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QUALITY OF LIFE FOLLOWING PHYSIOTHERAPY MANAGEMENT IN PATIENTS WITH TOTAL KNEE REPLACEMENT

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ABSTRACT

Background: Knee Osteoarthritis (OA) is a major cause of chronic pain & a leading source of functional disability in many individuals. Total knee Arthroplasty/Replacement (TKR) is an effective procedure for the treatment of OA. Reduction in pain, improvement in the physical function is the main expected outcomes after TKR. However, for some patients, the outcomes are not satisfactory. The functional benefits of this surgical procedure are not as convincing as large functional deficits persist in many patients.

Methods: 11 patients (four males and seven females) undergoing TKR were randomly selected from the orthopedic wards of a tertiary public sector hospital. Post written informed consent, patients were evaluated pre-operatively using EQ-5D and Knee injury and Osteoarthritis (KOOS) outcome measures. The TKR was followed by vigorous physiotherapy treatment from post-operation day 1, followed up to 6 weeks, and then patients were re-evaluated.

Results: The patients who participated had a mean age of 64.36. Analysis with a paired t-test showed statistically significant improvement (p-value < 0.05) for all the domains of KOOS and also EQ-5D. The patients responded well to physiotherapy with statistically significant improvement (p-value < 0.05) in their quality of life.

Conclusion: There is a significant improvement in the quality of life of patients undergoing total knee replacement surgery post physiotherapy. More intensive rehabilitation should be promoted in the sub-acute recovery period after TKR to optimize functional outcomes.

Keywords: Total knee replacement, knee osteoarthritis, physiotherapy, Quality of life, EQ-5D, KOOS.

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INTRODUCTION

Diseases and their subsequent treatment are a constant burden to the healthcare system of our country. Between the ever-increasing population and the revolutionized medical care of the current century, multiple years are added to an average life span. Aging has become a counter product of today's healthcare transformation, along with an increase in chronic and degenerative diseases owing to the present lifestyle. Osteoarthritis (OA) is one such condition. Over the period, OA has proven to be the most prevalent condition between the ages of 46-60, with clinical features including degeneration of the Knee joint commonly followed by inflammation, pain, bone remodeling, etc. it has been found that females are predominantly affected [1-3]. To understand the knee pathology, it is essential to appreciate the anatomy of this complex joint. Tibiofemoral & Patellofemoral joints are the parts of the knee complex. The medial & lateral compartments are existing in the Tibiofemoral joint. The medial joint space is mostly affected owing to weight-bearing forces and many other factors [4]. Due to the absence of an established cure for OA knee, both pharmacological and surgical management are explored.

TOTAL KNEE REPLACEMENT (TKR): Advanced knee osteoarthritis (OA) patients enjoy restored knee movements and pain reduction on account of Total knee Arthroplasty/Replacement (TKR) [5-7]. TJKR has become the need of the hour in the past decade, making it a general orthopedic procedure. To avert the rising demand for this method, newer approaches for the management of individuals undergoing TKR is required [8,9]. Poor outcomes are reported by 10 to 30% of patients or no improvement following the intervention and diminished Health-Related Quality of Life (QoL) [10,11,12,13]. It is still an immense challenge to identify the factors affecting the outcomes of TKR and poor patient satisfaction. They are undoubtedly complex, and the possible determinants are primarily perioperative surgical complications and prosthetic-related factors. Surgical factors such as the design of, type of implant (cruciate-retaining or postero-stabilized), bearing type (mobile or fixed), plays a minor role in the short-term outcomes but has affects the longevity of the prosthesis. Perioperative or surgical complications may upset the short-term as well as the long-term outcomes of TKR. The pain, function, and QoL during the preoperative period influence the outcomes achieved during the postoperative period following a total knee joint arthroplasty [14,15,16]. Many other personal, clinical, or psychosocial factors have been associated with worse pain, function, and QoL following TKR. These factors include increased age, females, more impoverished communities, illiteracy, high body mass index (BMI), longer disease duration, comorbidities, preoperative use of assistive devices, depression, and social negligence. The degree of association between these factors and the outcomes remain elusive [17,18,19]. A pre-rehabilitation program or an intensive rehabilitation post-surgery needs

to be implemented for patients recognized to pose a risk of an inferior outcome. Hence, this study was conducted to evaluate the quality of life following Physiotherapy management in patients with Total Knee Replacement.

METHODOLOGY

All the patients (n=11) signed informed consent before participation in the study. The Department Review Board approval was obtained before the commencement of the study (No.PT/DRB/35). The study was conducted at the PT School & Center, KEM Hospital, a public sector tertiary care hospital. The patient's health files in the orthopedic ward of the hospital were checked, and the data was collected based on these files. The patients were interviewed a few days before surgery. The outcome measures used were the Knee Injury & Osteoarthritis Outcome Measure (KOOS) & EQ-5D. The patients were evaluated before surgery, followed by physiotherapy treatment & re-evaluated at a follow up six weeks post-operatively in the outpatient department. The patients recruited were referred from primary care to an orthopedic surgeon in the public sector hospital after being diagnosed with OA knee using knee radiographs and considered eligible for TKR by the surgeon. Patients undergoing bilateral and simultaneous TKR, revision surgery, uni-compartmental knee arthroplasty, high tibial osteotomy were excluded from the study along with individuals reporting rheumatoid arthritis and infection. Patient education was done to encourage the participant to engage in the management of their OA knee actively. This was based on a focus on the diagnosis of OA, the etiology, symptoms & risk factors, a short overview of current treatment options, surgical procedures & postoperative rehabilitation & its importance.

Outcome Measures

Knee Injury and Osteoarthritis Outcome Measure (KOOS): [20,21,22] is an outcome measure for evaluating the patient-relevant treatment effects in Osteoarthritis. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is extended to design the KOOS tool. This 42-item self-administered, self-explanatory questionnaire covers five patient-relevant dimensions such as Pain, ADL functions, Sport & Recreation functions & QoL. A Likert scale scored from 0 (No Problems) to 4 (Extreme Problems) is used. For scoring purposes, a scale of 0-100 is used, with 0 representing the severe knee problems and 100 depicting absolutely no knee problems. This shows that the lesser the score, the more affection. The scores are then converted to represent percentages.

EQ-5D: [23,24] is a generic 5-item questionnaire for assessing self-reported general health developed by the EuroQoL group. It is used to collect QoL scores as a basis for determining health state utilities. It provides a simple, descriptive profile & a single index value for health status used in the clinical & economic health care or surveys. The EQ-5D descriptive system: comprises five dimensions: Mobility, Self-care, Usual activities, Pain/discomfort, and anxiety/depression. No problems, some problems &

severe problems are the three dimensions of this scale. The EQ-5D Visual Analogue Scale (EQ-VAS): records the “best imaginable health state” & “worst imaginable health state” based on the respondent’s self-rated health on a vertical VAS where the endpoints are labeled. This is used as a quantitative measure of health outcome as judged by individual respondents.

The patients were given the questionnaire & asked to fill them before surgery, at the time of discharge from the hospital & also six weeks later after physiotherapy management in the outpatient department.

Physiotherapy Protocol

All patients attended a supervised rehabilitation session until discharge & were asked to continue this at home. They came for a follow up at six weeks post-operation. The exercises were done twice a day. Each session included 5 components: [25,26]

- Warm-up (5 mins): General mobility exercises for the neck, upper limbs, and back, alternated ankle movements, lower limb abduction, gradual knee flexion.
- Strengthening exercises (5 mins): Static quadriceps, static hamstrings, dynamic quadriceps, straight leg raise, VMO exercises, and upper limb exercises.
- Functional task-oriented exercises (5 mins): Bridging, get up & sit, commode training, standing, weight-shifts (antero-post & medio-lat), and unilateral knee flexion to 90° in standing.
- Gait training (10 mins): Walking with walker/cane, walking in place with a large amplitude of hip & knee flexion & upper limb movements, and climbing a flight of stairs.
- Cool Down (5 mins): Slow walking, stretching, deep breathing exercises, and cryo-therapy in the event of pain.

RESULTS

The data was analyzed using SPSS version 24. Demographic data were recorded for all the results. The variables appear to have normal distribution on analysis with the Shapiro-Wilk test for normality. A paired t-test was used for statistical analysis of the outcomes. The significance level was set at a p-value < 0.05. The improvement observed is reflected in the below tables.

Table 1: Demographic details of patients

Variable	Mean	Standard Deviation
Age in years	64.36	7.06
Gender (M/F)	4/7	

This table shows the mean age and gender of the patients.

Table 2: Comparison between KOOS domains

Variable		Mean	SD	t-value	p-value
Symptoms	Pre	70.98	8.71	-3.85	0.003
	Post	82.19	4.53		

Pain	Pre	48.09	5.89	-11.70	0.000
	Post	68.73	2.41		
ADL	Pre	54.13	8.55	-10.21	0.000
	Post	75.99	3.70		
Quality of Life	Pre	38.49	4.84	-15.67	0.000
	Post	62.67	1.02		

Physiotherapy protocol showed statistically significant improvement for all the domains of KOOS.

Table 3: Comparison of Quality of Life

Variable		Mean	SD	t-value	p-value
EQ5D	Pre	45.09	7.35	-8.25	0.000
	Post	70.45	4.71		

Quality of life was also found to improve statistically post physiotherapy rehabilitation.

DISCUSSION

OA knee is one of the few conditions affecting the quality of life of the aging population [27]. Total knee replacement is one of the most common operations in orthopedic surgery. Reduction in pain, improvement in physical function, and Quality of Life are the expected primary outcomes after TKR [28]. Stakeholders, health service systems, hospitals, industries, etc. have begun to use patient perception outcomes as benchmarking parameters. Patient satisfaction, particularly with surgical procedures, is vital to measure. A high level of satisfaction has been reported following joint TKR [29]. Physiotherapy has been used to treat patients with TKR for a long time. To identify whether a patient achieved a satisfactory symptom state, we used the EQ-5D together with KOOS.

Our study was conducted on patients with a mean(sd) age of 64.36(7.06) years, predominantly females (n=7), as illustrated in Table 1. Muraki et al. (2012) [30] also found a high incidence of OA knee in the female population assessed in their study. Similarly, results were found by Singh (2008) [17], Mahapatra and Kar (2019) [31] in their study, thus, justified the need for creating community awareness and encouraging women to undergo regular screening and early intervention. Tables 2 and 3 of our study demonstrate a statistically significant outcome and superior functional performance post physiotherapy intervention. It also highlights the enhancement in quality of life. The faster locomotor recovery, combined with the ability to perform daily activities with less pain, stiffness & difficulty, most likely contributed to favoring a more active lifestyle in patients after TKR. Similar results were observed by Moffet et al. (2008) [32]. KOOS showed improvement in all the domains tested in this study. As concluded by Roos & Larsen, KOOS is advantageous to use while assessing groups with high expectations of physical activity, interventions where the physical function is the primary outcome, and when assessing long-term outcomes [17].

The quality of life is an essential aspect of an individual’s lifespan. This prospective analysis of early patient reports of performance after TKR showed marked changes in

the level of satisfaction during the first six weeks after surgery. Physiotherapy is thus an integral part of the road to recovery post Total knee replacement.

CONCLUSION

Physiotherapy plays an essential role in the rehabilitation of patients who have undergone total knee replacement and is also vital to enhancing the quality of life. The utilization of instruments and rating scales is paramount for the adequate assessment of several orthopedic procedures of the knee, including ACL reconstruction, meniscectomy, and TKR. Although direct performance assessment and patient-reported questionnaires are both useful outcome measurement tools, they are complementary and should be reported as such. It may be helpful to use a framework of different outcome tools.

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