The effect of post-discharge telephone intervention on rehabilitation following total hip replacement surgery

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ABSTRACT

Purpose: To determine the effect of post-discharge telephone intervention with both patients and family caregivers on patient compliance with doctors’ advice and rehabilitation progress in total hip replacement patients.

Methods: In total, 249 participants were assigned to either the control or telephone intervention group according to the discharge date. The patients in the intervention group were contacted by phone three to seven days after discharge, at one month, and at three months post-discharge. Their family caregivers received were contacted by phone twice a month. Content of the telephone intervention included discussion of exercise, cautions in daily life, and regular examination. The patients in the control group received routine health education and follow-up. All participants were evaluated by the questionnaire of compliance with doctors’ advice when they were discharged at one, three, and six months after discharge. The Harris Hip Score of patients was assessed on discharge day and six months after discharge.

Results: There was no significant difference between the patients’ compliance scores in the two groups on discharge day or one month after discharge. Three and six months after discharge, the scores in the intervention group were significantly higher than the control group (p < 0.05). There was no significant difference between the groups in the Harris Hip Score on discharge day. Six months after discharge, the Harris Hip Score in the intervention group was significantly higher than the control group (p < 0.05).

Conclusion: Telephone intervention with patients and family caregivers improved patient compliance with doctors’ advice and promoted functional hip joint rehabilitation.

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1. Introduction

Total hip replacement (THR) is a type of reparative surgery where an artificial joint prosthesis is used to replace a partial or total impaired hip joint in order to improve motor function. It is an important method for the treatment of such diseases as femoral head ischemic necrosis, traumatic arthritis, rheumatoid arthritis, and femoral neck fracture [1–3]. Patients who undergo THR experience a reduction in hip joint pain, an improvement in self-care ability, and increased quality of life. Key components for successful recovery of hip joint function myodynamia following THR surgery are early rehabilitation and continuity of care after discharge [4,5]. However, lack of patient understanding regarding the importance of postoperative rehabilitation, patient fear of pain, and insufficient professional guidance and effective social support system may lead to poor compliance of doctor’s advice following discharge.

In this study, we evaluated the benefit of regular telephone follow-ups by nurses with a family caregiver of patients after THR surgery. These follow-ups were associated with significant long-term improvement of patient compliance and functional recovery of the hip joint.

2. Methods

2.1. Participants

The participants were recruited from the orthopedic ward of the First Affiliated Hospital of Anhui Medical University in China between March 2012 and May 2013. Inclusion criteria for this study were the ability to correctly answer questions without cognitive dysfunction and volunteering for the study. Exclusion criteria included severe cardiopulmonary disease [6] and living alone after discharge from hospital. In total, 249 participants were assigned to either the control or the intervention group according to the discharge date. During the study, seven cases in the control group and five cases in the intervention group were excluded due to loss of contact.

2.2. Interventions

2.2.1. Control group
The patients in the control group received conventional discharge guidance and follow-up. Discharge guidance included the explanation and demonstration with images, audio, video, and real products of functional exercises to both patients and families. All participants were issued a THR patient care manual containing information about hip replacement surgery, diet, rehabilitation training, and hip protection technology. All participants received routine out-patient follow-up at one, three, and six months after discharge.

2.2.2. Intervention group
In addition to conventional nursing guidance, the intervention group received the following interventions.

2.2.2.1. Establishment of intervention group. The nurses leading the intervention group included two associate chief nurses, four supervisor nurses, and six senior nurses with professional training, including four orthopedic specialists. The members of this group had more than three years of experience in orthopedic care, with abundant experience caring for patients with THR. The associate chief nurses supervised the intervention process. The remaining nurses trained THR patients’ supervisors, implemented the intervention, and instructed THR patients on how to complete questionnaires. All group members received unified training, including rehabilitation knowledge about THR patients at different stages after discharge, skills of telephone intervention, and guidance of filling in questionnaire. All members were eligible for participation in this study after qualifications were tested.

2.2.2.2. Selection and training of THR patient supervisor. Researchers selected one suitable family supervisor per THR patient during hospitalization. Inclusion criteria included: a lineal relative who lived with the patient for a long time (such as spouse or child); a sense of responsibility, love, and patience; education level above Primary school; and informed consent. The supervisors were told the purpose and method of the study. After informed consent was obtained, the patient supervisors received on-site training where they were told the specific function, purpose, and role of supervisors and issued a THR family supervisor manual. In order to maintain contact and reduce loss of patients during follow-up, all supervisors registered detailed contact information.

2.2.2.3. Intervention procedures. (1) The patients in the intervention group were contacted by telephone three to seven days after discharge and one and three months after discharge. The nurses of the intervention group implemented the telephone follow-up combined with the manual of THR patient care. Depending on joint and muscle function at different stages, patients received individualized health education and guidance including exercise, cautions in daily life, and regular examination accordingly. Each call lasted 20–30 min. (2) Researchers communicated with supervisors via telephone twice a month to understand the patient’s functional exercise and daily life self-management, with emphasis on the importance and necessity of compliance of the discharge instructions. By doing so, the quality of the supervisors and the compliance of discharge instructions were monitored.

2.3. Outcome measures

Before being discharged from the hospital, patients were issued the Harris scale and THR patient medical behavior questionnaire in person, and they were required to complete the survey immediately. One, three, and six months after discharge the THR patient medical behavior questionnaire was completed again, and at six months patients were physically reexamined at the hospital. The Harris Hip Score was also assessed at six months after discharge. Patients who were not reexamined in person on time were investigated by researchers via telephone and required to fill in the questionnaire. Eventually, 237 patients completed the study and all the questionnaires were completed.
Table 1 – Comparison of general information between two groups (n = 237).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Intervention group</th>
<th>Control group</th>
<th>χ²/t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>46</td>
<td>53</td>
<td>1.271</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (year, x ± s)</td>
<td>66.2 ± 15.5</td>
<td>67.3 ± 16.7</td>
<td>-0.535</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Etiology</td>
<td></td>
<td></td>
<td>0.043</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Femoral head ischemic necrosis</td>
<td>29</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Femoral neck fracture</td>
<td>40</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>12</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>25</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating method</td>
<td></td>
<td></td>
<td>1.482</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>One-side femoral head replacement</td>
<td>3</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-side total hip replacement</td>
<td>79</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-sides total hip replacement</td>
<td>21</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3.1. Harris rating scale

Harris Rating Scale [7] is the most common clinical post-operative hip joint function evaluation tool in patients with THR. It includes seven domains: pain degree (44 points), instrumental activities of daily living (14 points), gait (11 points), walking aids (11 points), walking distance (11 points), instrumental activities of daily living (14 points), gait (11 points), walking aids (11 points), and range of activity (5 points). Regarding score, total score of 90–100 was considered optimal, 80–90 was good, 70–80 was moderate, and less than 70 was poor.

2.3.2. THR patient medical behavior questionnaire

This questionnaire was designed by the researchers following thorough review of the relevant literature, consultation with orthopedic specialist nurses, and revision by five expert specialists in a related area. It included three main aspects; functional exercise, behavior, and regular examination with orthopedic specialist nurses, and revision by five expert specialists in a related area. It included three main aspects; functional exercise, behavior, and regular examination.

2.4. Statistical analysis

All data was recorded into EpiData3.1 (Odense, Denmark) and statistically analyzed using SPSS package version 14.0 (Chicago, IL, USA). Continuous data are presented as the mean ± standard deviation and analyzed using t test and repeated measures analysis of variance. Categorical data were analyzed with the chi-square test. p < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of general information between two groups (Table 1)

Although there was no statistical difference in compliance behavior between the two groups at discharge and one month after discharge (p > 0.05), compliance behavior was significantly different at three and six months post-discharge (p < 0.05) (Table 2). The patients’ compliance behavior score decreased over time in both groups but less so in the intervention group relative to the control group.

3.3. Comparison of Harris score between two groups

The Harris score for both groups at discharge and six months post-discharge are shown in Table 3. Upon discharge from the hospital, the percentage of patients with excellent, good, or medium hip joint function was 2.0%, 13.0%, and 46.0%, respectively, in the intervention group and 2.2%, 12.4%, and 43.0%, respectively, in the control group. Six months after discharge, the percentage in the intervention group was 8.0%, 41.0% and 25.0%, respectively, and 5.1%, 25.5%, and 35.8%, respectively, in the control group.

4. Discussion

4.1. Compliance behavior

The implementation of telephone follow-up for continuous care has been rising due to its conciseness, cost-effectiveness, and ease of use [8]. Studies have shown that telephone intervention could improve medication compliance, improve self-care ability, reduce readmission rate, and reduce medical cost [9–11]. The use of a family supervisor is also widely utilized in public health research, e.g. in the management of tuberculosis patients [12–15].

The recovery time following THR surgery for rebuilding limb function is quite long, usually 6 months [14]. One and 3 months post-discharge are two key time points during

Table 2 – Comparison of compliance score between the two groups at discharge and 1, 3, and 6 months after discharge (±s)

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Discharge</th>
<th>1 month after discharge</th>
<th>3 months after discharge</th>
<th>6 months after discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group</td>
<td>100</td>
<td>67.78 ± 14.51</td>
<td>67.25 ± 14.66</td>
<td>64.93 ± 15.38</td>
<td>62.28 ± 14.64</td>
</tr>
<tr>
<td>Control group</td>
<td>137</td>
<td>68.67 ± 13.49</td>
<td>62.86 ± 13.58</td>
<td>56.40 ± 14.92</td>
<td>50.61 ± 16.23</td>
</tr>
<tr>
<td>t</td>
<td>-1.833</td>
<td>0.540</td>
<td>2.074</td>
<td>2.549</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>0.077</td>
<td>0.594</td>
<td>0.047</td>
<td>0.017</td>
<td></td>
</tr>
</tbody>
</table>

ANOVA for repeated measurement, F(group) = 32.32, P < 0.001; F(time) = 4.639, P < 0.05; F(interaction) = 3.594, P < 0.05.
rehabilitation where implementation of nursing intervention can have significant therapeutic benefit. In this study, the research team made a comprehensive and scientific telephone follow-up plan to target the THR patients’ rehabilitation characteristics. Each phone call was approximately 30 min in order to provide effective nursing intervention and obtain patients’ overall rehabilitation information. Family supervisors oversaw and encouraged patients in daily exercises and provided powerful support for rehabilitation outside the hospital. Post-discharge telephone follow-up combined with a family supervisor was an effective and feasible way to promote rehabilitation exercise following THR.

Through telephone follow-up, nurses improved compliance by communicating with THR patients to assess their physical condition, wound healing, and rehabilitation progress; providing continuous professional health education, emotional support, and encouragement to perform functional exercise; and issuing precautions in daily life. At the same time, nurses could detect abnormal conditions and implement effective actions to help the family supervisor to avoid further accidents or complications. Family supervisors monitor patients’ behavior and are asked to recognize problems and to contact nurses for corresponding guidance and help. Similar to Mingying et al. [16], this study revealed that compliance behavior is better for patients in the intervention group than the control group. Analysis of variance indicated in the control group that patients’ compliance behavior deteriorated as time went by, whereas in the intervention group, compliance decreased less so. One plausible explanation is that patients do not continue to comply with doctors’ advice as limb function is restored. It also demonstrates the necessity sustain and improve patients’ compliance.

### 4.2. Telephone follow-up improves rehabilitation compliance and hip joint function

Studies have shown that early or late introduction of activity following THR surgery may lead to insufficient functional recovery, so appropriate rehabilitation time is beneficial for early recovery. Regular telephone follow-up after discharge and effective assessment provides individualized, continuous, and professional rehabilitation exercise guidance and aids in hip joint function recovery in THR patients. At the same time, the role of the family supervisor for each THR patient cannot be underestimated, as they directly help patients implement the exercise plan and communicate with patients to improve rehabilitation compliance, hip joint function, and their quality of life. We found no statistically significant difference between the groups in the Harris score at discharge, but by six months after discharge, the intervention group exhibited significantly higher Harris scores relative to control, indicating better overall hip joint function.

Telephone follow-up is an economic, concise, and feasible way to implement continuous health care, and the family supervisor is an easy-access source of social support. This study found that telephone follow-up and use of a family supervisor as a nursing intervention for THR patients after discharge improved compliance and hip joint function recovery.

### Conflicts of interest

None

### References


<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Discharge</th>
<th>6 months after discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group</td>
<td>100</td>
<td>52.67 ± 10.78</td>
<td>86.38 ± 14.91</td>
</tr>
<tr>
<td>Control group</td>
<td>137</td>
<td>51.34 ± 13.58</td>
<td>72.50 ± 20.19</td>
</tr>
<tr>
<td>t</td>
<td>7.343</td>
<td>9.338</td>
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<td>p</td>
<td>0.176</td>
<td>0.003</td>
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