

A study to determine the outcome of osteoarthritis after physiotherapy interventions

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Abstract

Introduction: Osteoarthritis is a top cause of disability in older people. The goal of treatment is to reduce pain and improve function and to advise people to exercise as a core treatment, irrespective of age, comorbidity, pain severity or disability like local muscle strengthening and general aerobic fitness. **Aims and Objectives:** To find outcome of Osteoarthritis knee after physiotherapy intervention. **Material and Methods:** A randomized control trial undertaken to determine outcome of the patients with physiotherapy interventions in the elderly patients with osteoarthritis. 60 patients with knee osteoarthritis were included in the study and were divided into two groups randomly (30 participants for each group). Group I receiving physiotherapy exercises at center and Group II receiving placebo exercises. **Results:** The VAS score at baseline in physiotherapy and placebo group was 5.31 ± 1.42 and 5.28 ± 1.36 respectively. It decreased to 3.23 ± 0.98 and 3.86 ± 1.12 and the VAS score for restriction of activity at baseline in physiotherapy and placebo group decreased to 2.93 ± 0.98 and 3.26 ± 1.12 in physiotherapy and placebo group. The WOMAC score for pain decreased to 5.29 ± 1.98 and 6.76 ± 2.12 in physiotherapy and placebo group and for physical function decreased to 19.23 ± 3.78 and 22.86 ± 2.12 in physiotherapy and placebo group after 12 weeks which were statistically significant between the two groups. The relation of age, sex, BMI and quality of life among study groups after physiotherapy showed no statistical difference. The relation of knee malalignment and Foot malalignment with quality of life among study groups after physiotherapy showed no statistical difference. **Conclusion:-** The mean VAS score, WOMAC score for pain, WOMAC score for physical function, mean quadriceps strength, step test score and time up score was significant in patients treated with physiotherapy.

Keywords: Osteoarthritis, knee, Elderly patients, WOMAC, Physiotherapy.

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INTRODUCTION

Osteoarthritis is a top cause of disability in older people. The goal of treatment in OA is to reduce pain and improve function. There is no cure for the disease, but some treatments attempt to slow disease progression.¹ By the beginning of 20th century the disease had been granted its own title of "osteoarthritis", derived from the

Greek words "osteo" meaning "of the bone", "arthro" meaning "joint" and "itis" meaning "inflammation".² The 20th century saw a dramatic expansion of medical techniques and rapid development of the technology available for diagnosis. One of the most important inventions of the period was the X-ray machine, and this was to prove an important tool in developing the understanding of OA. This led to a distinction being made between OA and rheumatoid arthritis, and also to the development of a radiographic scoring system by Kellgren and Lawrence which is still in use today and used in this study.^{3,4} The United States Centre of Disease Control (CDC) estimates that OA affects 13.9% of adults aged 25 and older, and 33.6% of those aged 65 and older. This means that, for the United States, 26.9 million people are estimated to suffer from OA.⁵ A similar picture is seen in the United Kingdom with the National Health Service (NHS) reporting an estimated 8.5 million people suffering from OA.⁶ It is also important to note that the

figures from the CDC from 2005 show a rise from 21 million OA sufferers in 1990. This increase of 5.9 million OA sufferers is likely due to the ageing population phenomenon occurring in developed countries, but could also be due to increase in prevalence of risk factors for OA.⁷ The progressive nature of osteoarthritis and its deformation of the cartilage and bone mean that once the disease has initiated in a joint it is unlikely that it will fully recover. However, treatments for the disease can often slow or halt its progression and this can lead to some recovery of function of the joint and reduction of pain and swelling. Treatments include; exercise, weight control, rest and joint care, surgery, and medicines designed to reduce pain or stimulation of cartilage regeneration.^{8,9} Advise people with osteoarthritis to exercise as a core treatment, irrespective of age, comorbidity, pain severity or disability. Exercise should include: local muscle strengthening and general aerobic fitness.¹⁰

AIMS AND OBJECTIVES

To find outcome of Osteoarthritis knee after physiotherapy intervention

MATERIAL AND METHODS

Study Design

The present study was a randomized control trial undertaken to determine outcome of the patients with physiotherapy interventions in the elderly patients with osteoarthritis.

Study Participants

60 patients with knee osteoarthritis were included in the study. All individuals were informed about the program. The participants were divided into two groups randomly (30 participants for each group).

Inclusion Criteria

Diagnosed as knee osteoarthritis with 2 or 3 scoring according to Kellgren-Lawrence radiographic grading scale of knee osteoarthritis. Self-report of knee pain longer than last 3 months and No history of any surgical procedure on either lower extremity in past 6 months.

Exclusion Criteria

Patients suffering from Musculoskeletal diseases, Neurological diseases, Heart problems, Acute myocardial infarction, Unstable angina, Chronic liver and kidney diseases, Patient who are receiving cortisone injection for knee OA, Uncontrolled Diabetic Mellitus, Deep Venous Thrombosis (DVT), History of knee arthroplasty and Stroke patients.

Setting

This study had approval from the Research and Ethics Committee to conduct this study at the physiotherapy

department. The rehabilitation program took twelve weeks, two sessions per week.

Data Collection

The patients were referred from clinic with diagnosis of knee osteoarthritis. All participants were informed about the study "purpose, groups, treatment intervention and benefits". Upon patient acceptance, the patient must sign up the consent form. Participants in both groups, were received health education on knee OA by researcher, including joint protection, appropriate behavior changes to enhance functional outcomes, adjust to the environment to accommodate functional deficit and manage their status at home. All participants had baseline assessment. The participants were divided into two groups randomly and neither group was aware of the treatment that the other group was receiving:

- **Group I:** they were received the physiotherapy exercises at center.
- **Group II:** they were received placebo exercises.

Statistical Analysis

All data analysis had been done by using SPSS (version 17) for windows. The initial measures of each group were compared with the final measures of the study period and compared between the groups by using student *t* test.

RESULTS

Table 1: Association of WOMAC (Pain) among study groups

WOMAC (Pain)	Physiotherapy (n=30)	Placebo (n=30)	P value
Baseline	8.31 ± 2.42	8.28 ± 2.36	>0.05
At 12 weeks	5.29 ± 1.98	6.76 ± 2.12	<0.05*
Change from baseline	-2.74%	-2.38%	

(*P<0.05 statistically significant)

It was seen from above table the mean WOMAC score for pain at baseline in physiotherapy and placebo group was 8.31 ± 2.42 and 8.28 ± 2.36 respectively. It was decrease to 5.29 ± 1.98 and 6.76 ± 2.12 in physiotherapy and placebo group after 12 weeks which was statistically significant between the two groups. (p < 0.05)

Table 2: Association of Pain on Movement among study groups

VAS (Pain on Movement)	Physiotherapy (n=30)	Placebo (n=30)	P value
Baseline	5.31 ± 1.42	5.28 ± 1.36	>0.05
At 12 weeks	3.23 ± 0.98	3.86 ± 1.12	<0.05*
Change from baseline	-2.14%	-1.98%	

(*P<0.05 statistically significant)

It was seen from above table the mean VAS score at baseline in physiotherapy and placebo group was 5.31 ± 1.42 and 5.28 ± 1.36 respectively. It was decrease to

3.23 ±0.98 and 3.86 ±1.12 which was a statistically significant between the two groups. (p <0.05)

Table 3: Association of Restriction of activity among study groups

VAS (Restriction of activity)	Physiotherapy (n=30)	Placebo (n=30)	P value
Baseline	4.71 ±1.41	4.82 ± 1.38	>0.05
At 12 weeks	2.93 ± 0.98	3.26 ±1.12	<0.05*
Change from baseline	-2.16%	-1.87%	

(*P<0.05 statistically significant)

It was seen from above table the mean VAS score for restriction of activity at baseline in physiotherapy and placebo group was 4.71 ±1.41 and 4.82 ± 1.38 respectively. It was decrease to 2.93 ± 0.98 and 3.26 ±1.12 in physiotherapy and placebo group which was a statistically significant between the two groups. (p <0.05)

Table 4: Relation of age and quality of life among study groups after physiotherapy

Age	Quality of Life (WOMAC)		Total
	Improved	Not improved	
>60	17	03	20
<60	08	02	10
Total	25	05	30

(X²=0.87 DF=1; p=0.56 Not significant)

The relation of age and quality of life among study groups after physiotherapy showed no statistical difference. (P>0.05)

Table 5: Relation of sex and quality of life among study groups after physiotherapy

Sex	Quality of Life (WOMAC)		Total
	Improved	Not improved	
Male	12	02	14
Female	13	03	16
Total	25	05	30

(X²=0.88 DF=1; p=0.57 Not significant)

The relation of sex and quality of life among study groups after physiotherapy showed no statistical difference. (P>0.05)

Table 6: Relation of BMI and quality of life among study groups after physiotherapy

BMI	Quality of Life (WOMAC)		Total
	Improved	Not improved	
>25	20	03	23
<25	05	02	07
Total	25	05	30

(X²=0.87 DF=1; p=0.55 Not significant)

The relation of BMI and quality of life among study groups after physiotherapy showed no statistical difference. (P>0.05)

Table 7: Relation of Knee mal alignment among study groups

Group	Knee Mal alignment		Total
	Improved	Not improved	
Physiotherapy	12	02	14
Placebo	13	03	16
Total	25	05	30

(X²=0.87 DF=1; p=0.56 Not significant)

The relation of knee mal alignment and quality of life among study groups after physiotherapy showed no statistical difference. (P>0.05)

Table 8: Relation of Foot mal alignment among study groups

Group	Foot Mal alignment		Total
	Improved	Not improved	
Physiotherapy	12	02	14
Placebo	13	03	16
Total	25	05	30

(X²=0.87 DF=1; p=0.56 Not significant)

The relation of foot mal alignment and quality of life among study groups after physiotherapy showed no statistical difference. (P>0.05)

DISCUSSION

In our study the mean VAS score at baseline in physiotherapy and placebo group was 5.31 ±1.42 and 5.28 ± 1.36 respectively. It decreased to 3.23 ±0.98 and 3.86 ±1.12 which was a statistically significant between the two groups. The findings of the present study were in accordance with study by KL Bennell *et al*¹¹ who found Pain reduction averaged 42% with physiotherapy treatment and 38% with placebo treatment. In our study it was observed that the mean VAS score for restriction of activity at baseline in physiotherapy and placebo group was 4.71 ±1.41 and 4.82 ± 1.38 respectively. It was decrease to 2.93 ± 0.98 and 3.26 ±1.12 in physiotherapy and placebo group which was a statistically significant between the two groups. It was observed that the mean WOMAC score for pain at baseline in physiotherapy and placebo group was 8.31 ±2.42 and 8.28 ± 2.36 respectively. It was decrease to 5.29 ± 1.98 and 6.76 ± 2.12 in physiotherapy and placebo group after 12 weeks which was statistically significant between the two groups. It was observed that the mean WOMAC score for physical function at baseline in physiotherapy and placebo group was 27.31 ±1.42 and 28.38 ± 1.36 respectively. It was decrease to 19.23 ± 3.78 and 22.86 ±

2.12 in physiotherapy and placebo group after 12 weeks which was a statistically significant between the two groups. The result of this study were supported by Falconer *et al*¹² found improvements in motion (11%), pain (33%), and gait speed (11%) after 12 treatments of stretching, strengthening, and mobility exercises combined with manual therapy procedures performed in a physical therapy clinic over 4 to 6 weeks. In a controlled, randomized, single-blinded study, Deyle *et al*¹³ demonstrated that manual therapy techniques and exercises applied by physical therapists for 8 clinical visits produced averaged 56% improvement in self-reports of functional ability 54%, stiffness 54%, and pain 60% as measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scale and a 12% improvement in 6-minute walk test scores. The results of present study were also supported by Deyle *et al*¹⁴ who compared a home based physical therapy program and a clinically based physical therapy program in 134 subjects with knee OA. Subjects in the clinic treatment group received supervised exercise, individualized manual therapy, and a home exercise program for a 4 weeks period. Subjects in the home exercise group received the same exercise program initially, reinforced at a clinic visit 2 weeks later. Both groups showed significant improvements in 6-min walk distances (approximately 10%) and Western Ontario McMasters University Arthritis Index scores at 4 weeks (particularly in the pain, stiffness, and function subscales) and at 8 weeks. The subjects in the clinic treatment group improved 52%, and the home exercise group improved only 26% in Western Ontario McMasters University Arthritis Index scores at 4 weeks. By one year, there was no difference between the groups, presumably because they were both completing the same home exercise program. The relation of age and quality of life among study groups after physiotherapy showed no statistical difference. The relation of sex and quality of life among study groups after physiotherapy showed no statistical difference. The relation of BMI and quality of life among study groups after physiotherapy showed no statistical difference. The relation of knee mal alignment and quality of life among study groups after physiotherapy showed no statistical difference. The relation of foot mal alignment and quality of life among study groups after physiotherapy showed no statistical difference. Similar findings were seen in study done by Sarah L Ingham *et al*¹⁵ where, Sensitivity, specificity and accuracy were all close to 100% when assessing varus malalignment using the self-reported knee malalignment instrument. The progressive increase in knee alignment angle from severe varus to severe valgus knee malalignment suggests that this line drawing instrument is a valid ordinal measure of

knee malalignment. However, there was no difference in knee alignment angle between those with mild and severe varus deformity at the knee. This may be due to heterogeneity in patient's perception of severity of varus malalignment at the knee. Thus the self-reported knee malalignment instrument is valid in discriminating between varus, straight and valgus knee malalignment but it may not be robust in discriminating between severe and mild varus malalignment

CONCLUSION

The mean VAS score, WOMAC score for pain, WOMAC score for physical function, mean quadriceps strength, step test score and time up score was significant in patients treated with physiotherapy. Sensitivity, specificity and accuracy were all close to 100% when assessing varus malalignment using the self-reported knee malalignment instrument.

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