence of complications in the nursing of laparoscopic surgery for rectal cancer. Currently, the application effect of EBN on AFHR for the elderly is highly concerned [5]. Therefore, 86 elderly patients with FNF admitted to Affiliated Hospital of Changchun University of Traditional Chinese Medicine from December 2016 to December 2018 were included in the study for exploration.

Table 1. Comparison of baseline information

Group	Study group (n = 43)	Control group (n = 43)	x^2/t	P
Gender			0.048	0.826
Male	25	26		
Female	18	17		
Average age (year)	82.5 ± 3.2	82.9 ± 3.1	0.589	0.558
Cause of injury (n)			0.551	0.759
Traffic accident injury	28	25		
Fall injury	10	11		
Other causes	5	7		
Average injury time (h)	6.52 ± 1.14	6.58 ± 1.11	0.247	0.805
Education level (n)			0.282	0.868
Junior college and above	8	10		
Senior high school	20	19		
Junior high school and below	15	14		

Materials and methods

Baseline information

A total of 86 elderly patients with FNF admitted to Affiliated Hospital of Changchun University of Traditional Chinese Medicine from December 2016 to December 2018 were included in the study, all of whom were treated with AFHR. The patients were randomized into the control and study groups (n = 43 for each group) according to the random number table. In the study group, there were 18 females and 25 males, 78-86 years old with an average age of 82.5 ± 3.2 years. This group consisted of 28 cases of traffic accident injury, 10 cases of fall injury and 5 cases of other causes. The injury time was 3-10 hour with an average injury time of 6.52 ± 1.14 hour. There were 8 cases of junior college and above, 20 cases of senior high school and 15 cases of junior high school and below. In the control group, there were 17 females and 26 males, 75-85 years old with an average age of 82.9 ± 3.1 years. This group consisted of 25 cases of traffic accident injury, 11 cases of fall injury and 7 cases of other causes. The injury time was 4-9 hour with an average injury time of 6.58 ± 1.11 hour. There were 10 cases of junior college and above, 19 cases of senior high school and 14 cases of junior high school and below. There was no statistically significant difference in baseline information between the two groups (P > 0.05), which are comparable. More details are shown in **Table 1**. This study was approved by the Ethics Committee of Affiliated Hospital of Changchun University of Traditional Chinese Medicine. Patients and their families were informed and signed an informed consent form.

Inclusion criteria: (1) Patients diagnosed by MRI and CT. (2) Patients whose onset was the first time.

Exclusion criteria: (1) Patients complicated with malignant tumors. (2) Patients who had received femoral neck surgery 6 months before the study. (3) Patients who had received relevant treatment before the study. (4) Patients complicated with metabolic and endocrine diseases. (5) Patients with incomplete clinical data. (6) Patients with surgical contraindications and blood and immune systems diseases. (7) Patients with depression and schizophrenia.

Methods

Patients in the control group received routine nursing. The patients were assisted to improve admission procedures, and complete relevant examinations (electrocardiogram, color Doppler ultrasound, biochemical tests, blood examination, urine routine and stool routine) on the day of admission and the next day. Their conditions, changes of vital signs and incisions were monitored. They should follow the doctor's advice strictly. In addition, the patients were informed of matters needing attention after admission, so that they and their families could adapt to the treatment environment as soon as possible.

Patients in the study group received EBN. (1) An EBN group composed of head nurses and nursing staffs was established. The members had been professionally trained and exactly knew the purpose and content of EBN. They put forward evidence-based questions, searched keywords using the computer network according to the specific conditions of hospitals and patients, and consulted relevant literatures, so as to analyze the causes of complications and slow recovery rate of patients with FNF during AFHR. (2) Evidence-based approach. The members searched in combination with the questions raised, evaluated the scientificity and ef-

Table 2. Comparison of postoperative recovery

Group	Anal exhaust time (h)	Time to get out of bed (d)	Hospitalization time (d)
Study Group (n = 43)	7.26 ± 0.94	4.26 ± 0.52	9.92 ± 0.94
Control Group (n = 43)	12.88 ± 1.84	7.88 ± 1.15	13.25 ± 1.97
t	17.836	18.808	10.004
P	0.000	0.000	0.000

Table 3. Comparison of compliance behavior score ($\bar{x}$ ± sd)

Group	Before intervention	After intervention	t	P
Study group (n = 43)	5.26 ± 0.35	10.02 ± 1.25	24.046	0.000
Control group (n = 43)	5.28 ± 0.32	8.25 ± 0.64	8.265	0.000
t	0.277	27.218		
P	0.783	0.0000		

fectiveness of the searched data, and then discussed in groups, so as to determine the best nursing plan. (3) Specific nursing contents: 1) Health education. The nursing staffs explained the knowledge of the disease and the operation to the patients and their families and carefully answered their questions, in order to improve their awareness of the disease and the operation. 2) Mental nursing. The nursing staffs carried out personalized psychological intervention on the patients based on various factors, such as their education levels, occupations, incomes and conditions. Successful cases of rescue were added into intervention contents to set an example for the patients and enhance their desire for survival [6]. 3) Postoperative basic nursing. The changes of the patients' vital signs were closely monitored. In case of arrhythmia and elevated blood pressure, first aid medicine should be prepared for accurate rescue at any time. 4) Diet nursing. After operation, the patients had slow gastrointestinal function because of staying in bed for a long time, so they should have bland diet and eat more foods containing protein, cellulose, calories, vitamins, etc. Raw, cold, spicy and stimulating foods were forbidden to keep defecation unobstructed. 5) Nursing of complications. Elderly patients had poor immune function so they were prone to incision infection. The nursing staffs closely observed changes of incision and regularly changed dressings to keep incision clean and dry. They strengthened the monitoring of skin temperature and color of the patients' lower limbs, assisted the patients to turn over regularly, and massaged their lower limbs timely and regularly, so as to avoid venous thrombosis. The nursing staffs guided the patients to carry out effective cough and deep-breathing exercises, in order to prevent lung infection [7]. (4) Work summary. The department regularly evaluated and reviewed the implementation of EBN, timely analyzed and summarized the problems during nursing, and put forward targeted improvement programs.

Outcome measures and evaluation criteria

The postoperative recovery, compliance behavior, complications, quality of life and nursing satisfaction were compared. Postoperative recovery included anal exhaust time, time to get out of bed and hospitalization time.

Statistical methods

SPSS 25.0 was used to process the data. Measurement data were tested by t and expressed as $\bar{x}$ ± sd. Count data were tested by χ^2 and expressed as n (%). P < 0.05 indicates a statistically significant difference.

Results

Comparison of baseline information

There was no statistically significant difference between the study and control groups in gender, age, cause of injury, injury time, educational level and other baseline information (P > 0.05). More details are shown in **Table 1**.

Comparison of postoperative recovery

The postoperative recovery in the study group was significantly better than that in the control group (P < 0.05). More details are shown in **Table 2**.

Comparison of compliance behavior score

Before intervention, there was no statistically significant difference between the study and control groups in compliance behavior score (P > 0.05). After intervention, the score in the study group was significantly higher than that in

Table 4. Comparison of incidence of complications (n, %)

Group	Joint dislocation	Infection	Deep vein thrombosis	Incidence of complications
Study Group (n = 43)	1 (2.33)	0 (0.00)	0 (0.00)	1 (2.33)
Control Group (n = 43)	2 (4.65)	3 (6.98)	3 (6.98)	8 (18.60)
χ^2	0.345	3.108	3.108	4.468
P	0.557	0.078	0.078	0.014
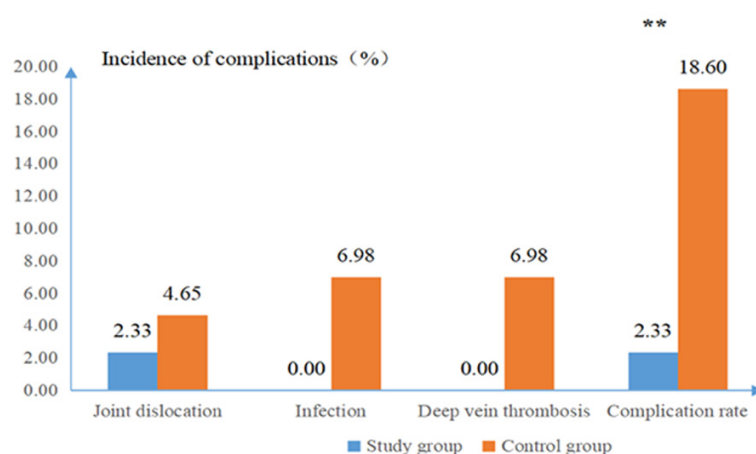
Figure 1. Comparison of the incidence of complications between the two groups. Compared with the control group, **P < 0.05.

Table 5. Comparison of quality of life score ($\overline{x}$ ± sd)

Group	Before intervention	After intervention	t	P
Study group (n = 43)	62.62 ± 5.04	83.86 ± 9.85	12.588	0.000
Control group (n = 43)	62.59 ± 5.08	70.04 ± 6.01	6.183	0.000
t	0.028	7.871		
P	0.978	0.000		

Table 6. Comparison of nursing satisfaction (n, %)

Group	Very satisfied	Satisfaction	Not satisfied	Total satisfaction
Study group (n = 43)	16 (37.21)	25 (58.14)	2 (4.65)	41 (95.35)
Control group (n = 43)	10 (23.26)	20 (46.51)	13 (30.23)	30 (69.77)
χ^2				9.719
P				0.002

the control group (P < 0.05). In the two groups, the score after intervention was significantly higher than that before intervention (P < 0.05). More details are shown in **Table 3**.

Comparison of incidence of complications

The incidence of complications in the study group was significantly lower than that in the control group (P < 0.05). More details are shown in **Table 4** and **Figure 1**.

Comparison of quality of life score

Before intervention, there was no statistically significant difference between the study and control groups in quality of life score (P > 0.05). After intervention, the score in the study group was significantly higher than that in the control group (P < 0.05). In the two groups, the score after intervention was significantly higher than that before intervention (P < 0.05). More details are shown in **Table 5**.

Comparison of nursing satisfaction

The nursing satisfaction in the study group was significantly higher than that in the control group (P < 0.05). More details are shown in **Table 6**.

Discussion

With the advancement of China's aging population in recent years, the incidence of FNF has significantly increased, which aggravates burdens on society and families [8, 9]. Due to the gradual degeneration of muscle groups around the hip joint, elderly patients are generally complicated with coronary heart disease and diabetes, with slow responses and osteoporosis. After greatly impacted, their femoral neck is easy to fracture, and FNF accounts for about 54% of hip fractures [10, 11]. AFHR can relieve the patients' conditions in a short time. However, elderly patients need to stay in bed for a long time after operation due to their old age, so they are prone to infections, lower limb thrombosis and dearticulation, which hinders their compliance behavior, significantly prolongs their hospitalization

time, increases their treatment expenses, and aggravates their own and their families' psychological burden and pressure [12, 13]. In a study, nearly 22%-75% of patients with FNF cannot recover their hip joint function within 6 months after operation, and perioperative nursing greatly affects the postoperative recovery of the hip joint function [14].

In this study, the anal exhaust time, time to get out of bed and hospitalization time in the study group were significantly shorter than those in the control group. Compared with the control group, patients in the study group had significantly higher compliance behavior, quality of life and nursing satisfaction, significantly lower incidence of complications. In a study by Wang Xiaomei, the incidence of complications in the evidence-based group is 7.50%, significantly lower than 24.32% in the routine group, which is consistent with the results of this study [15]. This indicates that EBN is safe and effective in nursing after AFHR. The analysis is as follows. (1) EBN is a new nursing method. Nursing staffs discover the potential or existing health problems of service objects through consultation, communication, examination and observation. Based on these problems, they look for credible and valuable scientific basis and carry out targeted nursing on patients, which makes up for single, passive and fixed traditional nursing [16-18]. (2) EBN strengthens the mental nursing and carries out psychological intervention in multiple ways and methods, to urge patients to correctly treat FNF and AFHR and positively face treatment, which greatly reduces the stress responses of patients during the perioperative period and contributes to smooth operation [19, 20]. (3) EBN helps patients adjust their diet structure and lifestyles, improves the predictability of nursing staffs for perioperative risk events, and urges nursing staffs to adopt targeted and reliable nursing methods as early as possible, so as to minimize the incidence of complications and promote patients' postoperative recovery [21, 22].

Small sample size and short research time in this study affect the reliability and generality of the results. Therefore, the sample size needs to be enlarged and the research time needs to be extended, to provide more scientific references for evaluating the feasibility of EBN in patients with FNF during AFHR.

In conclusion, EBN for elderly patients with FNF during AFHR can shorten the patients' treatment time, reduce the incidence of complications, and improve the patients' compliance behavior, quality of life and prognosis, so it is worthy of clinical trust.

Disclosure of conflict of interest

None.

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References

[1] Shi H, Xiao L, Wang Z. Curative effect of artificial femoral head replacement and its effect on hip joint function and complications of senile patients with femoral intertrochanteric fracture. Exp Ther Med 2018; 16: 623-628.

[2] Kitayama A, Hida M, Takami H, Hirata N, Deguchi Y, Miyaguchi K, Nakazono M, Nakagawa R, Fukumoto N, Hamaoka K. Factors associated with psycho-cognitive functions in patients with persistent pain after surgery for femoral neck fracture. J Clin Med Res 2017; 9: 771-775.

[3] Ni LY, Sun CZ, Li BB. Application of iliac fascia block composite laryngeal mask anesthesia in elderly patients udergoing hip arthroplasty. Academic Journal of Second Military Medical University 2017; 38: 452-457.

[4] Wang Q. Application of evidence-based nursing in laparoscopic surgery for colorectal cancer. Guide of China Medicine 2016; 14: 216-217.

[5] Nandi S, Austin MS. Choosing a femoral head: a survey study of academic adult reconstructive surgeons. J Arthroplasty 2017; 32: 1530-1534.

[6] Al-Ani AN, Cederholm T, Sääf M, Neander G, Blomfeldt R, Ekström W, Hedström M. Low bone mineral density and fat-free mass in younger patients with a femoral neck fracture. Eur J Clin Invest 2015; 45: 800-806.

[7] Seki N, Okuyama K, Kamo K, Chiba M, Shimada Y. Negative magnetic resonance imaging in femoral neck stress fracture with joint effusion: a case report. Skeletal Radiol 2016; 45: 843-846.

[8] Bartlett CS 3rd, Birch CE. Femoral head reduction osteoplasty for fracture dislocation: a surgical technique. Injury 2015; 46: 1689-1694.

[9] Yoo JH, Kim KT, Kim TY, Hwang JH, Chang JD. Postoperative fever after hemiarthroplasty in elderly patients over 70 years of age with dis-

placed femoral neck fracture: necessity of routine workup? Injury 2017; 48: 441-446.

[10] Affatato S, Zavalloni M, Spinelli M. Long-term in vitro wear performance of an innovative thermo-compressed cross-linked polyethylene. Tribology International 2016; 43: 22-28.

[11] Massironi S, Ulivieri FM, Marchelli D, Basilisco G. Reduced bone mineral density in chronic intestinal idiopathic pseudo-obstruction. Am J Gastroenterol 2008; 103: 1579-1581.

[12] Zhao D, Qiu X, Wang B, Wang Z, Wang W, Ouyang J, Silva RM, Shi X, Kang K, Xu D, Li C, Zhong S, Zhang Y, Pinkerton KE. Epiphyseal arterial network and inferior retinacular artery seem critical to femoral head perfusion in adults with femoral neck fractures. Clin Orthop Relat Res 2017; 475: 2011-2023.

[13] Stoner R, Strambi F, Bohacek I, Smoljanovic T. Femoral head avascular necrosis is not caused by arthroscopic posterolateral femoroplasty. Orthopedics 2016; 39: 330.

[14] Sandiford NA, Misur P, Garbuz DS, Greidanus NV, Masri BA. No difference between trabecular metal cones and femoral head allografts in revision TKA: minimum 5-year follow up. Clin Orthop Relat Res 2017; 475: 118-124.

[15] Wang XM. The application effect of evidence-based nursing in senile osteoporosis femoral neck fracture. Journal of Clinical Medicine in Practice 2015; 19: 174-175.

[16] Kloß H, Woydt M, Willmann G. Berechnung der Blitztemperaturen der Mikrokontakte in künstlichen Hüftgelenken unter Benutzung des Kontaktmodells von Greenwood-Williamson. Materialwissenschaft Und Werkstofftechnik 2015; 33: 534-543.

[17] Lazaro LE, Dyke JP, Thacher RR, Nguyen JT, Helfet DL, Potter HG, Lorich DG. Focal osteonecrosis in the femoral head following stable anatomic fixation of displaced femoral neck fractures. Arch Orthop Trauma Surg 2017; 137: 1529-1538.

[18] Kester BS, Williams J, Bosco JA, Slover JD, Iorio R, Schwarzkopf R. The association between hospital length of stay and 90-day readmission risk for femoral neck fracture patients: within a total joint arthroplasty bundled payment initiative. J Arthroplasty 2016; 31: 2741-2745.

[19] Samsami S, Saberi S, Sadighi S, Rouhi G. Comparison of three fixation methods for femoral neck fracture in young adults: experimental and numerical investigations. J Med Biol Eng 2015; 35: 566-579.

[20] Tannast M, Jost LM, Lerch TD, Schmaranzer F, Ziebarth K, Siebenrock KA. The modified Dunn procedure for slipped capital femoral epiphysis: the Bernese experience. J Child Orthop 2017; 11: 138-146.

[21] Kang JS, Jeon YS, Ahn CH, Roh TH. Osteosynthesis versus endoprosthesis for the treatment of femoral neck fracture in Asian elderly patients. BMC Musculoskelet Disord 2016; 17: 264.

[22] Giordano V, Paes RP, Alves DD, Amaral AB, Belangero WD, Giordano M, Freitas A, Koch HA. Stability of L-shaped and inverted triangle fixation assemblies in treating Pauwels type II femoral neck fracture: a comparative mechanical study. Eur J Orthop Surg Traumatol 2018; 28: 1359-1367.