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Original Article

Effects of continuous nursing based on WeChat platform on the functional recovery and quality of life in elderly patients after total hip arthroplasty

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Abstract: Objective: To investigate the effects of continuous nursing (CN) based on WeChat platform on the functional recovery and quality of life (QOL) in elderly patients after total hip arthroplasty (THA). Methods: A prospective study was performed on selected 124 patients undergoing THA in Orthopedics and Traumatology Department. According to the random number method, the patients were divided into control group (CN, n=62) and observation group (CN based on WeChat platform, n=62). Hip joint function before and after intervention, postoperative complications and QOL were observed. Results: Harris hip scores and QOL scores 3 and 6 months after intervention were higher in both groups than those before intervention, and the improvement was better in the observation group (all P<0.05). The excellent-effective rate of hip joint function improvement 6 months after intervention in the observation group was higher than that in the control group (P<0.05). The incidence of complications and readmission rate in the observation group were significantly lower than those in the control group (both P<0.05). Conclusion: CN based on WeChat platform can improve the hip joint function, reduce complications and postoperative readmission rate, and ameliorate QOL of patients after THA.

Keywords: WeChat platform, continuous nursing, the elderly, total hip arthroplasty, quality of life

Introduction

The incidence of hip joint diseases such as femoral neck fracture, osteoarthritis and femoral head necrosis is increasing with the growth of age. However, the pathogenesis of these diseases is still unclear, and there is no effective treatment to reverse the diseased hip [1, 2]. Total hip replacement (THA) is an effective means to treat hip joint diseases. Although it cannot reverse the progress of hip joint pathology, it can retain the function of hip joint to the maximum extent [3, 4]. It has become one of the main methods for the treatment of advanced hip lesions [5, 6]. However, elderly patients after THA suffer from larger trauma and need longer time f to recover when restoring hip joint function [7, 8]. Therefore, effective guidance and recovery training for patients after THA is of great significance for the recovery and prognosis of hip joint function.

After THA, it takes a long time for the recovery of wound and functional exercise. Continuous nursing (CN) is an extension and expansion of hospital nursing. The nursing care of patients is mainly provided by medical staff during hospitalization and by family members after discharge. CN has become an important factor affecting the postoperative hip joint functional recovery of patients, so it is particularly vital to apply CN after THA, especially for elderly patients [9]. With the rapid development of science and technology, and information and communication technology, WeChat platform has become an essential platform for interpersonal communication. With WeChat, medical staff can not only communicate with patients in real time, but also guide patients and their families timely and deal with emergencies. Previous studies have shown that CN can promote the functional recovery of elderly patients after THA [10]. However, there are still few reports on the

long-term functional recovery and quality of life (QOL) of the elderly patients after THA through WeChat platform and no study has been conducted on the elderly patients after THA. This study applied the randomized controlled study method and conducted follow-up observation on the included patients to observe the influence of CN based on WeChat platform on the functional recovery and prognosis in elderly patients after THA.

Materials and methods

General information

This study was approved by the Ethics Committee of The Second Affiliated Hospital of Xi'an Jiaotong University and all patients signed the informed consent. A total of 124 patients undergoing THA in Orthopedics and Traumatology Department of The Second Affiliated Hospital of Xi'an Jiaotong University from January 2017 to October 2019 were selected in this study. According to the random number method, the patients were divided into control group (CN, n=62) and observation group (CN based on WeChat platform, n=62). The patients were aged between 65 and 85 years, with an average age of 73.6±6.2 years.

Inclusion criteria: Patients with first THA due to femoral neck fracture; patients with the age above 65 years.

Exclusion criteria: Patients with a history of hip joint surgery; patients with malignant tumors; patients with severe heart, liver and kidney diseases; patients who received invasive surgery within 3 months.

Methods

Routine CN regimen was used in the control group. Details are as follows. (1) At the time of discharge, patients and their family members were told to take care of the surgical wound, keep warm and do rehabilitation exercise for hip joint function. (2) Postoperative health guidance manuals were provided for patients and their family members. (3) The postoperative complications of hip joint and prevention methods were introduced. (4) Publicity and education on the dosage, usage and other matters of the drugs were carried out, in order to avoid the occurrence of missing or less taking. (5) Health guidance was given upon discharge and telephone follow-up was conducted 1, 3 and 6 months after discharge.

CN was carried out in the observation group based on WeChat platform. Based on routine CN, additional scheme was conducted as follows. (1) The patients or their family members were required to subscribe the WeChat public account and join the hip postoperative recovery WeChat group. Key points of attention and prevention for postoperative rehabilitation of hip joint were regularly pushed to the patients or their family members. (2) The patients were guided to do exercises after hip joint surgery. Video or picture explanation was provided to help patients understand and complete postoperative rehabilitation training more easily. (3) Timely explanation and guidance were provided for the difficulties of patients and their family members during postoperative rehabilitation. (4) Patients were encouraged to perform actively functional exercise after hip joint surgery. Detailed rehabilitation regimen for each patient was formulated and the patient was supervised to complete it.

The patients in both groups were nursed for 6 months and follow-up was conducted.

Outcome measures

Primary outcome measures: (1) Harris hip scores before, 3 and 6 months after intervention were observed in both groups [11]. (2) The excellent-effective rate of hip joint function improvement 6 months after intervention was recorded in both groups. Scoring criteria: Daily activity and gait account for 47 points, pain 44 points, joint activity 5 points and joint deformity 4 points, with a total of 100 points. Excellent: 90-100 points; effective: 80-89 point; medium: 70-79 points; poor: less than 70 [11]. Excellent-effective rate = Number of case (excellent + effective)/total number of cases ×100%. (3) The incidence of complications in both groups was recorded 6 months after intervention. The incidence of complications = Number of cases with complications/total number of cases × 100%.

Secondary outcome measures: (1) The proportion of patients readmitted to hospital for hip joint within 6 months after intervention was recorded in both groups. (2) The SF-36 quality

Table 1. Comparison of general information (n)

Item	Observation group (n=62)	Control group (n=62)	χ^2/t	P
Age (years)	73.9±6.1	73.1±6.5	0.481	0.707
Gender (male/female)	41/21	39/23	0.141	0.707
Body mass index (kg/m^2)	24.45±2.42	24.69±2.64	0.599	0.528
Combined disease		-	-	-
Hypertension	25	31	1.172	0.297
Type 2 diabetes mellitus	19	22	0.328	0.567
Coronary heart disease	15	13	0.158	0.668
Cerebral infarction	20	24	0.564	0.453

Table 2. Comparison of Harris hip scores ($\bar{x}$ ± sd)

Item	Before intervention	3 months after intervention	6 months after intervention
Observation group (n=62)	70.23±2.89	86.73±3.99***	92.17±8.34***,###
Control group (n=62)	69.76±3.01	83.12±3.33***	88.04±8.12***,###
χ^2	0.377	5.471	2.794
P	0.887	<0.001	0.006

Note: Compared with before intervention, ***P<0.001; Compared with 3 months after intervention, ###P<0.001.

of life (QOL) scale before intervention and 6 months after intervention was recorded for the comparison of QOL in both groups.

Statistical analysis

SPSS20.0 software was used for data analysis. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd); intergroup comparison was assessed by independent sample t test; repeated measures analysis of variance was used for intragroup comparison at different time points; Bonferroni method was further used for pairwise comparison when there was a statistical difference. Ranked data were analyzed by non-parametric test, denoted by Z. The count data were expressed as the number of cases/percentage (n/%) and tested by chi-square test or Fisher's exact test. A value of *P*<0.05 was considered statistically significant.

Results

Comparison of general information

There was no statistical difference in the general information between the two groups (all P>0.05). See **Table 1**.

Comparison of Harris hip scores

Before intervention, there was no statistical difference in the Harris hip scores between the two groups (P>0.05). Harris hip scores 3 and 6 months after intervention were higher in both groups than those before intervention (all P<0.001); those at 6 months after intervention were higher in both groups than those at 3 months after intervention (both P<0.001); the observation group obtained higher scores 3 and 6 months after intervention than the control group (both P<0.01). See **Table 2**.

Comparison of excellent-effective rate of hip joint function improvement after intervention

The excellent-effective rate of hip joint function improvement 6 months after intervention in the observation group was higher than that in the control group (P<0.01). See **Figure 1**.

Comparisons of the incidence of complications and readmission rate

The incidence of complications and readmission rate in the observation group were significantly lower than those in the control group (both P<0.05). See **Tables 3**, **4**.

Comparison of QOL scores

Before intervention, there was no statistical difference in the QOL scores between the two groups (P>0.05). QOL scores 3 and 6 months after intervention were higher in both groups than those before intervention (all P<0.001); QOL scores 6 months after intervention were higher in both groups than those 3 months after intervention (both P<0.001); the observation group showed higher scores 3 and 6 months after intervention than those in the control group (both P<0.05). See **Table 5**.

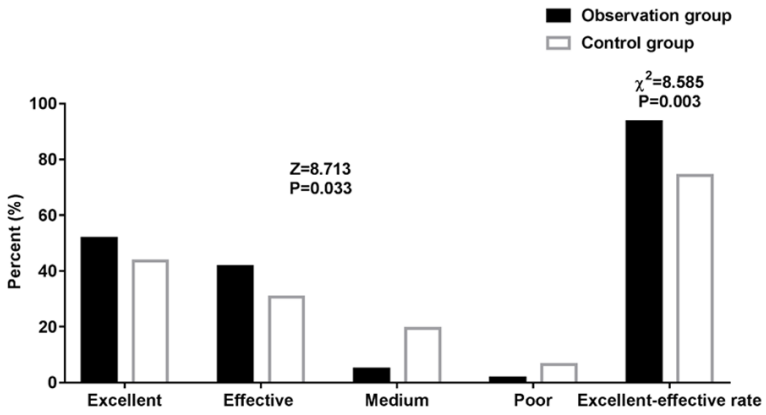

Figure 1. Comparison of excellent-effective rate of hip joint function improvement after intervention.

Table 3. Comparison of the incidence of complications (n, %)

Adverse reaction	Observation group (n=62)	Control group (n=62)	χ^2	P
Prosthesis dislocation	2 (3.23%)	4 (6.45%)	0.701	0.403
Deep venous thrombosis	1 (1.61%)	3 (4.84%)	1.033	0.309
Infection of incisional wound	1 (1.61%)	3 (4.84%)	1.033	0.309
Pressure sores	0 (0.00%)	2 (3.23%)	2.033	0.154
Total	4 (6.45%)	12 (19.35%)	4.593	0.032

Table 4. Comparison of readmission rate (n, %)

Item	Observation group (n=62)	Control group (n=62)	χ^2	P
Number of readmissions	8 (12.90%)	17 (27.42%)	4.058	0.044

Discussion

THA is the main surgical method for improving hip joint function [12, 13]. Although the therapeutic effect of THA has great advantages, postoperative complications and functional recovery are still clinical problems to be solved [14]. Therefore, CN is of great significance for hip joint functional recovery and prevention of complications after THA [9]. With the development of science and technology, WeChat as a communication platform can facilitate doctor-patient communication and help for timely treatment and guidance of the disease. Thus, CN based on WeChat platform arises at the historic moment. Previous studies have suggested that CN for THA patients after discharge can effectively improve the hip joint function and compliance of patients, which is conducive to the recovery of patients after discharge [15]. This study also indicated that the application of CN had a promoting effect on the hip joint functional recovery of patients after THA. Further comparison found that CN based on WeChat platform had a better effect on the improvement of postoperative hip function, with a higher excellent-effective rate of hip joint function improvement. WeChat platform promotes intuitive communication between doctors and patients and their families, breaks the time and space interval between doctors and patients, and can provide patients and their families with health guidance and rehabilitation training guidance at any time, which is conducive to the recovery of patients after THA. Most of THA patients are elder, and they often cannot well understand and implement oral commands [16]. WeChat platform can solve patients' confusion through video and timely communication, which is conducive to postoperative recovery of THA patients.

THA is a traumatic operation, and postoperative complications often occur due to improper postoperative care or failure to perform effective hip joint functional exercise. Studies have shown that professional nursing is beneficial to the prevention of complications and the improvement of prognosis for patients with surgery and chronic diseases who need CN after discharge [17, 18]. In this study, it was also found that the application of CN based on WeChat platform reduced the incidence of postoperative complications and postoperative readmission rate, and improved the QOL in THA patients. WeChat platform can solve the problems encountered by patients in a timely, rapid and effective manner, leading to the decreased incidence of complications, thereby reducing postoperative readmission rate caused by hip joint. Previous studies also suggested that compared with general nursing, CN can reduce the readmission rate after THA by 48% [19]. In terms of postoperative QOL, previous studies have believed that

Table 5. Comparison of QOL scores ($\bar{x} \pm sd$)

Item	Before intervention	3 months after intervention	6 months after intervention
Observation group (n=62)	72.34±15.82	97.23±14.32***	114.22±10.21***,###
Control group (n=62)	73.63±15.29	92.01±13.92***	107.45±10.54***,###
χ^2	0.645	2.104	3.633
P	0.462	0.037	<0.001

Note: Compared with before intervention, ***P<0.001; Compared with 3 months after intervention, ###P<0.001. QOL: quality of life.

guided health exercises for patients after THA is beneficial to the recovery of hip joint function and has a positive effect on the improvement of patients' QOL [20, 21]. The results of previous studies are consistent with those of this study.

There are some limitations in this study. This a single-center study with small sample size and short follow-up time. Therefore, multi-center study with expanded sample size and increased follow-up time should be further performed to explore the significance and value of CN based on WeChat platform for patients after THA.

In summary, CN based on WeChat platform can improve hip joint function, reduce complications and postoperative readmission rate, and ameliorate QOL for patients after THA.

Disclosure of conflict of interest

None.

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References

[1] Kuitunen I, Skyttä ET, Eskelinen A, Huhtala H and Artama M. Induced abortions among women having undergone total hip replacement: a nationwide register study in Finland. Scand J Surg 2019; 108: 258-264.

[2] Shi XT, Li CF, Han Y, Song Y, Li SX and Liu JG. Total hip arthroplasty for crowe type iv hip dysplasia: surgical techniques and postoperative complications. Orthop Surg 2019; 11: 966-973.

[3] Jo WL, Lee YK, Ha YC, Kim TY and Koo KH. Delay of total hip arthroplasty to advanced stage worsens post-operative hip motion in patients with femoral head osteonecrosis. Int Orthop 2018; 42: 1599-1603.

[4] Yuan H, Zhu J, Sun Z and Zhang Z. Comparison of effectiveness between superpath approach and posterolateral approach in total hip arthroplasty. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi 2018; 32: 14-19.

[5] Wainwright TW, Gill M, McDonald DA, Middleton RG, Reed M, Sahota O, Yates P and Ljungqvist O. Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: enhanced recovery after surgery ERAS society recommendations. Acta Orthop 2020; 91: 3-19.

[6] Burke NG, Gibbons JP, Cassar-Gheiti AJ, Walsh FM and Cashman JP. Total hip replacement the cause of failure in patients under 50 years old? Ir J Med Sci 2019; 188: 879-883.

[7] Aggarwal VK, Suh YM, Hutzler L, Moscona L and Castañeda P. Total hip arthroplasty for secondary causes of arthritis an increase in time and money. Bull Hosp Jt Dis 2019; 77: 233-237.

[8] Jonas SC, Whitehouse MR, Bick S, Bannister GC and Baker RP. An 18-year comparison of hybrid total hip replacement and birmingham hip resurfacing in active young patients. Hip Int 2019; 29: 630-637.

[9] Drampalos E, Bayam L, Oakley J, Hemmady M and Hodgkinson J. Symptomatic trochanteric non-union following total hip replacement treated with reattachment combined with two-stage revision surgery of the femoral stem. Ann R Coll Surg Engl 2019; 101: e133-e135.

[10] Oosting E, Jans MP, Dronkers JJ, Naber RH, Dronkers-Landman CM, Appelman-de Vries SM and van Meeteren NL. Preoperative home-based physical therapy versus usual care to improve functional health of frail older adults scheduled for elective total hip arthroplasty: a pilot randomized controlled trial. Arch Phys Med Rehabil 2012; 93: 610-616.

[11] Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. an end-result study using a new method of result evaluation. J Bone Joint Surg Am 1969; 51: 737-755.

[12] Haro-Gómez HL, Merida-Herrera E, Torres-Fernández BJ, Pérez-Hernández E, Torres-González R and Pérez-Atanasio JM. Preoperative serum albumin as a predictor of complications following total hip replacement in patients with rheumatoid arthritis. Acta Ortop Mex 2018; 32: 193-197.
[13] Kim MK, Ahn SE, Shin E, Park SW, Choi JH and Kang HY. Comparison of analgesic efficacy of oxycodone and fentanyl after total hip replacement surgery: a randomized controlled trial. Med Baltimore 2018; 97: e13385.
[14] Maeda K, Sonohata M, Kitajima M, Kawano S and Mawatari M. Risk factors of neuropathic pain after total hip arthroplasty. Hip Pelvis 2018; 30: 226-232.
[15] Hørdam B, Sabroe S, Pedersen PU, Mejdahl S and Søballe K. Nursing intervention by telephone interviews of patients aged over 65 years after total hip replacement improves health status: a randomised clinical trial. Scand J Caring Sci 2010; 24: 94-100.
[16] Bischoff-Ferrari HA, Lingard EA, Losina E, Baron JA, Roos EM, Phillips CB, Mahomed NN, Barrett J and Katz JN. Psychosocial and geriatric correlates of functional status after total hip replacement. Arthritis Rheum 2004; 51: 829-835.
[17] Mayo AM, Ray MM, Chamblee TB, Urden LD and Moody R. The advanced practice clinical nurse specialist. Nurs Adm Q 2017; 41: 70-76.
[18] Bryant-Lukosius D, Carter N, Reid K, Donald F, Martin-Misener R, Kilpatrick K, Harbman P, Kaasalainen S, Marshall D, Charbonneau-Smith R and DiCenso A. The clinical effectiveness and cost-effectiveness of clinical nurse specialist-led hospital to home transitional care: a systematic review. J Eval Clin Pract 2015; 21: 763-781.
[19] He RX, Yan SG, Wu LD, Wang XH and Dai XS. Position of the prosthesis and the incidence of dislocation following total hip replacement. Chin Med J (Engl) 2007; 120: 1140-1144.
[20] Huang TT, Sung CC, Wang WS and Wang BH. The effects of the empowerment education program in older adults with total hip replacement surgery. J Adv Nurs 2017; 73: 1848-1861.
[21] Chang CF, Lin KC, Chen WM, Jane SW, Yeh SH and Wang TJ. Effects of a home-based resistance training program on recovery from total hip replacement surgery: feasibility and pilot testing. J Nurs Res 2017; 25: 21-30.