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EFFECTIVENESS OF MANUAL THERAPY VERSUS EXERCISE THERAPY FOR THE MANAGEMENT OF KNEE OSTEOARTHRITIS IN KARACHI PAKISTAN

¹Ayesha Zakir
²Syed Imran Ahmed
³Saima Aziz
⁴Faisal Yamin
⁵Atiq-ur-Rehman
⁶Shireen Khanzada

ABSTRACT

Introduction: Among musculoskeletal disorders knee Osteoarthritis (OA) is exceedingly prevailing articular disorder affecting people and it is a major cause of disability and socioeconomic burden. It is more common in women than men. Entities with knee OA must often undergo a variety of problems, such as pain and tenderness in joints, movement limitation, crepitus on movement, swelling, recurrent effusion, and local inflammation which ultimately leads to limitation in physical function, like lack of ability to perform Activities of Daily Living (ADL) or Instrumental Activities of Daily Living (IADL). For reducing knee pain in osteoarthritis several conventional treatment methods are used world widely but most extensively used in our country are pharmacologic and physical therapy. The objective of the study is to find out the effectiveness of Manual therapy verses Exercise therapy for the management of knee osteoarthritis.

Methods: Sixty patients including both male and female with mean age (51years) and SD of (5.1) were enrolled in the study and divided randomly in to two groups. Those who were assigned as group A had received Manual therapy and those who were assigned as group B had received Exercise therapy. Participants had received three treatment sessions of 30 min per week for consecutive 4 weeks. OUTCOME MEASURE: WOMAC index score for pain, stiffness and physical function was used to evaluate the baseline score and treatment effects after 12 therapy sessions.

Results: Study showed significant improvement in both groups before and after the treatment but in comparison manual therapy group showed significant results with respect to pain subscale ($p=0.003$) and physical function subscale ($p=0.004$).

Conclusion: Significant difference found between manual therapy and exercise therapy treatment approaches in treating knee osteoarthritis. Findings of this study revealed the fact that short term treatment sessions of manual therapy were superior to exercise therapy in terms of alleviating pain, stiffness and functional limitation.

Keywords: Osteoarthritis, Manual therapy, Exercise therapy, WOMAC index.

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²Assistance Professor, Department: Physiatrist,
 Work Place: Institute of Physical Medicine & Rehabilitation,
 Dow University of Health Sciences, Karachi Pakistan.

³Senior Lecturer, Department: Physiotherapy,
 Work Place: Institute of Physical Medicine & Rehabilitation,
 Dow University of Health Sciences, Karachi Pakistan.

⁴Assistance Professor, Department: Physiotherapy,
 Work Place: Institute Of Physical Medicine & Rehabilitation,
 Dow University of Health Sciences, Karachi Pakistan.

⁵Assistance Professor, Department: Physiotherapy,
 Work Place: Institute of Physical Medicine & Rehabilitation,
 Dow University of Health Sciences, Karachi Pakistan.

⁶Physiotherapist, Dow University of Health Sciences.

CORRESPONDING AUTHOR

¹Ayesha Zakir

MSPT student, Department: Physiotherapy,
 university: Institute of Physical Medicine &
 Rehabilitation, Dow University of
 Health Sciences, Karachi Pakistan.

INTRODUCTION

Among musculoskeletal disorders knee Osteoarthritis (OA) is one of the most maddening disorder which affects the patients. It is exceedingly prevailing articular disorder affecting people and it is a major cause of disability and socioeconomic burden [1]. It is more common in women than men. Among 1 per 100,000 world standard population in 2000 the prevalence for males was 1,770 and for females were 2,693. As it is an irreversible disease its prevalence increases radically with age. OA is the 4th leading cause of Year lives with disability (YLDs) at a global level; accounting for 3.0% [2]. In the United States the prevalence of radiographic knee OA in adults of age 60 and above is 42.1% in women and 31.2% in men [3]. The Prevalence of knee OA inside the Asia-Pacific region revealed that its frequency is 5.8% in rural India; 22–28% in urban and 7.5%, 9.2% and 10.6%, respectively in Bangladeshi rural, urban slum and urban affluent communities; 7.5% in China; and 7% in Australia [4]. A study conducted in Iran on rheumatic complaints showed that knee OA is the most recurrent complaints in the population over the age of 15 years which accounts for 41.9% overall prevalence.⁵ Statistics of knee osteoarthritis in Pakistan is not known but two researches showed that knee osteoarthritis is the most common identifiable disorder in North Pakistan & affects mostly female in urban affluent community [6,7].

Osteoarthritis is a pathological condition defined as loss of articular cartilage within the focal areas of synovial joints, accompanying with bone hypertrophy, formation of bone osteophytes and sclerosis in subchondral bone along with capsule thickening [8]. Research has shown that in addition to mechanical wear and tear, other factors like chemical, hormonal, immunological and/or genetic factors involves in pathogenesis of OA [9]. Entities with knee OA must often undergo a variety of problems, such as pain and tenderness in joints, movement limitation, crepitus on movement, swelling, recurrent effusion and local inflammation which ultimately leads to limitation in physical function, like lack of ability to perform Activities of Daily Living (ADL) or Instrumental Activities of Daily Living (IADL) [10]. Gait analysis of patients with knee OA revealed that patient with knee OA have slow walking, they reveal a reduced stride length with increased stance phase of the gait cycle in comparison to healthy individuals [11]. In knee OA the joint destruction and chronic pain could lead to atrophy of muscles, mobility reduction, disturb balance and subsequent disability which will reduce functional capacity and compromise the quality of life and raises the risks of additional morbidity and mortality [12,13].

In developing countries like Pakistan disruptive life styles & poor nutrition are prompting to develop knee osteoarthritis. Squatting repetitively along with lifting heavy weight and kneeling are prominent risk factors for OA. Obese people with habit of prolong kneeling or squatting has a greater risk of developing knee OA in contrast to non-obese people. Poor consumptions of vitamin D along with their low serum levels seemed to be linked with an increased risk for

development of knee OA [14]. For reducing knee pain in osteoarthritis several conventional treatment methods are used world widely but most extensively used in our country are pharmacologic and physical therapy. By putting a glance over physical therapy treatment approaches, several treatment techniques have been used for the management of knee OA to reduce pain & improve quality of life.

Physical therapy treatment approaches include exercise therapy, manual therapy, cryotherapy, acupuncture & electrotherapy. Prior studies have proved the effectiveness of electrotherapy, exercise therapy, acupuncture, cryotherapy & manual therapy all by giving them individually and together. Two studies conducted in the United States proved that the manual physical therapy and supervised exercises when given in combination can generate functional benefits in patients with osteoarthritis of the knee [15,16]. One retrospective study conducted in Canada on 26 outpatients showed that the high proportion of patients with moderate to severe knee joint disease may experience continued functional benefits from relatively brief out-patient physiotherapy program including exercises, electrotherapy, ice/heat and manual therapy [17].

A Study conducted in Australia proved the efficacy of short-term manual therapy knee Protocol for reducing pain & improving knee function in Participants with osteoarthritic knee pain [18]. A Trial conducted on comparison of cryotherapy, exercise and short waves in knee osteoarthritis treatment showed that the cryotherapy and exercises were more effective in reducing knee pain as compare to short wave and exercise together & exercise alone [19]. The author carried out a comprehensive literature search and as far as author's knowledge is concerned no such study has ever conducted on comparison of manual therapy with exercise therapy in pain management for knee osteoarthritis. Thus the aim of this study is to find out whether manual therapy or exercise therapy is effective, for reducing knee pain and functional limitation in fewer visits in patients of chronic knee osteoarthritis.

METHODOLOGY

Individual with mild or moderate knee osteoarthritis of aged between 40 to 60 years was included in this study. All subjects were assessed with ACR Clinical and radiological Classification Criteria for Osteoarthritis of the knee. Both genders were included. This study was conducted at out-patient department of Institute of Physical Medicine & Rehabilitation, Dow University of Health Sciences Karachi. Subjects with Severe knee osteoarthritis, Rheumatoid arthritis, seronegative arthropathies, advanced osteoporosis, Infection or a neoplastic disorder of an acute inflammatory nature and severe cardiopulmonary disease were excluded. Patients who are using cortico-steroids or opioid analgesics or analgesic injection for knee pain within the prior 30 days were also excluded from study. The rehabilitation program took total 12 sessions, completed in four weeks, comprising of three sessions per week. IRB of DUHS gave approval of this research on 5th April 2011. The Western

Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used as an outcome measure.

PROCEDURE

After approval from IRB of DUHS (Institutional Review Board), the research was started from April 2011. All patients who had fulfilled the inclusion criteria were selected from outpatient department of Institute of Physical Medicine & Rehabilitation, Dow University of Health Sciences Karachi, and outpatient department of Orthopedic at Civil Hospital Karachi & by conducted a free medical camp in Institute of Physical Medicine & Rehabilitation IPM&R.

After that patients were selected from purposive sampling technique. Patients were provided with a consent form and information sheet regarding manual therapy and exercise therapy. After taking consent from patient and describing the procedure they were allocated into two groups, those who were assigned as group A had received Manual therapy, which was a hands-on technique for decreasing pain and improving joint range of motion. Those who were assigned as group B had received Exercise therapy, which was a supervised program, included active range of motion, muscle strengthening and muscle stretching exercises.

Participants had received 30 minutes treatment, three treatment sessions per week for consecutive 4 weeks. Base line assessment of Patient's pain, stiffness and physical function were taken through Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). After the completion of treatment sessions Outcome of both groups had reviewed in terms of differences in their scores on Western Ontario and McMaster Universities Osteoarthritis Index.

Treatment Protocol for Group-A

Manual Therapy Protocol: Long axis traction technique, Maitland grade 1 and 2 tibiofemoral and patellofemoral gliding movement and rotational movements with 3 sets of 30 repetitions for pain relief.

1. The long-axis traction: Patient sat at the edge of the bed by both of their knees were dangled out of the bed with 25° knee flexion, the therapist than comfortably sat in front of patient by both of his hands grasped the distal aspect of tibia, proximal to the malleoli. Than the therapist pulled slowly on the long-axis of the tibia to separate the joint surfaces (the slack is taken up and the tissues surrounding the knee joint are tightened) for 10 seconds intervals and then slowly released to starting position with rest for a few seconds, repeated for 10 repetitions with 2 sets.
2. Maitland Tibiofemoral gliding movement: grade 1 and 2 Patient was comfortably laying in a supine position with slightly flexed knee by placing pillow under the knee. Therapist was standing in front of patient leg by grasping the patient's knee from both sides in such a way that his thumbs and heels of both hands are placed around the joint medially and laterally. The thumbs extend anteriorly over the joint line. And the finger tips were placed along the posterior surface of tibia adja-

cent to the joint line. The gentle oscillatory posteroanterior and anteroposterior movement is produced by the therapist's hand. For posterior anterior glide pressure was transmitted through the fingertips against the posterior surface of the tibia proximally. And for AP glide the therapist force was acting through the thumbs.

Maitland Patellofemoral Gliding Movement:

1. Longitudinal gliding movement: Patient was in supine lying with knee extended, therapist stood by the patient's side. The therapist's one hand was placed against the superior margin of the patella. The other hand is placed proximally over the patella than the cauded and cephalic movement was produced by the therapist's hand.
2. Transverse (medial and lateral gliding movement): Patient was in supine lying with knee extended, therapist stood by the patient's side. Thumbs are placed, pointing towards each other, against the lateral border of the patella and the fingers were positioned medially, Oscillatory movements of the patella are produced by the therapist's arms acting through the thumbs.
3. Rotational movements: patient was in a supine position, with pillow under the knee, therapist then palpates the joint line with one hand and with the help of other hand which was placed around the malleoli, performs the rotation movements of the tibiofemoral joint.

Treatment Protocol for Group-B

Exercise Therapy Protocol:

The stretching and strengthening exercises program consist of:

1. Hamstring Stretching: From long sitting with knee extended, the subject extend the arms and move forward by bending at the waist as far as possible while maintaining the knees in extension, holding it for 10 seconds. The patients was performed exercise 3 sets, every set had 10 repetitions within holding for 10 seconds with few seconds of rest in between. . Same exercise is repeated on another leg. After 4 sessions the number of sets was increased to 5 with 10 repetitions and holding for 20 seconds.
2. Gastrocnemius Stretching: From long sitting with knee extended the subject lean forward and grab the arches of feet with the help of towel and pull it towards their body until a stretch is felt in a calf muscle. The patients was performed exercise 3 sets, every sets had 10 repetitions within holding for 10 seconds with few seconds of rest in between. Same exercise is repeated on another leg. After 4 sessions the number of sets was increased to 5 with 10 repetitions and holding for 20 seconds.
3. Static (Isometric) Quad Sets Exercise: subject is in supine position with knee extended. Place a pillow under knee joint. The subject then contract the quadriceps

isometrically and dorsiflex the ankle, causing the patella glide proximally; then hold it for 10 seconds. The patients was performed 3 sets, every sets had 10 repetitions within holding for 10 seconds with few seconds of rest in between. After 4 sessions the number of sets was increased to 5 with 10 repetitions and holding for 20 seconds. The verbal encouragements were used. Same exercise is repeated on another leg.

4. Straight Leg Raising (SLR) Exercise: The patients were lying on their back with the exercising leg was extended and the opposite knees were flexed and the foot was placed on the bed. Then, the quadriceps muscle is contracted and the leg raised straight about 45no higher than the thigh of opposite leg and held the leg in the position for 10 seconds with attention paid to feeling quadriceps muscle
5. Contraction and then slowly lowered to the bed. The patients performed 3 sets with 10repetitions and held in the position for 10 seconds with few seconds of rest in between. As the subject progresses after 4 sessions, the subject lifts to 30 of hip flexion. Same exercise is repeated on another leg.
6. Flexion to Extension Exercise: The patient was sat in chair, with feet resting on the floor. The knee was then extended and held in as full extension as possible for 10 seconds and then gently lowered to the floor. Repetition was 3 sets of 10 repetitions with few seconds of rest in between. After 4 sessions, the number of sets was increased to 5 with 10 repetitions and held for 15 seconds.
7. Terminal Knee Extension Exercise: Patient was in supine lying position with small cushion placed beneath the exercising knee. The quadriceps muscle was contracted and the heel was lifted from the bed in a short arc range of motion. 3 sets of 10 repetitions was performed with few seconds of rest in between. After 4 sessions the number of sets was increased to 5 sets with 20 repetitions.
8. Hip Abduction Exercise: The patient was positioned side lying with affected knee up and unaffected knee down with flexed to 90o and hip flexed at 45. The affected leg is straight and body weight is shifted forward. The leg is lifted and held for 10 seconds and gently lowered back to starting position. The patients had 3sets of 10 repetitions with few second of rest in between. After 4 sessions the exercises sets was increased to 5 with 20 repetitions and held for 10 seconds.

STATISTICAL ANALYSIS

SPSS 16.0 was used for the statistical analysis, threshold for statistical significance was set as $p < 0.05$, results are expressed as mean and standard deviation (SD). The initial measures (pre score) of each group were compared with the final measures (post score) of the study period by using non parametric two related sample Wilcoxon sign

rank test. Furthermore comparison between post test results of the each group has been performed by employing Mann-whitney U test.

The differences between means and standard deviation of the WOMAC post test score and pre test scores for both of the treatment groups:

The Wilcoxon sign rank test for 2 related samples was used between pre and post Test of the WOMAC for both groups.

In manual therapy group the mean and standard deviation of total WOMAC index score before treatment was 54.5714 and 13.13584 and after treatment score reduced to 24.7857 and 10.3041 which were a significant difference between the two means (p - value < 0.001). In a pain subscale the mean and standard deviation pretest was 12.7143 and 3.02896 and after treatment they were reduced to 5.5714 and 2.57378 which was significant at 5% level of significance (p - value < 0.001). For stiffness subscale mean and standard deviation for pretest WOMAC index was 4.43 and 1.665 and after treatment reduced to 1.7500 and 1.10972 which was significant at 5% level of significance (p - value < 0.001). Similarly for physical function subscale mean and standard deviation for pretest were 49.2143 and 21.00151 and after treatment this score were reduced to 24.0000 and 13.24974 which was significant at 5% level of significance (p - value < 0.001).

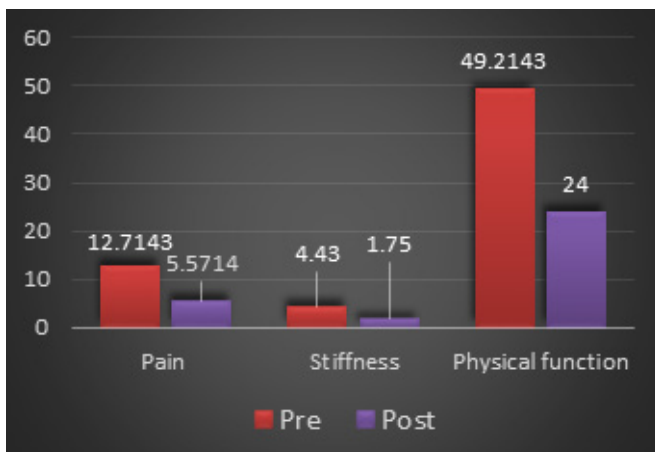
In exercise therapy group the mean and standard deviation of total WOMAC index score before treatment was mean (54.9231) and SD (22.51031) and after treatment mean score reduced to 40.5385 with SD of 18.62306. The differences between the pre and post means were significant at 5% level of significance (p - value < 0.001). In a pain subscale the mean and standard deviation pretest was 12.0769 and 5.05112 and after treatment they were reduced to 8.6538 and 4.20421 which was significant at 5% level of significance (p - value < 0.001). For stiffness subscale mean and standard deviation for pretest WOMAC index was 3.6538 and 2.07735 and after treatment reduced to 2.5000 and 1.60624 which was significant at 5% level of significance (p - value < 0.001). Similarly for physical function subscale mean and standard deviation for pretest were 56.1538 and 30.82297 and after treatment this score were reduced to 42.3077 and 25.19170 which was significant at 5% level of significance (p - value < 0.001).

Table 1: Mean and Standard deviation of WOMAC index score for both groups baseline and after treatment

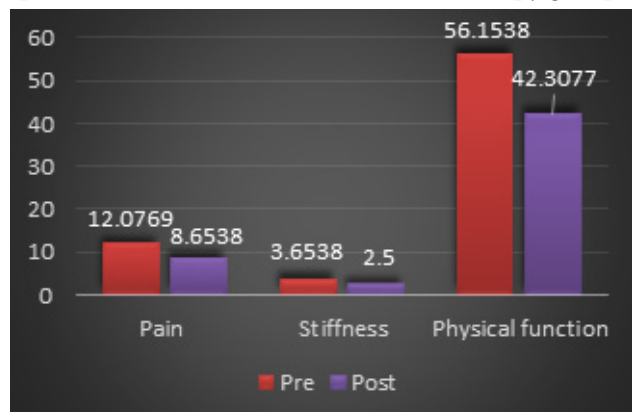
Scores	Manual therapy		Exercise therapy	
	Base line MEAN(SD)	After treatment MEAN(SD)	Base line MEAN(SD)	After treatment MEAN(SD)
Total WOMAC INDEX score	54.5714 (13.13584)	24.7857 (10.30411)	54.9231 (22.51031)	40.5385 (18.62306)
Pain subscale	12.7143 (3.02896)	5.5714 (2.57378)	12.0769 (5.05112)	8.6538 (4.20421)
Stiffness subscale	4.43 (1.665)	1.7500 (1.10972)	3.6538 (2.07735)	2.5000 (1.60624)
Physical function subscale	49.2143 (21.00151)	24.0000 (13.24974)	56.1538 (30.82297)	42.3077 (25.19170)

Table 2: The p- values for WOMAC pre and post test in manual therapy and exercise group

	Manual therapy	Exercise therapy
SCORES	p-value	p-value
Total WOMAC index	<0.001	<0.001
Pain subscale	<0.001	<0.001
Stiffness subscale	<0.001	<0.001
Physical function subscale	<0.001	<0.001



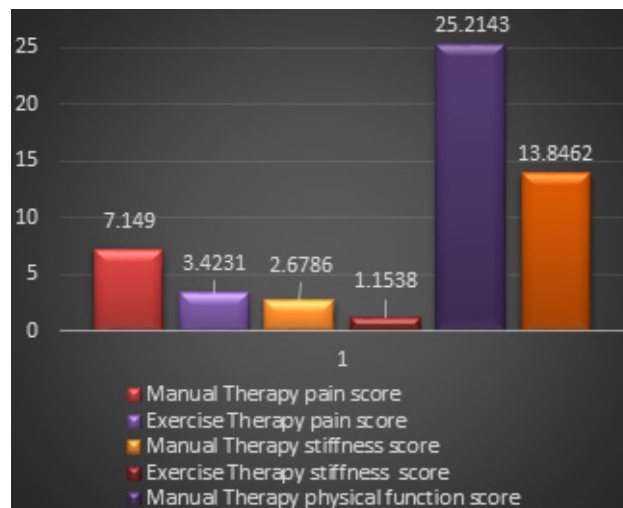
Graph 1: The differences between the means of pre and post test WOMAC index for Manual therapy group.



Graph 2: The differences between the means of pre and post test WOMAC index for Exercise therapy group.

	Manual therapy	Exercise therapy
SCORES	MEAN(95% CI)	MEAN(95% CI)
Total WOMAC index	29.78(26.23--33.34)	14.3846(11.25---17.51)
Pain subscale	7.1429(6.26---8.01)	3.4231(2.60---4.24)
Stiffness subscale	2.6786(2.26---3.08)	1.1538(0.78---1.52)
Physical function subscale	25.2143(20.73---29.69)	13.8462(9.84---17.84)

Table 3: Change in score difference before and after treatment for each group. Data was given as mean 95% confidence interval



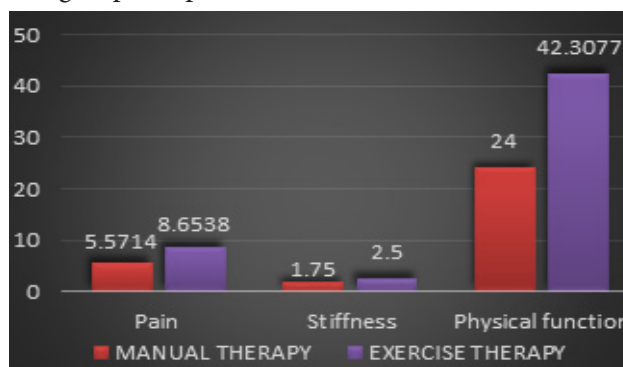
Graph 3: Changes in score difference before and after treatment for each group.

Comparison of WOMAC score post test between manual therapy and exercise therapy group:

For total WOMAC index score mean of post treatment in manual therapy was 24.7857 and exercise therapy was 40.5385 (p-value is 0.002) which is a significant at level of significant $\alpha = 0.05$. For pain subscale mean of post treatment in manual therapy was 5.5714 and exercise therapy was 8.6538 (p-value is 0.003) which is a significant at level of significant $\alpha = 0.05$. In stiffness subscale mean of post treatment in manual therapy was 1.7500 and exercise therapy was 2.5000 (p-value is 0.067) which is greater than 0.05 and not significant. When reviewing physical function subscale mean of post treatment in manual therapy was 24.00 and exercise therapy was 42.3077 (p-value is 0.004) which was significant at level of significant $\alpha = 0.05$. These results indicated that the manual therapy group had significant reduction in symptoms after 12 weeks of treatment session as compare to exercise group.

	MANUAL THERAPY	EXERCISE THERAPY	
SCORES	MEAN	MEAN	P-VALUE
Total WOMAC INDEX	24.7857	40.5385	0.002
Pain subscale	5.5714	8.6538	0.003
Stiffness subscale	1.75	2.5	0.067
Physical function subscale	24	42.3077	0.004

Table 4: Mean and p-values for WOMAC index score between group comparisons



Graph 4: Comparison of WOMAC Index scores between groups.

RESULTS

Of the 60 patients with mean age (51 years) and SD of (5.1) primarily enrolled in the study, 30 subjects in the Manual therapy group and 30 subjects in the Exercise therapy group, completed their assessment at baseline and after 4 weeks. Among these patients 54 patients had completed their treatment sessions. Six patients dropped out, 2 patients from the manual therapy group and 4 patients from the exercise group. In the manual therapy group, 2 patients withdrew, 1 was excluded after receiving a cortisone injection to the knee, and other had transportation difficulty. In the exercise therapy group 4 patients withdrew 2 due to transportation difficulty and 2 for unidentified reason. No patients were disqualified owing to lack of compliance or any intolerance to either treatment procedure.

AGE VARIABLE: The mean age of study population was 51 years old with SD of 5.1. The distribution of the study groups according to age variable, were (9 patients) with percentage of (16.7%) aged (50 years old), also there were (6 patients) with percentage of (11.1%) aged (55 and 56 years old), there were (4 patients) with percentage of (7.4%) aged (42 and 49 years old), (3 patients) with percentage (5.6%) aged (40, 52, 58 and 60 years old), (2 patients) with percentage (3.7%) aged (45, 48, 53 and 57 years old) Finally, there was one patient with percentage of (1.9%) in the category of other ages.

GENDER VARIABLE: Study included both male and female patients. Percentage of male patients were low (40.7%) as compared to female patients (59.3%) Initially in each group there were 30 patients who were enrolled in the study. After drop out there were 28 patients in manual therapy group among which 16 were female and 12 were male patients who had completed the study. In exercise group after drop out there were 26 patients among them 16 were female and 10 were male who had completed the treatment sessions.

DISCUSSION

The purpose of this study was to find out the effective treatment techniques in reducing patient's pain and improving physical function in patients of knee Osteoarthritis. Two treatment techniques had been compared for this purpose, one was manual therapy and the other one was exercise therapy.

As far as author's knowledge is concerned there are various studies available on knee osteoarthritis which had compared effects of manual therapy and exercise therapy in combinations but so far this is the first study which had been compared manual therapy alone with exercise therapy alone in treating knee osteoarthritis. After twelve sessions of treatment with manual therapy, the group had attained successful outcomes as measured by substantial reduction in WOMAC index score. Statistically there was a significant difference found between manual therapy and exercise therapy with respect to WOMAC index score.

Both groups showed reduction in WOMAC index scores of

pretest and post test in all 3 subscales of pain, stiffness and physical function but the manual therapy group showed significant results with respect to pain subscale ($p=0.003$) and physical function subscale ($p=0.004$) in comparison to exercise therapy group. The differences between the groups are likely attributable to the effects of manual contact which is supported by GD Maitland according to which gentle passive physiologic and accessory movement techniques stimulate neurophysiologic and mechanical effects thus can be used to treat painful joints, muscle spasm & joint hypo mobility [20].

As an outcome measure WOMAC index is a reliable measuring tool used in various studies. Deyle et al found significant reduction in WOMAC index score after treating patients of knee osteoarthritis with manual therapy and exercise therapy. They found 51.8% reduction in score after 4 weeks of treatment as compared to placebo group which was 15.8%. After 8 weeks the reduction in WOMAC score was 55.8% and in placebo group was 14.6%.

Participants of the study had sedentary life style and obesity which are the risk factors for knee Osteoarthritis. In obese people abnormal loads can lead to changes in the composition, structure, and mechanical properties of articular cartilage. It is supported by the fact that, in daily life if compression, shear and tensile forces are not appropriately act on soft tissues there tensile strength will gradually reduce. Thus the vital component in treatment of soft tissue lesion is to regain its tensile strength as early as possible and for this regard graded manual therapy techniques can fulfill this objective during the various stages of the healing process.

This study had large number of female patients (59.3%) due to its higher prevalence in female population because of various factors. Female's bony structures around the knee are different from their male counterparts. They have narrow femur with less thick articular cartilage, small and thin patella, small lateral tibial condyle that's why they are more prone to develop knee osteoarthritis. Studies of Farooqi A and Gibson T showed higher prevalence of knee OA in females of northern areas of Pakistan and in urban affluent population. Two studies on effectiveness of manual therapy in knee OA showed large number of female participants as compared to their male counterparts [21,22]. Similarly studies conducted by Deyle et al, Ibrahim HM, in comparing manual therapy with exercise therapy in knee osteoarthritis revealed more female participants as compared to male participants [23].

Patients of knee osteoarthritis have cardinal feature of knee pain which restricts their activity of daily living ADLs. Pain had significantly reduced after manual therapy sessions as supported by the studies. Moss et al. explored the immediate effects on pressure pain threshold (PPT) after giving 9 min of accessory tibiofemoral joint mobilizations on subjects with mild to moderate knee osteoarthritis. Study disclosed that the mobilizations would instantly reduce the mechanical pain and produced both local and widespread

hypoalgesic effects, which would ultimately improve the motor function. Pollard et al. reported immediate reduction in pain and improvement in the knee function after 2 weeks of manual therapy knee protocol as compared to control group that had shown no change in symptoms.

The benefits of the treatment in this study were achieved in 12 clinical visits; most of the previous studies have demonstrated the benefit of exercise therapy in 8 to 12 weeks.²⁴ In contrary studies on manual therapy effectiveness on knee OA showed improvement in 6 visits. In this study Manual therapy treatment protocol for osteoarthritis was more effective in reducing pain, stiffness and increasing physical function as compared to the exercise group which was supported by the study of Hoeksma et al, on comparison of manual therapy with exercise therapy in treating hip OA. Study comprised of 109 patients with hip OA revealed 81% improvement in pain, stiffness, hip function, and range of motion after 9 treatment sessions of manual therapy as compared to exercise group that showed 50% improvement.²⁵

As far as exercise therapy results are concerned there was a significant reduction in WOMAC scores in terms of differences in their baseline and after treatment scores. Considerable effects of exercise therapy is possibly due to increase in aerobic capacity and reduction of muscle spasm which are the possible factors for development of pain and disability in patients of knee OA but the validity of this statement is not definite because these two factors were not assessed in our study. Beneficial results of exercise therapy are supported by the study of Van baar et al which observed the reduction in pain and disability among patients of knee and hip OA after treatment with exercise therapy [26]. Smidt et al found that for knee osteoarthritis strengthening, stretching, and functional exercises are beneficial as compared to no treatment [27].

O'Reilly et al conducted a study focused on isometric strengthening of quadriceps and hamstrings muscles in a home based exercise programme. They had enrolled 191 patients with knee pain having aged 40-90 years. Experimental group regularly performed strengthening exercises for six month and control group hadn't received any treatment. Exercise therapy results showed 22.5% reduction in WOMAC index pain score and 6.2% in control group. Score of physical function of WOMAC index reduced up to 17.4% in exercise group and remained unchanged in control group [28].

Ettinger et al matched a strength training group, aerobic training group and a health education control group. Participants in the strength training group showed equal response as of the aerobic group, by means of modest but substantial improvements in domains of pain, disability and physical performance, in contrast with the health education control group [29]. In spite of regular findings of temporary improvements with exercise, the small number of studies assessing longer term effects of exercise therapy, illustrate that their benefits decline. The reason is that as

time progresses there is rapid reduction in patient adherence to exercise and is a significant factor determining loss of long-term effectiveness of exercise for patients with OA [30]. Two studies exposed that the effects of exercises on pain and function are not sustained. Prolong compliance is necessary to retain the positive effects [31, 32].

This trial is significant in our conventional physical therapy treatment scenario because it provides knowledge about a different treatment technique for knee osteoarthritis in the form of manual therapy which reduces patient's pain and stiffness in short sessions and allows patient to participate more effectively in activities of daily living.

CONCLUSION

In conclusion results of this study revealed that there was a significant difference between manual therapy and exercise therapy treatment approaches in treating knee osteoarthritis. Findings of this study exposed the fact that short term treatment sessions of manual therapy were superior to exercise therapy in terms of alleviating pain, stiffness and functional limitation.

REFERENCES

- [1] Sun.B, Wu .C, Kalunian. K.New Developments in Osteoarthritis.*Rheum.Dis Clin North Am.*2007; 33(1); 135-48.
- [2] Symmons D, Mathers C, P flegler B.Global burden of osteoarthritis in the year 2000.Geneva: World Health Organization; 2003.
- [3] Debi.R, Amit.M, Segal.O, Segal.G, Debbi. E, Agar .G, et al. Differences in gait patterns, pain, function and quality of life between males and females with knee osteoarthritis. *BMC Musculoskelet Disord.*2009; 10:127-37.
- [4] Anita Y. N. LIM, Michael DOHERTY. What of guidelines for osteoarthritis? *Int J Rheum Dis.*2011;14(2)136-44.
- [5] Davatchi F, Jamshidi Ar, Banihashemi At, Gholami J, Forouzanfar Mh, Akhlaghi M. WHO-ILAR COPCORD Study (Stage 1, Urban Study) in Iran.*J Rheumatol.*2008; 35(7):1384-90.
- [6] Farooqi A. and Gibson T. Prevalence of the major rheumatic disorders in the adult population of north Pakistan. *British J Rheum.* 1998; 37:491-5
- [7] Gibson T, Hameed.K, Kadir.M, Sultana S, Fatima Z. and Syed A. Knee pain amongst the poor and affluent in Pakistan. *British J Rheum.* .1996; 35 (2): 146-9.
- [8] Report of a WHO Scientific Group. The burden of musculoskeletal conditions at the start of new millennium By WHO Scientific Group on the Burden of Musculoskeletal conditions at the start of the new millennium; Geneva: World Health Organization;2003:24
- [9] Martin DF. Pathomechanics of knee osteoarthritis. *Med Sci Sports Exerc.*1994; 26(12):1429-34.
- [10] Linda L Currier, Paul J Froehlich, Scott D Carow, Ronald K McAndrew, Amy V Cliborne, Robert E Boyles, et al.Development of a Clinical Prediction Rule to Identify Patients With Knee Pain and Clinical

- Evidence of Knee Osteoarthritis Who Demonstrate a Favorable Short-Term Response to Hip Mobilization. *JPHYS THER.* 2007; 87:1106-19
- [11] Alamri S. Exercises versus Manual Therapy in Elderly Patients with Knee Osteoarthritis. Masters [dissertation]. Saudi Arabia (SA): King Saud University; 2011:3
- [12] Felson DT, Goggins J, Niu J, Zhang Y, Hunter DJ. The effect of body weight on progression of knee osteoarthritis is dependent on alignment. *Arthritis Rheum.* 2004; 50(12):3904-9.
- [13] Cerhan JR, Wallace RB, el-Khoury GY, Moore TE, Long CR. Decreased survival with increasing prevalence of full-body, radiographically defined osteoarthritis in women. *Am. J. Epidemiol.* 1995; 141 (3): 225-34.
- [14] Das SK, Farooqi A. Osteoarthritis. *Best Practice & Research Clin Rheum.* 2008; 22(4):657-75.
- [15] Deyle GD, Allison SC, Matekel RL, Ryder MG, Stang JM, Gohdes DD. Physical therapy treatment effectiveness for osteoarthritis of the knee: a randomized comparison of supervised clinical exercise and manual therapy procedures versus a home exercise program. *Phys Ther.* 2005; 85(12):1301-17.
- [16] Deyle GD, Henderson NE, Matekel RL, Ryder MG, Garber MB, Allison SC. Effectiveness of manual physical therapy and exercise in osteoarthritis of the knee. A randomized, controlled trial. *Ann Intern Med.* 2000; 132(3):173-81.
- [17] Marks R, Cantin D. Symptomatic Osteoarthritis of the Knee. The Efficacy of Physiotherapy. *J Phys.* 1997; 83(6):306-12
- [18] Pollard H, Ward G, Hoskins W, Hardy K. The effect of a manual therapy knee protocol on osteoarthritic knee pain: a randomised controlled trial. *J Can Chiropr Assoc* 2008; 52(4):229-42.
- [19] Silva ALP, Imoto DM, Croci AT. Comparison of cryotherapy, exercise and short waves in knee osteoarthritis treatment. *Acta Ortop Bras.* 2007; 15(4):204-9
- [20] Maitland GD. *Peripheral Manipulation.* 4th ed; 2005.
- [21] Moss P, Sluka K, Wright A. The initial effects of knee joint mobilization on osteoarthritic hyperalgesia. *Man Ther.* 2007; 12: 109-18
- [22] Van den Dolder PA, Roberts DL. Six sessions of manual therapy increase knee flexion and improve activity in people with anterior knee pain: A randomized controlled trial. *Aust J Physiother* 2006; 52:261-64.
- [23] Ibrahim AHM. Impact of Manual Therapy, Supervised Exercises and Electro Acupuncture versus Well-Designed Home Exercise Program on Pain and Physical Functions among Female Patient with Knee Osteoarthritis: A Comparative Study; *World. Appl. Sci. J.* 2011; 14 (3): 378-86
- [24] Petrella RJ. Is exercise effective treatment of osteoarthritis of the knee? *West J Med.* 2001; 174(3): 191-96
- [25] Hoeksma HL, Dekker J, Ronday HK, Heering A, Van der Lubbe N, Vel C, et al. Comparison of Manual Therapy and Exercise Therapy in Osteoarthritis of the Hip: A Randomized Clinical Trial. *Arthritis Rheum.* 2004; 51(5): 722-29
- [26] Van Baar M, Dekker J, Oostendorp R, Bijl D, Voorn T, Lemmens J, et al. The effectiveness of exercise therapy in patients with Osteoarthritis of the hip or knee: A Randomize control trial. *J Rheum.* 1998; 25(12):2432-39.
- [27] Smidt et al. Effectiveness of exercise therapy: A best-evidence summary of systematic reviews. *Aust J Physiother.* 2005; 51:71-85.
- [28] O'Reilly S, Muir K, Doherty M. Effectiveness of home exercise on pain and disability from osteoarthritis of the knee: a randomized controlled trial. *Ann Rheum Dis.* 1999; 58:15-19
- [29] Ettinger WH Jr, Burns R, Messier SP, Applegate W, Rejeski WJ, Morgan T. A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). *JAMA.* 1997; 277(1):25-31.
- [30] Bennell K, Hinman R. A review of the clinical evidence for exercise in osteoarthritis of the hip and knee. *J Sci Med Sport.* 2011; 14:4-9.
- [31] Kon E, Filardo G, Drobnic M, Madry H, Jelic M, van Dijk N, et al. Non-surgical management of early knee osteoarthritis. *Knee Surg Sports Traumatol Arthrosc.* 2012; 20(3):436-49.
- [32] Pisters MF, Veenhof C, van Meeteren NL, Ostelo RW, de Bakker DH, Schellevis FG, et al. Long-term effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review. *Arthritis Rheum.* 2007; 57(7):1245-53.

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