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PHYSIOTHERAPY REHABILITATION PRACTICES AFTER TOTAL KNEE REPLACEMENT IN LAHORE

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Abstract:

Background: *After total knee replacement surgery there is least availability of evidence based clinical guidelines to guide physiotherapy rehabilitation because of scarcity of clinical research.*

Objective: *The major objectives of this survey were to describe the standard physiotherapy rehabilitation practices after total knee arthroplasty. To provide possible explanation for practice variation, if these variations exist in practice.*

Materials and Methods: *A cross-sectional survey design was used with non-probability purposive sampling technique. Study was completed in four months (FEB 2015 to JUNE 2015) after the approval of synopsis. The sample consisted of 184 physiotherapists from different hospitals of Lahore. Data was collected through questionnaire comprised of 26 questions related to different phases of rehabilitation including acute phase, post-acute phase and primary program choice. After collection, the descriptive analysis of data was done by (SPSS-16).*

Results: *The results showed maximum participation by private hospitals that is 58.7%. In acute and post-acute rehabilitation phase consistency and diversity was observed. Control of pain, swelling, exercise prescription and gait retraining in the acute period had shown consistent findings. In post-acute phase control of swelling by compression, strengthening exercises and gait retraining lead to attainment of full weight bearing in six weeks. The modes of rehabilitation, discharge criteria from rehabilitation and the tools for measuring outcomes also showed less consistency. The practice variation was seen in institutional and non-institutional factors.*

Conclusion: *It is concluded that in different set ups of Lahore, there must be some standard practice guidelines for physiotherapists in dealing the patients after TKR. In acute and post-acute phases some elements have shown consistency and some elements have shown diversity.*

Keyword: *Total knee Arthroplasty, Rehabilitation, Physiotherapy.*

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INTRODUCTION:

Total knee replacement, that is also known as total knee arthroplasty, is the orthopedic procedure, getting very popular now a days. Over 600,000 total knee replacements were being performed in the United States annually as of 2010(1). At the end of year 2003, 21540 total knee replacements were done in Australia(2). There comes some other data from other countries consistent with the above figures, such as USA where between 1991 and 2000, the incidence of primary total knee replacements are doubled(3). The number of total knee replacements annually performed in the US is expected to grow by 673 percent to 3.48 million procedures by 2030. The knee joint is working as complex hinge joint, which not only allows flexion and extension but also rotation and gliding. Different pathologic conditions affecting the knee can be treated with total knee replacement. The pathologic conditions in which total knee replacement is recommended including osteoarthritis. Other conditions include rheumatoid arthritis, psoriatic arthritis, gouty arthritis and lupus. Other non-inflammatory conditions include Avascular necrosis, tumors, or congenital deformities. Over 95 percent of total knee replacements in the US are performed for patients of knee osteoarthritis(4). Osteoarthritis is also known as "degenerative joint disease." Multiple joints may get affect by osteoarthritis; sometimes it may affect only knee joints. The hallmarks of this disease are limitation in daily activities due to pain(5). Rheumatoid arthritis also affects knee joints. About twenty to thirty percent of patient's knees affected by rheumatoid arthritis have undergone TKR surgery. Other than arthritic causes, meniscal injury of knee joint may require knee replacement.

Back in 1860, history of total knee replacement began, when the German surgeon Themistocles Gluck implanted the first primitive hinge joints. In 1951, after the introduction of the Walldius hinge joint development was progressed, initially made up from acrylic and later(in 1958) from cobalt and chrome(5). Unfortunately, this hinge joint suffered from early failure. In the early1960s, John Charnley's proposed the modern TKR development(6). In the early 1970s, the condylar knee was developed independently in the United States and overseas. Throughout the 1970s, the metal-on-polyethylene condylar design that completely replacing the femoral and tibial articulating surfaces was introduced. Furthermore, the procedure of replacing the tibiofemoral condylar surfaces with cemented fixation, along with preservation of the cruciate ligaments, was developed and refined. The condylar knee with posterior cruciate sacrificing design was introduced, also in the early 1970s to correct severe knee deformities. The introduction of the "total condylar prosthesis" by Install and colleagues in 1972 is generally considered to mark the era of "modern" knee replacement(7). In 1973 "total condylar prosthesis" was introduced in which resurfacing of all three compartments was performed (PCL sacrificing). By 1974, replacing the patellofemoral joint and either preserving or sacrificing the cruciate ligaments had become standard practice. Subsequently, condylar knee designs were improved with use of universal instrumentation. Improvements in component materials, geometry, and fixation continued throughout the 1970s and 1980s. Future developments, such as navigation-guided surgery, enhanced in kinematics, and better fixation will give evolutionary advancements for the total knee replacement.

Broadly speaking knee replacements are of two types, total knee replacements and minimally-invasive partial knee replacements (mini knee).Despite of considerable benefits of total knee replacement (8) it gives significant financial burden on patients.

Presently after TKR, there is less evidence-based material on clinical guidelines of physiotherapy rehabilitation. Thus there is likelihood of practice variations during both acute rehabilitation phase and post-acute rehabilitation phase(9).There is also likelihood of differences between therapists and surgeon's preferences(10). Therefore, we have conducted a survey to describe physiotherapy rehabilitation practices after TKR and to provide possible explanation of variation in practice, if these variations exist.

METHODOLOGY:

The study design was cross sectional survey. The respondents interviewed were senior and contracted Physiotherapists from different government, semi government, and private hospitals of Lahore. The study was completed in 4 months (February2015 to June 2015) after the approval from research ethical committee of Riphah college of Rehabilitation Sciences (RCRS). The purposive sampling technique (non - probability sampling) was used and the sample size was 184 physiotherapists. An inclusion criterion that was used comprised of having patients who have undergone total knee replacement (TKR). Data was collected through questionnaire comprised of 26 closed ended questions. These questions were related to different phases of rehabilitation including acute

phase, post-acute phase and primary program choice. After collection of the data, descriptive analysis was done by using statistical package for social sciences (SPSS 16). Frequency table, pie and bar chart were constructed. Percentages and frequencies of given data were calculated.

RESULTS:

In the cross-sectional survey of physiotherapy rehabilitation practices after TKR in Lahore, data was collected from total 184 physiotherapists working in different hospitals (government, private, other rehabilitation centers) of LAHORE including Lahore General Hospital, Ittefaq Hospital, Shokat Khanum Hospital, and Doctors Hospitals. By using SPSS, the data showed following statistical results. The participation profile of respondents from different hosp/clinics/rehab centers, in which 58.7% is the maximum participation by private hospitals.22.3% from government hospitals. It shows TKR maximally performed in private set ups.

Participation Profile of Respondents from Different Hosp/Clinics/Rehab Centers

ACUTE CARE PHASE

Assessment tools used to measure outcomes

Tools to Measure Outcomes	Percentages
Objective observer measures (goniometer, strength)	28.8%
Functional (sit to stand, in formal gait assessment)	52.7%
Patient centered	15.8%
None	2.2%

Participation Profile of Respondents from Different Hosp/Clinics/Rehab Centers	No. Of Respondents	Percentages
Government hospitals	41	22.3
Private hospital	108	58.7
Rehabilitation centers	31	16.8
Others	4	2.2
Total	184	100.0

Treatments and Discharge from Acute Phase to Outpatient Phase: Immediately after Total Knee Replacement surgery different physiotherapeutic interventions were given. Cryotherapy (ice therapy) was most commonly used to reduce knee pain. Swelling & effusion in acute phase of TKR was most commonly reduced by Elevation of limb which is 40.2%. Mostly prescribed exercises include muscle setting exercise of quards, hamstrings & adductors. There was 37% gain in 0-70-degree range of motion in acute phase. Most commonly used assistive device was walking frame that is 77.2%. The discharge criteria were multifactorial but the most common discharge criteria from acute phase to post-acute was independence of patients in ADL which is 32.6%.

POST ACUTE CARE

A variety of treatments were given in post-acute (OPD) phase. Supervised group treatments, monitored home program, community program. The most preferable method was monitored home program.

Discharge criteria in post-acute phase:

The mostly used discharge criterion in post-acute phase is attainment of functional goals that is 54.3%.

PRIMERY PROGRAM:

Factors Influencing Primary Program:

Out of non-institutional factors, surgeon preference was 52.7% which was the greatest imposing factor on primary program choice. Out of institutional factors there are 47.3% results of established practice which impose greater impact on the choice of primary program.

The factors which had an impact on the choice of primary programme.

Non-Institutional Factors	Percentage
Therapist preference	13.6%
Patient preference	33.2%
Surgeon preference	52.7%
Institutional Factors	
Established practice	47.3%
Limited transport	19.6%
Limited staff	33.2%

In Application of Primary Program, Treatment(S) Provided:
The primary programme involved supervised groups or monitored home exercise prescription, functional activities, Manual therapy and education. The 40.8% results of Manual therapy (e.g. massage, patella mobilizations) stretches (self/assisted) as a treatment option used most frequently in the application of primary program.

DISCUSSION

This survey was conducted in Lahore (Pakistan) for the first time. All participants were evenly distributed. The response pattern showed participation profile of respondents from different hosp/clinics/rehab centers, in which 58.7% was the maximum participation by private hospitals, 22.3% from government hospitals, 16.8% from rehab centers and 2.2% from others, also showed TKR maximally performed in private set ups. This response rate was considered acceptable(11). In acute phase of TKR, cryotherapy (ice therapy) was most commonly used to reduce knee pain which was 50.5%. It was the trend among UK physiotherapists, they used cryotherapy to reduce intra articular knee swelling and pain (12).Swelling & effusion in acute phase of TKR was most commonly reduced by Elevation of limb which is 40.2%. There was 37.5% gain in 0-70-degree range of motion. In acute phase, mostly prescribed exercises included muscle setting exercise of quadriceps, hamstrings & adductors which is 71.2%. Gait training has started from post op day 1 in acute phase in which the most common use of assistive device was frame which is 77.2%. There was uniformity in results with gait retraining in the acute rehabilitation phase. The duration of primary program session must be short so that physiological changes(surgical pain, edema and low Hb levels)cannot restrict the performance of exercise(13). The most common discharge criteria from acute phase to post-acute was independence of patients in ADL which was 32.6%. The primary determinant of discharge from acute physiotherapy is functionality, not range of motion.

There were 47.3% result of elevation & compression in post-acute phase to control swelling. Different randomized controlled trials have shown same clinical uses of compression alone. Achievement of full weight bearing in 6 weeks of post-acute phase was 67.4% There were 38.0% results of closed chain exercises which were performed to gain strength in post-acute phase. To improve ADL's, there were 53.8% results of using both gait training & protected aerobic exercises. Mostly used discharge criteria in post-acute phase were attainment of functional goals that is 54.3%.

Out of non-institutional factors, surgeon preference was 52.7% which was the greatest imposing factor on primary program choice. Out of institutional factors there were 47.3% results of established practice which impose greater effect on primary program selection. Both institutional factors and non-institutional factors contributed to variation of practice and both of these affected equally on the choice of primary programme. From above results, it appears that both factors played same role in practice variation. In application of primary program, we got 40.8% results of Manual therapy (soft tissue massage, patellar mobilizations, stretching) as a treatment option used most frequently. The exercise predominantly included in primary program was strength training which has given 37.5% results. The intensity of exercise was guided by patient tolerance which was 60.9%. There were 57.1% results of typical duration of a session of physiotherapy in primary program and the progression of exercise was guided by attainment of functional goals that was 39.1%. The frequency of exercise which was 4 times per week showed 46.2% results. Objective research findings have supported the outcome tools.

CONCLUSION:

From the results of this survey, it is concluded that in different set ups of Lahore, there must be some

standard practice guidelines for physiotherapists and uniformity in care in dealing the patients after TKR. In acute and post-acute phases some elements have shown consistency and some elements have shown diversity. Variation in practice was explained by both institutional and non-institutional factors. So, for propagation of evidence-based practice guidelines, repetitive clinical trials are required so that cost-effective rehabilitation is practiced after total knee arthroplasty.

RECOMMENDATIONS AND LIMITATIONS

Total knee replacement procedure is expensive and all public hospitals do not provide services for total knee replacement surgeries. So, at the level of tertiary care hospitals, its cost must be controlled to make it easy for most of the patients. If TKR have become common at public set ups, it will automatically become less frequent in private hospitals. In early stages of rehabilitation, psychological counseling of patient is also very important as TKR mostly performed in aged people, who require more mental motivation and confidence. Some patients are reluctant in doing exercises post operatively, due to pain, inflammation and dressing (bandage) over the operated knee. They must be encouraged and educated about exercise and initial weight bearing.

This study is very noteworthy for physiotherapists, as its results contain the statistical values about rehabilitation protocols of TKR, and very less work has been done on this topic up till now. So, this should be published in orthopedic and physical therapy journals. Time to complete study was very short. Study was limited only to specific one city. If enough time and resources are available, this study can be conducted on large scale.

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