ORIGINAL RESEARCH

The Outcomes of Continuous Nursing Combined With Rehabilitation Guidance in Patients Receiving Hip Joint Replacement

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ABSTRACT

Objective • To compare the outcomes of routine nursing vs continuous nursing in promoting the recovery of hip joint function and self-care ability and improving the psychological state of patients receiving hip joint replacement.

Methods • A total of 312 patients who had received hip joint replacement were randomly divided into 2 groups: the routine nursing group and the continuous nursing group. Continuous nursing included guidance for the recovery of muscle function, psychological support, emotional support and pain control. The patients were followed up until 3 months after discharge. Harris Hip (HHS), Barthel Index (BI), Self-rating Depressive Scale (SDS), and Numeric Rating Scale (NRS) scores were compared in the 2 groups at discharge and at 1 and 3 months after discharge.

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INTRODUCTION

Hip joint replacement is one of the most successful surgical interventions in modern orthopedics. It is considered an effective treatment for rheumatoid arthritis, aseptic necrosis of the femora head and femoral neck fracture.¹ Hip joint replacement involves replacing a portion of or the entire hip joint with a joint prosthesis, which can relieve joint pain and reconstruct hip joint motor function.²⁻⁴

The postoperative continuous care and rehabilitation process are equally important, as they can effectively accelerate the patient's recovery process and reduce the nursing risks after hip replacement surgery. Nurses play a crucial role in this process. They not only need to provide **Results** • After discharge, the HHS and BI score increased in both groups. The SDS and NRS scores gradually decreased in the 2 groups. These changes were more pronounced in the intervention group. There were significant differences in these indicators between the 2 groups upon discharge and at 1 and 3 months after discharge. The outcome indicators were compared at different time points in the intervention group. In the control group, there was no significant difference in the SDS or NRS scores at 1 and 3 months after discharge.

Conclusion • Continuous nursing promotes the recovery of hip joint function and self-care ability and improves the psychological state and pain control in patients undergoing hip joint replacement. (*Altern Ther Health Med.* 2023;29(5):216-221).

continuous care for patients, but also need to supervise and guide their rehabilitation, helping patients recover to their preoperative state.

In recent years, patients have continuously raised their expectations for the quality and service of medical care, which has also put higher demands on the professional quality of nursing staff. Therefore, establishing a complete and scientific postoperative rehabilitation treatment plan and cultivating high-quality nursing personnel are urgent issues that need to be addressed. In China, nursing care is generally provided during the patients' hospital stay after hip joint replacement, and there has been a shortage of continuous nursing for these patients after discharge.^{5,6}

The aim of this study is to determine the effects of continuous nursing care vs routine nursing care in promoting the recovery of hip joint function after artificial hip replacement surgery. This will deepen our understanding of the importance of continuous nursing care and rehabilitation guidance in patients undergoing artificial hip replacement surgery, improve nursing standards and guidelines and further enhance the level of medical services, thereby meeting the needs and expectations of patients.

METHODS

Study Participants

From November 2018 to May 2020, 312 patients receiving hip joint replacement at the Third Xiangya Hospital in China were recruited and randomly divided into the control and the intervention groups by a random number table, with 156 patients in each group. There were 80 males and 76 females in the control group, who were aged 42.8 ± 13.5 years on average. There were 88 males and 68 females in the intervention group, with an average age of 44.6 ± 14.2 years.

Inclusion criteria. Patients who had (1) received hip joint replacement; (2) clear consciousness and were cooperative with treatment; (3) had good compliance and were cooperative with rehabilitation training.

Exclusion criteria. Patients who had (1) pathological fractures; (2) undergone surgery for lower limb fractures in the past year; (3) had other diseases affecting motor functions; (4) terminal-stage systematic diseases.

Intervention Group

The rehabilitation concept was implemented on patient admission. The nursing and rehabilitation plan was developed based on the patients' actual condition and was strictly adhered to. Continuous electrocardiogram (ECG) monitoring was administered for 24h postoperatively, along with oxygen inhalation therapy. The patients' consciousness, pupils and changes in vital signs were closely observed. Blood oozing from the incision was observed and recorded. Blood supply, skin color and temperature, sensation and movement, dorsalis pedis pulse and swelling of the limb ending were also observed on the affected side. The patients and their relatives were informed of the importance of maintaining correct posture. Guidance was provided for dynamic and static postures: In a supine position, a thin, soft pillow was placed under the affected limb and another between the legs. A standing abduction position was maintained at an angle of 15° to 30°. T-shaped shoes were worn with the toes pointing upwards. Hip adduction and internal rotation were avoided.

Turning over. The patient could turn onto their unaffected side at a 15° to 20° angle on the day of surgery. When turning over, patients slightly bent the healthy leg and straightened the hip joint on the surgery side. A soft pillow was placed between the legs and another under the back. This process required guidance and assistance from the nurse.

3-point bridging exercise. Force was exerted at 3 points—the elbows, shoulder and back, and the healthy limb. The hip was elevated from the bed to prevent pressure sores and for functional exercises.

Functional exercises began 1 day after surgery, including isometric contractions of the quadriceps femoris and gastrocnemius muscles, ankle pump movement, and concentric muscle massage on the affected side. On the second day after surgery, quadriceps femoris contraction exercises and ankle pump movement were started in the 2 lower limbs. The patient was instructed to perform 3 sets of these exercises per day, with 20 repetitions per set. On days 3

to 5, the patient performed exercises twice daily, for 20 min each session.

All patients received routine oral and written health information upon discharge. Patients were followed up by telephone calls 1 week, 2 weeks, 1 month, 2 months and 3 months after discharge.

The nurses paid family visits in addition to continuous nursing to provide rehabilitation guidance according to the rehabilitation plan and to offer psychological support for postoperative functional recovery. Functional recovery included strength training, joint movement training, weightbearing exercise and walking training, and self-care training. The patients mainly began muscle training in bed 1 month after discharge.

Foot movements included gradual flexion and extension of the ankles and feet. Each exercise lasted for 5 or 10 min once a day.

Ankle rotation. One ankle was rotated towards the other ankle and then in the opposite direction. The ankle rotation exercises were performed several times per day, with 5 repetitions per session.

Straight leg raising. Patients contracted their thigh muscles, completely straightened and elevated their legs several degrees from the bed. This posture was maintained for 5 to 10 seconds and then repeated.

Knee bending on the bed surface. The foot was maintained on the bed surface, and then the knee was bent while sliding the heel toward the buttock. This movement was repeated, and performed without internal rotation of the lower limbs.

Muscle contraction of the anterior thigh. The thigh muscles were contracted using the same method as for lower limb straightening and maintained for 5 to 10 seconds. This exercise was repeated 10 times in 10 min.

Buttock contraction. Patients tightened their buttock muscles and maintained that posture while counting from 1 to 5, and then relaxed.

Abduction movement. Patients slid the lower limbs away from the body (the further, the better) and then retracted them.

The patients were allowed to ambulate out of bed 1 month later. The patients were told to read in a straight sitting position, with a \geq 90° angle between the upper body and the thighs. A sitting position with the angle between the upper body and the thighs <90° was avoided. The patients were instructed to repeat the exercise of standing up and sitting down while holding onto a chair. Forced exertion and bearing was avoided during the exercise. The operated limb was moved in every direction with supports. The maximum movement range did not exceed 30°. Each exercise consisted of 10 repetitions, and was performed 3 times in a row.

Exercise intensity was increased every week, according to the patients' condition. The intensity was not above the patients' tolerance. The patients were informed about those movements that were not fit for them and the necessity to avoid these movements during rehabilitation. Such movements included squatting, crossing the legs while sitting on a mat, bending sideways, sitting on a low chair or a soft sofa, lying on the affected side and crossing the legs while sitting down.

Other aspects of continuous nursing were also administered. **Informational support** was an important part of psychological support in order to make patients fully aware of the necessity of postoperative rehabilitation training after hip joint replacement. **Emotional support** included proactive communication with the patients on any problems occurring during hospitalization and rehabilitation and providing encouragement.

Interpersonal support included encouraging the patient's family to participate in rehabilitation training.

Pain control included explaining the pain mechanism to the patients and assisting patients with local muscle relaxation and pain relief. Pain intervention measures were determined based on the patients' pain evaluation scores. Mild pain was treated with loxoprofen sodium plus non-pharmacological treatment, including psychological counseling, local muscle relaxation and physiotherapy. Moderate pain was treated with weak opioids, loxoprofen sodium plus nonpharmacological therapy. Severe pain with treated with strong opioids, loxoprofen sodium, adjuvant drugs and nonpharmacological therapy. The patients' condition was evaluated repeatedly to adjust medications (dosage and administration pathway) in a stepwise manner. Efforts were made to improve patients' quality of life (QoL) by ascertaining that the patients' pain level was acceptable.

Considering the nature of the intervention in this study, blinding the subjects is challenging. However, to minimize bias, evaluators responsible for assessing efficacy and safety were distinct from the researchers, thus ensuring evaluators remained blinded throughout the assessment process.

Outcomes Evaluation

The outcomes of different nursing approaches were evaluated upon discharge, 1 month after discharge and 3 months after discharge.

Harris hip scores. The dimensions covered by the Harris hip score include pain severity, function, joint deformity and mobility. The total score ranges 0 to 100 points, and the results are interpreted as follows: 90-100 points, excellent; 80-89 points, good; 70-79 points, fair; and below 70 points, poor.

Barthel index. This index evaluates the activities of daily living (ADL), including eating, bathing, hygiene, dressing, bladder and bowel control, movement from bed to wheelchair, toileting, ambulating and climbing up and down the stairs. For each item, 15, 10, 5 and 0 points are given, depending on whether or not assistance was needed for the specific activity. The total score is 100; the higher the total score, the better the ADL.⁵

SDS scores. This score reflects patients' depressive state, including psychotic-affective symptoms, somatic disorders, psychomotor disorders and psychological disorders. SDS

scores \geq 50 indicates depressive symptoms; 53-62 mild depression; 63-72 moderate depression, and >72 severe depression.

NRS scores. Range, 0 to 10 points. 0 point = no pain; <3 points, mild but tolerant pain; 4-6 points, pain that disturbs sleep; 7-10 points, severe to intolerable pain.

Data Analysis

All data were statistically processed and analyzed using IBM[°] SPSS 19.0 software. Intergroup comparisons were performed by using the *t* test, with the significance level set at P = .05.

RESULTS

The 2 groups did not differ significantly in any outcome indicator upon hospital discharge. At 1 month and 3 months after discharge, the 2 groups differed significantly in HHS, BI, SDS and NRS scores. As for intragroup comparison, both groups showed significant differences in HHS, BI and NRS scores at 1 and 3 months after discharge. In the control group, there was no significant difference in SDS scores at 1 and 3 months after discharge; in the intervention group, there was a significant difference in SDS scores at 1 and 3 months after discharge; not the intervention group, there was a significant difference in SDS scores at 1 and 3 months after discharge. No additional surgical interventions were performed in either group of patients during the study. The results are shown in Tables 1, 2 and 3.

Table 1. Comparison of Harris Hip Scores in the TwoGroups

Group	At discharge	At 1 month	At 3 months	F	P value
Intervention	37.26 ± 6.87	$54.88\pm9.34^{\text{a}}$	$73.98 \pm 10.83^{\mathrm{a},\mathrm{b}}$	18.31	<.05
Control	37.23 ± 6.53	$46.89\pm8.63^{\text{a}}$	$58.77 \pm 13.66^{a,b}$	15.22	<.05
t	0.130	4.297	9.025		
P value	.762	.020	.000		

^aThere was a significant difference compared with patient condition upon discharge.

^bThere was a significant difference compared with patient condition 1 month after discharge.

Table 2. Comparison of the Barthel Index Score in the Two

 Groups

Group	At discharge	At 1 month	At 3 months	F	P value
Intervention	35.76 ± 6.35	$68.58\pm8.64^{\rm a}$	$86.38\pm9.71^{\text{a,b}}$	56.45	<.05
Control	32.34 ± 7.11	$48.63\pm10.78^{\text{a}}$	$71.25\pm9.87^{\text{a,b}}$	59.67	<.05
t	1.988	5.496	8.993		
P value	.135	.008	.002		

^aThere was a significant difference compared with patients' condition upon discharge.

^bThere was a significant difference compared with patients' condition 1 month after discharge.

Table 3. Comparison of Self-rating Depressive Scale Scoresin the Two Groups

Group	At discharge	At 1 month	At 3 months	F	P value
Intervention	46.33 ± 8.62	$35.76\pm9.73^{\text{a}}$	$30.16\pm8.63^{\text{a,b}}$	32.63	<.05
Control	47.84 ± 9.02	$40.34\pm12.36^{\text{a}}$	38.25 ± 11.36^{a}	44.28	<.05
t	2.374	5.388	7.452		
P value	.267	.011	.003		

^aThere was a significant difference compared with patients' condition upon discharge.

^bThere was a significant difference compared with patients' condition 1 month after discharge.

Table 4. Comparison of Numeric Rating Scale Scores in the

 Two Groups

Group	At discharge	At 1 month	At 3 months	F	P value
Intervention	5.64 ± 2.62	4.23 ± 2.23^{a}	$3.83 \pm 2.56^{a,b}$	30.58	<.05
Control	5.58 ± 2.11	3.97 ± 1.26^{a}	$3.21 \pm 1.77^{a,b}$	39.62	<.05
t	2.388	4.957	7.238		
P value	.148	.024	.015		

^aThere was a significant difference compared with patients' condition upon discharge.

^bThere was a significant difference compared with patients' condition 1 month after discharge.

Harris Hip Scores Comparison

Intergroup comparison was conducted of HHS at different time points. There was no significant difference in HHS upon discharge. However, the differences were statistically significant between the 2 groups at both 1 and 3 months after discharge. Intragroup comparison of HHS revealed significant differences between the 2 groups upon discharge and at 1 month, upon discharge and 3 months and upon discharge and at 3 and 1 month after discharge.

Barthel Index Score Comparison

Intergroup comparison was conducted of BI scores at different time points. There was no significant difference in BI scores at discharge. However, the differences were statistically significant between the 2 groups at both 1 and 3 months after discharge. Intragroup comparison of the BI showed there were significant differences between scores at discharge and at 1 month, upon discharge and at 3 months and at 3 months and 1 month after discharge.

Self-rating Depressive Scale Score Comparison

Intergroup comparison of SDS scores showed no significant difference upon discharge. However, the differences were of statistical significance between the 2 groups both at 1 and 3 months after discharge. Intragroup comparison of SDS scores was performed; in the intervention group, there were significant differences between the SDS scores upon discharge and 1 month after discharge, upon discharge and 3 months after discharge and between the scores at 3 and 1 month after discharge. In the control group, there was a significant difference between SDS scores upon discharge and 1 month after discharge and at discharge and 3 months after discharge. However, there was no significant difference between the scores at 3 and 1 month after discharge.

Numeric Rating Scale Score Comparison

Intergroup comparison of the NRS scores revealed no significant difference in NRS scores between the 2 groups at discharge. However, there were statistically significant differences between the 2 groups at both 1 and 3 months after discharge. Intragroup comparison of the SDS scores was performed. In the intervention group, there were significant differences between SDS scores upon discharge and 1 month after discharge, upon discharge and 3 months after discharge, and 3 and 1 month after discharge. In the control group, there was a significant difference between SDS scores upon discharge and between SDS scores upon discharge and 1 month after discharge. However, there was no significant difference between the scores at 1 and 3 months after discharge.

DISCUSSION

Hip joint replacement can relieve pain and restore joint functions and mobility to a certain degree. After hip joint replacement, most patients can find relief from the associated arthropathy of the hip. However, the performance of a joint prosthesis, as a new implanted structure in the patients, is still not without challenges. Professional guidance and subsequent follow-up are critical to helping the patients adapt to their prosthesis and improve their QoL.8 Proactive postoperative nursing and rehabilitation are conducive to functional recovery and reduce the associated complications. The most severe complication following hip joint replacement is deep venous thrombosis in the lower limbs. The most common causes are obstructed venous return and reduced blood flow velocity. The affected limbs may develop edema. In some situations, the thrombi may become detached, leading to pulmonary embolism or even death. Postoperative nursing, rehabilitation, and timely intervention to guide early passive and active movements are highly beneficial to promote blood circulation and prevent thrombosis and muscle atrophy.^{9,10}

Continuous nursing, founded on routine nursing, is an individualized nursing approach centered around the patient that addresses various potential risk factors during rehabilitation. Studies have shown that the first 3 months after hip joint replacement is the best period for the recovery of hip joint function. In our study, we compared the routine and continuous nursing approaches at different time points during the 3 months following discharge. During this period, we conducted family visits, guided functional training, offered psychological and interpersonal support, assisted with pain control, and observed the outcomes of continuous nursing.^{11,12}

Continuous Nursing

The nursing staff played a core role in continuous nursing, and the patient's relatives were invited to participate in the process. Patients were encouraged to continue various rehabilitation exercises. An individualized postoperative nursing plan was developed and implemented for patients after hip joint replacement. Answers were provided for different questions raised by patients and relatives at various stages of rehabilitation and training.

Pain. The nursing staff was also responsible for disseminating knowledge about pain management and informing patients of pain mechanisms. The patients were assured that postoperative pain was normal so that they could accept it psychologically and feel less anxious. It was explained that local pain can be reduced via local muscle relaxation achieved by elevating a specific part of the body from the bed or actively changing posture. Less pain usually means more comfort during the rehabilitation process and a higher level of individualization by the nursing service. As shown by the NRS scores, none of the patients in the 2 groups had severe pain. Patients in the intervention group did not take painkillers with the guidance of and assistance and from the nursing staff. A total of 3 patients in the control group took 1 or 2 doses of loxoprofen sodium to help relieve the pain within 1 month after discharge. Our results showed that the intervention group's HHS at 1 and 3 months after discharge were significantly higher than in the control group at the corresponding time points. This indicated that continuous nursing had a specific effect on postoperative recovery of hip joint function and did help the patients overcome pain, increase pain tolerance and reduce medication use.

Self-care ability. Recovering self-care ability is the fundamental goal of nursing after hip joint replacement. Whether or not self-care ability can be restored has a large bearing on the QoL of patients and their relatives. Some relatives perform all ADL for patients after surgery. However, such excessive care usually leads to impairment of the patients' self-care ability and poor joint function recovery.13 Our study showed that the BI scores in the intervention group were significantly higher than in the control group. This indicated that early functional training and psychological support accelerated postoperative recovery of hip joint function and regaining of self-care ability. Zhang, et al. compared 67 patients receiving early rehabilitation training after hip joint replacement with the use of bone cement vs controls. They found that patients receiving early rehabilitation training outperformed control patients in terms of pain severity, functions and mobility of the hip joint. In their study, patients in the early rehabilitation training group started the static contraction movement of the quadriceps femoris on the first day after surgery. The amplitude and intensity of this exercise gradually increased until 2 weeks after surgery.¹⁴

Depression is a major type of mood disorder, clinically presenting as a low mood irrespective of the external environment. One study recruited 30 patients receiving hip

joint replacement and it was found that the positive and negative moods coexisted before surgery. The positive moods increased, while the negative moods decreased after surgery. The patients may feel cheerful and experience an improved psychological state due to the elimination of joint pain and recovery of hip joint function after surgery.^{15,16} Another study suggested that adequate family support can boost the patients' confidence in the face of diseases and help get rid of anxiety.^{17,18} We found that the depressive symptoms in both groups were improved at 1 and 3 months after discharge. The improvement was even more significant in the intervention group. Improvement in depressive symptoms at 1 and 3 months after discharge was statistically significant compared with upon discharge. However, there was no significant difference in depressive symptoms at 1 and 3 months after discharge. However, in the control group, patients' psychological state was not noticeably improved at 1 month after surgery. This might be related to the slow recovery of hip joint function and self-care ability at 1 month after discharge (see the results in Tables 1 and 2).

Hip joint function was noticeably recovered within 1 month after discharge. The patients regained many ADL skills that were lost before surgery. Patients were satisfied and encouraged by attaining their surgical goals and the improvement in QoL, leading to a significant reduction in anxiety scores. In contrast, in patients who did not receive continuous nursing within 1 month after discharge, their hip joint functions and ADL were not significantly improved. The patients did not achieve high-quality postoperative recovery, and as a result, the patients' psychological state deteriorated, leading to an insignificant reduction in anxiety scores. Patients in the intervention group maintained a continuously improving trend in hip joint function recovery, improvement in self-care ability and pain control beyond 1 month after discharge due to continuous nursing. These physical changes were accompanied by an expected and apparent reduction in anxiety scores. From 2 different perspectives, these results demonstrated that a series of improvements in hip joint functions, self-care ability and pain contributed to the improvement in psychological state.19,20

NRS scores. There was a reduction in NRS scores in the 2 groups of patients at discharge. Boths group showed a significant improvement at 1 and 3 months after discharge compared with upon discharge. No significant difference was observed in the NRS scores between the 2 groups upon discharge. However, there was a statistically significant difference between the 2 groups both at 1 and 3 months after discharge. These results indicated that hip joint replacement plays a definite role in pain relief,^{21,22} and continuous nursing played a role in strengthening and promoting this effect.

In our study, nurses assumed the primary work tasks and played a crucial role in the rehabilitation process. Their responsibilities encompassed communicating and negotiating with patients and their families, assessing patient conditions, collaborating with medical teams to create treatment plans, supporting doctors and other therapists in administering various rehabilitation treatments such as physical therapy and occupational therapy, aiding patients with ADL and personal hygiene, providing emotional support and comfort, adhering strictly to medical orders to promote correct medication use and prevent drug overdose or abuse and more.

It is worth noting that the specific tasks assigned to nurses and physical therapists during medical treatments may vary somewhat across different countries or regions.

In developing countries and regions, nurses have taken on many of the responsibilities typically assigned to physical therapists. This trend can be attributed to several factors: first, medical resources are comparatively scarce in these areas, with a severe shortage of doctors and physical therapists; second, there is a dearth of professional technical talent available to healthcare providers; third, the income earned by physical therapists in many developing countries and regions is quite low in comparison to that of nurses. As a result, hospitals may choose to reduce costs by hiring nurses to undertake some of the duties traditionally performed by physical therapists. In contrast, in developed countries and regions, rehabilitation medicine is highly advanced and features a fully-realized rehabilitation medical service system, streamlined and efficient rehabilitation medical service procedures, a standardized medical insurance reimbursement system, and a rehabilitation medical service team with a rehabilitation physician at the helm.

China, as a developing country, has experienced a positive trend in the number of physical therapists in recent years, yet it still faces several challenges. Patients' lack of awareness of rehabilitation treatment remains an issue, and the level of professional education provided for physical therapists varies considerably. In addition, the current number of physical therapists available is insufficient to meet the demand for rehabilitation services throughout the country.

CONCLUSION

In summary, the development of physical therapy in China continues to face significant challenges and difficulties, and a concerted effort from all parties is required to ensure its healthy growth. Based upon our study findings, we concluded that there is a need to strengthen postoperative continuing care, which should be a joint endeavor between physical therapists and nurses moving forward rather than the sole domain of nurses. This approach would facilitate the recovery and functional improvement of rehabilitation patients and promote the healthy evolution of physical therapy as a discipline.

Taken together, continuous nursing promoted the recovery of hip joint functions and self-care ability and improved the psychological state and pain control of patients undergoing hip joint replacement.

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