

Application and Evaluation of Hospital-Community-Family Integrated Rehabilitation Model in Patients Undergoing Total Knee Arthroplasty

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Abstract: The hospital-community-family integrated rehabilitation model is a continuous rehabilitation model for patients, we explore the application of this model for patients with knee replacement. This study aimed to examine the effectiveness of hospital-community-family integrated rehabilitation model in patients undergoing Total Knee Arthroplasty. A randomized, single-blinded, parallel-armed, controlled trial was conducted. A total of 80 patients with Arthroplasty from November 2018 to June 2021 randomly into the control group (n=40) and the Observation Group (n=40), the observation group implemented the “Hospital-community-family” integrated rehabilitation model. The ROM, HSS and satisfaction were compared between the two groups preoperation and one week, one month and three months after operation. The scores of ROM and HSS in the observation group were significantly better than those in the control group ($P<0.01$), the degree of rehabilitation satisfaction in the observation group was significantly higher than that in the control group three months after operation. The integrated rehabilitation model of “Hospital-community-family” is beneficial to the joint function recovery of the patients after total knee arthroplasty, the ability of self-care in normal life is good, and the patients and their families are satisfied with it, the application effect is remarkable and worth popularizing.

1. Introduction

The problem of aging in our country is becoming more and more serious. With the increase of age and degenerative joint diseases caused by physical or pathological reasons, knee osteoarthritis/osteodystrophy is a chronic joint disease characterized by degeneration, destruction of articular cartilage and reactive hyperplasia of subchondral bone [1]. Total Knee Arthroplasty (TKA) is an effective method for the treatment of late-stage knee diseases [2, 3], postoperative rehabilitation training plays an important role in helping patients to recover joint function [4]. The integrated hospital-community-family rehabilitation model is a kind of continuous rehabilitation model for patients, it can provide a model of continuous nursing service health education across hospital, community and family for patients by hospital and related community medical staff

through joint cooperation, to ensure the smooth process of patients' rehabilitation, improve the clinical prognosis, promote their early rehabilitation [5], orthopaedic patients 73.33% have the need to accept continuous care [6], some patients are very long for the implementation of continuous care. However, there are still many inadequacies in the study of continuing nursing in our country, and the professional knowledge of community nurses is not complete, which cannot solve the problems of specialty. This study through the hospital-community-family model, the construction of the conditions of our country's continuing care model.

2. Materials and Methods

2.1 Study Design

This was a randomized, single-blinded, parallel-armed controlled trial. The research assistant responsible for data collection was blinded to the intervention assignment of participants. Before recruitment, an independent statistician generated a randomization list using a permuted block randomization method (no stratification factor) with a 1:1 allocation ratio using Research Randomizer. The block size was blinded to the study team. Patients were randomized into 2 groups (40 patients in each group) using an opaque envelope containing nonduplicated numbers (1-80)

2.2 Eligibility Criteria

Inclusion criteria: Age 50-85 years old; first total knee arthroplasty; conscious and able to communicate normally; living in a local community after discharge; patients and family members were informed of this study, volunteer and sign the consent form. Exclusion criteria: orthopedic patients with other serious diseases, such as malignant tumor, severe liver and kidney failure, previous language and understanding disorders, cognitive disorders or mental disorders. Drop-off criteria: deaths during the study period; voluntary withdrawal from the study; and readmission for other reasons during the study period.

This prospective study was conducted in the hospital From November 2018 to June 2021, The mean age was (66.9 ± 5.3) years, the oldest was 84 years, the youngest was 54 years, there were 34 males. There was no significant difference between the two groups in the general data of age, sex and severity of disease ($P > 0.05$).

2.3 Intervention

The patients in the control group were given traditional guidance and follow-up after discharge. After discharge from the Hospital 1 week, 1 month, 3 months, 6 months and 1 year after the outpatient follow-up examination of knee joint activity, measurement of knee joint activity, during any abnormalities should be timely come to the hospital. The patients were given anonymous evaluation by self-made Satisfaction Questionnaire when they returned to the outpatient department 3 months after discharge, and the satisfaction was observed.

On the basis of the traditional guidance of discharge, the Observation Group received the intervention of hospital-community-family integrated rehabilitation model. Set up a hospital department to continue the rehabilitation steering group, including bed doctors, specialist guidance nurses, rehabilitation therapists, a clear division of labor, mutual assistance.

The bed doctors and the specialized nurses carry on the disease related knowledge training to the patient and the family related member, establishes the WeChat Group, the convenience communicates with the patient. All patients were evaluated by the rehabilitation department before discharge, a functional exercise rehabilitation plan was set up, and the relevant information plan

was notified to the full-time rehabilitation therapists in the community. After discharge, specialist nurses were followed up by telephone once every 1-2 weeks to monitor the patients' functional exercise after discharge.

The patients returned to the outpatient department one week, one month, three months, six months and one year after discharge to examine the recovery of the joint function after rehabilitation training, including the knee joint activity and the measurement of the knee joint activity, self-made satisfaction questionnaire was completed in 3 months.

Within 1-3 months after discharge, community rehabilitation therapists, nurses and hospital nurses contact, information docking, communication functional training guidance content, monthly home visits, to monitor the patients' functional exercise after discharge according to the functional exercise rehabilitation plan, and adjust it according to the situation.

Specialized nurses can teach health knowledge to patients and their main carers, inform them of follow-up requirements by telephone, and contact community rehabilitation therapists and nurses in time for convenient and urgent problems, or in the WeChat group to inform communication, if cannot solve the hospital's own nursing experts, rehabilitation doctors and bed doctors; non-urgent problems can be telephone follow-up, outpatient follow-up to solve, to relieve the patient's family members of the emergency, to avoid anxiety, to facilitate the family members of patients to arrange family life, personnel and work hours.

2.4 Outcome Measures

Range of motion (ROM) and knee function score (HSS) were evaluated at discharge and 1 week, 1 month and 3 months after discharge. Rom was measured by goniometer, including 7 items, of which 6 items (function, pain, mobility, muscle strength, stability, flexion deformity) were added, 1 deduction points items (whether the need for tools, stretching the lack of degree). HSS score ≥ 85 was excellent, 70-84 was good, 60-69 was moderate, & LT; 60 was poor [7]. Through the questionnaire survey satisfaction, including three aspects, first, the bedside doctor's attitude, medical technology, communication satisfaction; The second is whether they are satisfied with the attitude, nursing technology, functional training guidance and communication of the specialized guidance nurses, and the third is whether they are satisfied with the hospital's medical procedure, follow-up procedure, treatment target, etc.. The satisfaction score is 10 points, unsatisfactory (0-3 points), relatively satisfactory (4-7 points) and satisfactory (8-10 points).

2.5 Data Analysis

The sample size was calculated based on a repeated measure analysis accounting for intracluster to examine the differences between the 2 groups, A P value (P) of less than 0.05 was considered statistically significant. The analysis was performed using SPSS19.0 statistical software. The measured data were expressed as $X \pm s$, T test was performed, and the counting data were expressed as percentage, X2 test was performed. P & LT; 0.05 was statistically significant.

3. Results

The satisfaction rate of the two groups was compared 38 patients (95.0%) in observation group and 25 patients (62.5%) in control group were satisfied 3 months after operation. The satisfaction rate of the observation group was higher than that of the control group, and there was a significant difference between the two groups (P & LT; 0.05).

Rom of knee joint before and after operation in both groups The ROM of the observation group before operation was higher than that of the control group (60.30 ± 5.79 VS 58.65 ± 5.79), and the

ROM of the control group was higher than that of the Observation Group one week after operation (67.2 ± 5.27 VS 68.15 ± 5.17). There was no significant difference between the two groups ($P > 0.05$). However, it was higher in the Observation Group at 1 month and 3 months after operation than that in the observation group, and the difference between the two groups was statistically significant ($P < 0.05$) See Table 1.

Table 1: ROM comparison of knee joint motion before and after operation between the two groups (degree)

| Group | n | preoperation Mean±SD | 1st Follow-up Mean±SD | 2nd Follow-up Mean±SD | 3rd Follow-up Mean±SD |
|-------------------|----|----------------------|-----------------------|-----------------------|-----------------------|
| control group | 40 | 58.65±5.79 | 68.15±5.17 | 85.28±4.07 | 96.90±3.99 |
| Observation Group | 40 | 60.30±5.79 | 67.2±5.27 | 92.03±4.23 | 107.80±4.32 |
| t | | 1.274 | 0.814 | 7.275 | 11.726 |
| P | | 0.206 | 0.418 | 0.000 | 0.000 |

Before and after operation, the score of HSS in the Observation Group was lower than that in the control group (53.45 ± 5.16 vs 54.00 ± 5.31 , $P > 0.05$). But the score of knee joint function in the observation group was significantly better than that in the control group at one week, one month and three months after operation ($p < 0.05$), See Table 2.

Table 2: Knee function score (HSS) before and after operation in both groups (scores)

| Group | n | preoperation Mean±SD | 1st Follow-up Mean±SD | 2nd Follow-up Mean±SD | 3rd Follow-up Mean±SD |
|-------------------|----|----------------------|-----------------------|-----------------------|-----------------------|
| control group | 40 | 54.00±5.31 | 75.40±4.93 | 83.53±3.45 | 86.15±2.84 |
| Observation Group | 40 | 53.45±5.16 | 76.35±4.84 | 88.82±2.40 | 91.38±1.94 |
| t | | 0.470 | 0.869 | 7.982 | 9.596 |
| P | | 0.640 | 0.375 | 0.000 | 0.000 |

4. Discussion

After patients returned to their community homes after hospitalization, through the hospital-community-family integrated rehabilitation model [8-15], patients' satisfaction with disease recovery was 95%, which was significantly higher than the satisfaction of 62.5% with traditional guidance methods, to enable medical professionals to walk more, patients and their families to travel less, so that patients in the community, families can continue to receive professional health education guidance and homogeneity with the original hospital, reduce patient's worry and family's worry, facilitate family life and time arrangement [16-17]; at the same time, reduce patient's family members to travel between the family and the hospital, reduce the economic expenditure, reduce the burden of the family.

After discharge, the hospital links up personal information, treatment and follow-up health information with the health therapist in the relevant community. Although the patient returns to the community and family, but the effective health education, the rehabilitation treatment uninterrupted, continues continues, lets the patient family member feel at ease, rest assured.

After communicating with the hospital, the community-based rehabilitation therapists continue to develop professional and individualized health education functional rehabilitation training plans, implementation goals and ultimate goals for the patients, let the patient be willing to receive in the implementation process, not boring not to be bored, step by step by step every day progress, and

through the rehabilitation treatment of special equipment to assist the patient's rehabilitation process, doubled patients' self-confidence and self-identity [18]

The patients were followed up at Outpatient Clinic 1 week, 1 month, 3 months, 6 months and 1 year after discharge. During this period, doctors and special guidance nurses in the hospital visit and communicate by phone and WeChat every 1-2 weeks to guide a healthy lifestyle, psychological comfort and communication, to increase patients' self-confidence and sense of well-being in their recovery, and to exchange information with the community in a timely manner so as to grasp the primary source of patients' recovery process, in order to put forward reasonable and individualized health education methods in the follow-up outpatient follow-up, so that patients and their families return to normal family life.

At present, artificial joint replacement is widely used in clinic, and it has important significance for the patients with severe knee joint disease, to give the patients regular, continuous and effective functional exercise of health education after replacement can prevent joint stiffness, prevent muscle atrophy, improve the effectiveness of the operation and promote the rehabilitation of limb function, return to normal life habits, improve the quality of life [19]. Although the concept of carrying out rehabilitation training after operation in hospital has been accepted and practiced by more and more medical and nursing personnel, the patients' functional rehabilitation training after discharge cannot get the continuous rehabilitation guidance, which leads to the unsatisfactory rehabilitation effect, and increase the readmission rate of patients. After joint replacement, the functional exercise needs a long time, and the rehabilitation time is different for different age. After discharge, the rehabilitation exercise should be standardized according to the actual condition of patients, in order to obtain the maximum functional effect of surgery. The hospital-community-family integration model [20] can provide patients with continuous, professional and complete health education and nursing services after discharge, and eliminate the adverse factors affecting the rehabilitation of patients, to ensure the further step-by-step functional exercise to achieve an ideal postoperative rehabilitation effect. eir families return to normal family life.

5. Conclusions

This study demonstrated the effectiveness of the patients undergoing Total Knee Arthroplasty remarkable under the integrative rehabilitation mode of hospital treatment, community guidance and family exercise, which has been approved by the patients' families. The patients' joint function was recovered and their self-care ability was restored to normal. They were in a good mood and had a good life. According to the “National Service System planning outline” put forward the concept of “Major disease in the hospital, minor disease in the community, rehabilitation back to the community.” The integrated rehabilitation model of hospital-community-family is in line with the reform of public medical care proposed by the state, the realization of graded diagnosis and treatment, the expansion of medical services, and the full play of the initiative and automaticity of patients and their families, promote the recovery of patients. Patients can go home when their condition is stable after surgery, shorten the length of stay in hospital, save medical expenses, give limited medical resources to more patients in need, and ease the contradiction of one bed in the hospital, moreover, the patients' returning home is more consistent with their living habits, and they can return to the society as soon as possible, reducing the family members' running back and forth between the hospital, family and work units. The satisfaction degree of the family members has obviously increased, this benefits society, hospitals and patients' families. The integrated rehabilitation model also enables close cooperation between medical institutions of different levels and nature, to meet patients' needs of medical treatment, rehabilitation and life, and to ensure the continuity of medical care for patients, it is worth popularizing and applying.

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