A prospective study to determine physiotherapy outpatient discharge criteria in post tkr (total knee replacement) at kpj hospitals, Malaysia

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Abstract

Objective: The aim of this study was to evaluate the outcome of physiotherapy treatment following Post TKR and suggest the standard criteria for outpatient discharge from physiotherapy department at KPJ Hospitals. Methods: Male And Female patients with unilateral and bilateral TKR and underwent rehabilitation at KPJ Hospital from Jan 2013 to Oct 2013 were selected as samples for the study. Pre and post data of knee joint pain, knee range of movement, knee flexion and extension muscle strength, lower limb dynamic balance and ADL functional scale were analyzed to find the outcome. Result: All the variables had significance effect after intervention with P < 0.001*. Knee joint Pain has reduced to 3.5 ± 0.22, range of movement for knee flexion increased to 91.85 ± 3.38 and extension lag has reduced to 1.5 ± 0.43, Manual Muscle Power for quadriceps and hamstrings has increased to 3.63 ± 0.1 and 3.63 ± 0.11 respectively. Dynamic balance of lower limb has improved to 3.24 ± 0.12. Functional scale has improved for Dressing, Toileting, Transfer, Mobility and Stair as 9.17 ± 0.26, 8.89 ± 0.29, 12.78 ± 0.43, 13.63 ± 0.39 and 7.87 ± 0.41 respectively. Conclusion: This study concluded that Physiotherapy rehabilitation can significantly reduce Post TKR Pain and improve Knee joint mobility, Muscle strength, Balance capability and activities of daily life among post TKR patients. This study result has suggested the outpatient discharge criteria for post TKR at KPJ Hospitals in Malaysia.

1. Introduction

Knee Arthroplasty/TKR is a replacement of damaged particular surface of the knee joint with a metal or plastic materials in order to restore the integrity of the joint. Knee arthroplasty is a replacement of damaged or arthritic surface of the distal femur and proximal tibia and rest of the knee joint with a metal or plastic materials to restore the integrity of the joint. The main indication is to relieve pain caused by arthritis. Secondary goals are to correct deformity and to restore function. More specifically, candidates for knee replacements have severe degenerative changes of their knee joint seen on radiographs and have failed multiple methods of non operative treatment to relieve their pain. These methods include anti inflammatory medication, use of cane, decreased activity, loss of weight when indicated as well as interarticular corticosteroid injections. These methods should be tried 3 to 6 months before a knee arthroplasty.

A proper course of rehabilitation is essential in order to gain full benefit of the surgery. Most patients usually start rehabilitation while in the hospital. After leaving the hospital, patients will either undergo outpatient therapy while living at home or in-patient therapy at a rehabilitation center. Advanced rehabilitation will be able to begin resuming normal activities. This will start as progress from using a walker (or crutches) to a cane, eventually walking own. At this time will be able to begin climbing stairs. Physical therapy sessions will continue until back at home. Outpatient physical therapy required until full recovery of functions.

During outpatient physical therapy recommend using heat or ice treatments or electrical stimulation to help reduce any persistent swelling or pain. In addition therapist will guide through an exercise program that includes range of motion, strengthening, balance, and endurance exercises as well as functional activities. Therapist can also teach specific exercises that will help to perform job safely. The main indication for post surgical and physiotherapy management is to relieve pain and...
restore function and regain capability. The issue of pain and general functional abilities have successfully proved in postoperative rehabilitation of patients following total knee replacement.36

Research objective

This study focused to evaluate the outcome of physiotherapy treatment following Post TKR and also to suggest the standard outpatient discharge criteria for Post TKR patients at physiotherapy department of KPJ hospitals, Malaysia.

Materials and Methods

This was a cross sectional descriptive study using prospective materials and data. This study included both male and female patients with unilateral and bilateral TKR cases from January to October 2013 of KPJ hospitals Malaysia. A number of 54 physiotherapy outpatients were selected for the study. Subjects with traumatic condition, multiple chronic disorders, psycho-social disorders and repeated TKR were excluded from the study.

Demographic data collected from the patients during admission for physiotherapy treatment. Pre data were collected before starting the treatment and post data collected during discharge of the patient. Data collected using VAS Scale for Pain evaluation, MMT grading for muscle power, goniometry for knee joint Range of movement, Dynamic balance scale11, Barthel Index (ADL functional measures) scale.

Statistical Analysis

Data collected before and after the treatment from the post TKR patients at outpatient physiotherapy department of KPJ Hospitals of Malaysia. Descriptive analysis used to measure the demographic data. Dependent T test used to compare any significant difference within the variables. Data are reported as mean ± standard deviation (SD) with t and P values. P < 0.05 was considered as significant effects of the study.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SEM)</th>
<th>T value</th>
<th>P value</th>
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<tbody>
<tr>
<td>Pain</td>
<td>6.3 ± 0.23</td>
<td>12.61 df=53</td>
<td>P &lt; 0.001*</td>
</tr>
<tr>
<td>Range of motion</td>
<td>62.4 ± 2.90</td>
<td>8.69 df=53</td>
<td>P &lt; 0.001*</td>
</tr>
<tr>
<td>Manual Muscle Power</td>
<td>2.78 ± 0.1</td>
<td>8.21 df=53</td>
<td>P &lt; 0.001*</td>
</tr>
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Fig. 1: Knee joint pain has significantly reduced within the group of the study.
All the variables got significant effect with $P<0.001^*$ after physiotherapy intervention. Pain has reduced to $3.5\pm 1.61$ out of grade 10 without medication during movement and weight bearing. Muscle power of quadriceps has increased to $3.63\pm 0.76$ and hamstrings to $3.63\pm 0.83$ out of grade 5. Active range of movement for knee flexion has increased to $91.85\pm 24.84$ out of 140 degrees and for extension to $150\pm 3.13$, Lag $<5^\circ$ (Zero considered as normal). Dynamic balance has increased to $3.24\pm 1.08$ out of 4 and Barthel Index (ADL functional measures) scale included; dressing score increased to $9.17\pm 0.88$ out of 10, toileting score increased to $8.89\pm 2.10$ out of 10, transfer score increased to $12.78\pm 3.17$ out of 15, mobility score increased to $13.63\pm 2.83$ out of 15 and stair climbing score has increased to $7.87\pm 3.01$ out of 10.

We found that patients’ high expectations concerning pain relief after TKR were to a great extend fulfilled while their expectations about demanding physical activities were not fulfilled to the same degree. Preoperatively, 98% of the patients expected much less or less pain postoperatively. Similarly to physical function, walking ability, and leisure-time activities, the best outcome regarding self-reported pain was seen at the 12-month follow-up when 93% experienced much less or less pain after 5 years. Combination of pain control with active exercise improve activities daily living. The successful outcome of POST TKR following physiotherapy rehabilitation is influence by the strength of Quadriceps and Hamstring muscle.

A study on improvement of performance after total knee arthroplasty reported that performance-based measures of activity and all impairment measures improved At 12 months compared with the 1-month test. The rank order of responsiveness in the long
term change in outcome measures from the preoperative to 12-month test. The frequency of use of an assistive device significantly increased from the preoperative to 1-month assessment during the performance tests and decreased from 1-month to the 12-month test. The study hypothesized that there would be greater improvement in the region-specific knee outcome survey—activities of daily living scale and generic Short Form–36 health status measure compared with the level of improvement in the performance-based measures of activity, especially in the early stages after TKA.

A study on the relationship between progression in the replaced knee functionality and painful symptoms has experienced by patients subjected to specific rehabilitation treatment, in association with analgesic physical therapy with Horizontal Therapy or TENS. With regard to the recovery of quadriceps strength and the ischiobial elements, evaluated using isokinetic method, which provide an indication of the strengthening technique implemented as a part of rehabilitation cycle. The improvement of pain reduction and muscular strength of quadriceps muscle was significant in group treated with analgesic physical therapy with Horizontal Therapy.

A longitudinal study with a more progressive and intense rehabilitation program instituted earlier after TKA (3–4 weeks postoperatively) and designed specifically to address the functional impairments following a TKA has been repeatedly reported by Mizner and colleagues at the University of Delaware. Their protocol consisted of 3 days of inpatient physical therapy; followed by 2 to 3 weeks of home physical therapy visits. At approximately 4 weeks after surgery, the patients with TKA began 6 weeks (2 to 3 times per week) of outpatient rehabilitation. Progressive, high-intensity volitional exercises were used to increase lower musculature extremity strength and improve functional ability in 40 individuals who completed this protocol. At 1 month post surgery, before treatment was initiated, knee ROM, quadriceps strength, and performance on the timed up and go (TUG) and stair climb test (SCT) were lower than they were at pre surgery. The TKA recipients' quadriceps strength decreased 62% from the preoperative value at the first month post surgery. Following 6 weeks of rehabilitation, quadriceps strength improved significantly at each following assessment (2, 3, and 6 months post surgery). There was also a 21% improvement in the TUG and a 40% improvement in the SCT from the preoperative test to 6 months after surgery. Finally, quadriceps strength was correlated with functional performance measures at all testing sessions and as quadriceps strength improved, there was an enhancement in functional performance. This study dearly demonstrates that the muscle impairments and functional limitations can be reversed following a TKA.

In our investigation we found that post TKR rehabilitation is effective on reduction of pain; improve quadriceps and hamstrings muscle power. Knee Range of movement has improved for flexion and extension movement. Dynamic balance and ADL functions also greatly improved after physiotherapy rehabilitation for post TKR cases in KPJ hospitals in Malaysia.

Limitation
Physiotherapists were not blinded and aware about the study so there is probability of manipulating the data.

Recommendation
Conduct a retrospective study in future to avoid the probability of manipulating the data. Extend the study at private and public hospitals and institutes to enhance external validity. Conduct a cohort study to determine the patient’s quality of life following Post TKA.

Conclusion
This study concluded that, there is significant effect on Pain reduction, knee joint mobility, muscle strength of hamstring and quadriceps, dynamic balance of lower limb and activities of daily life among patients with post TKR. This study result has suggested the minimum requirement of outpatient discharge criteria for post TKR patients at KPJ Hospitals in Malaysia.

Acknowledgement
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6. References
[8] Mizner RL et al, Altered loading during walking and sit-to-stand is affected by quadriceps weakness after total knee arthroplasty, 2005;5; Sep;23(3):1083-90.
