**ORIGINAL ARTICLE**

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# IMPACT OF NON-WEIGHT BEARING EXERCISES ON QUALITY OF LIFE FOR ELDERLY PEOPLE WITH OSTEO-ARTHRITIS (OA) OF THE KNEE

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**ABSTRACT:**

**BACKGROUND-** Osteoarthritis (OA) is the most common form of arthritis. The Knee is the weight-bearing joint most commonly affected by osteoarthritis (OA). The symptoms of pain, morning stiffness of short duration and physical dysfunction in the activities of daily living (ADL) can affect many aspects of health, affecting Quality of life. Regular and moderate physical activity adapted to an individual's life-styles and education, and joint protection strategies have been advocated as conservative management. Quality of life is the condition of life resulting from the combination of the effects of the complete range of factors such as those determining health, happiness, education, social and intellectual attainments, freedom of action, justice and freedom of expression. **METHOD–** It is a Randomized Clinical Trial. Study done on Geriatric people in Geriatric Home Centre, Vilad Ghat. Ahmednagar. On 20 Samples. After obtaining approval from the Ethical Committee, Informed consent was obtained by each subject after explaining them in their language. Subjects were selected on the basis of inclusion and exclusion criteria. The subjects were divided into two groups. Group A: Experimental group consisting of 10 subjects and Group B: Control group consisting of 10 subjects. **RESULT-** In this study, we found that there was a significant improvement in all the parameters of WOMAC Index. **CONCLUSION- :** From the present study we found that there was a significant improvement in the Experimental group than the Control group.

**KEY WORDS:** Osteoarthritis, Weight bearing, Quality of life, Elderly.

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## INTRODUCTION:

Osteoarthritis (OA) is the most common form of arthritis[1]. It is marked by two localized pathological features: the progressive destruction of articular cartilage and the formation of bone at the margins of the joint[2]. The prevalence of Knee Osteoarthritis (OA) increases with advancing age.[3,4] Common signs and symptoms of Knee OA include Knee pain, joint stiffness, decreased muscle strength, and proprioceptive deficits.[5, 6, 7].

Idiopathic OA may be localized to a specific joint, or generalized, affecting three or more joints. It is said to be secondary when the causes such as trauma, congenital malformation or other musculoskeletal diseases can be identified. Radiological classification of OA can be graded according to Kellgren and Lawrence[8]. Osteoarthritis of Knee joint includes clinical findings such as Knee pain, crepitus, tenderness, joint stiffness < 30 minutes.

The prevalence of Knee OA rises steadily with advancing age and is higher in women than in men[9]. With advanced age; there is a loss of stiffness and elasticity and destruction of cartilages which causes joint space reduction and compressive forces on the bone.

Quality of life is the condition of life resulting from the combination of the effects of the complete range of factors such as those determining health, happiness, education, social and intellectual attainments, freedom of action, justice and freedom of expression[10]. Quality of life can be evaluated by assessing a person's subjective feelings happiness or unhappiness about the various life concerns.

The symptoms of pain, morning stiffness of short duration and physical dysfunction in the activities of daily living (ADL) can affect many aspects of health, affecting Quality of life. Pain and functional limitations due to OA significantly impact Quality of life and impose a substantial amount of health care expenditures[11].

In normally aligned Knee the weight-bearing line passes through the center of the joint between the inter-condylar tubercles[12]. Weight bearing line is drawn from the center of the femoral head to the center of the head of the talus. The weight-bearing line is used as a simplification of ground reaction force as it travels up the lower extremity. In bilateral stance, the weight-bearing stresses on the Knee joint so that there is an equal distribution between the medial and lateral condyles. In Unilateral stance, the weight-bearing line must shift medially to account for a smaller base of support[13].

Non-weight bearing exercises (NWB) exercises, are those exercises where the distal extremity is free to move. Muscle activation occurs predominantly in the prime mover and is isolated to muscles of the moving joint. Movement of body segments is only distal to the moving joint[14]. It improves muscle strength. Non-weight bearing exercises include exercises such as Static Quadriceps, VMO Strengthening, and Short-Arc Exercises etc. Weight-bearing (WB) exercise of the lower extremity is typically performed with feet fixed on a stable object that generates compressive forces in the hip, knee and ankle joints[15,16]. Hence this study was undertaken with the purpose to find out the effect of Non-Weight bearing exercises on Quality of Life in Elderly patients with Osteoarthritis.

## METHODOLOGY:

After obtaining approval from the Ethical Committee, Informed consent was obtained by each subject after explaining them in their language. Subjects were selected based on inclusion and exclusion criteria. The subjects were divided into two groups Group A: Experimental group consisting of 10 subjects and Group B: Control group consisting of 10 subjects. Experimental group subjects were given exercises including the warm-up and cool-down phases. Inclusion Criteria included both males and females, age 60-75 years., no previous Knee surgery, Diagnosed Osteoarthritis Knee. Exclusion Criteria included a recent fracture of the lower limb, undo-operative patients. Patient not willing to give consent. The warm-up phase included self-stretching of Quadriceps and Hamstrings for 5 minutes. Non-weight bearing exercises included Static Quadriceps and Vastus Medialis Oblique( VMO) strengthening exercises. Static Quadriceps exercises were given with the subject in a supine position with a towel roll kept under the popliteal fossa. The subjects were asked to press the Knee on the towel roll and hold it for ten counts.

VMO strengthening exercises were given to the subject in a supine position with a pillow kept under the popliteal fossa so that the Knee remains in 20 degrees of flexion then asks the subject to dorsiflex the foot and hold it for ten counts.

These exercises should be done for 10 minutes and performed for two days per week. Cooldown phase included Calisthenics exercises for 10 minutes.

Control group subjects were also given warm-up and cooldown phases. The warm-up phase included self-stretching of Quadriceps and Hamstrings for 5 minutes. Cooldown phase included Calisthenics exercises for 10 minutes, and instructions which included the following:

- Avoid squatting.
- Avoid ascending and descending stairs.
- Avoid cross-legged sitting.
- Avoid putting a sudden strain on the joint eg. lifting heavy loads.

**Fig.1** Static Quadriceps Exercises

**Fig.2** VMO Strengthening Exercises

The outcome Measure used was WOMAC Index.

## STATISTICAL ANALYSIS:

Analysis of our study was done using an Unpaired t-test. In this study, there was a significant improvement in all the parameters of the WOMAC Index.

## RESULT:

**Table 1:** It shows the age-wise distribution of patients in the study

| Age of patient(in years) | Experimental Group | Control Group |
|---|---|---|
| 60-65 | 3 | 3 |
| 66-70 | 3 | 2 |
| 71-75 | 4 | 5 |
| Total | 10 | 10 |
| Mean age | 64.1 | **73.1** |

**Table 2:** It shows a comparison of Pain between Experimental and Control Group

| Groups | Days | Mean | SD | t value | p value | Results |
|---|---|---|---|---|---|---|
| Experimental | 0 | 7.50 | 2.01 | 2.8129 | 0.0120 | Significant |
| Control | | 4.89 | 2.03 | | | |
| Experimental | 15 | 6.10 | 1.37 | 1.7045 | 0.1065 | Not significant |
| Control | | 4.78 | 1.99 | | | |
| Experimental | 30 | 6.60 | 1.51 | 2.5785 | 0.0195 | Significant |
| Control | | 4.56 | 1.94 | | | |

**Table no.3:** It shows a comparison of Stiffness between the Experimental and Control group.

| Groups | Days | Mean | SD | t value | p value | Results |
|---|---|---|---|---|---|---|
| Experimental | 0 | 3.20 | 0.42 | 4.0382 | 0.0009 | Significant |
| Control | | 1.89 | 0.93 | | | |
| Experimental | 15 | 3.00 | 0.47 | 3.3443 | 0.0038 | Significant |
| Control | | 1.89 | 0.93 | | | |
| Experimental | 30 | 3.00 | 0.47 | 3.3443 | 0.0038 | Significant |
| Control | | 1.89 | 0.93 | | | |

**Table no 4:** It shows a comparison of Physical function between the Experimental and Control group.

| Groups | Days | Mean | SD | t value | p value | Results |
|---|---|---|---|---|---|---|
| Experimental | 0 | 22.50 | 5.93 | 5.1639 | 0.0001 | Significant |
| Control | | 9.44 | 4.98 | | | |
| Experimental | 15 | 17.80 | 6.11 | 3.4853 | 0.0028 | Significant |
| Control | | 9.11 | 4.54 | | | |
| Experimental | 30 | 16.20 | 4.76 | 3.5348 | 0.0025 | Significant |
| Control | | 8.89 | 4.20 | | | |

## DISCUSSION:

The results of our study found that Pain, Stiffness and Physical function were statistically significant in the Experimental group and Control group.

In our study, the Experimental group subjects were given Non-weight bearing exercises in the form of Static Quadriceps, VMO Strengthening where improvement was seen as compared to Control group subjects where only instructions were given

Similarly, the study done by Mei-Hwa Jan and et al in the year 2009 showed that there was an improvement in both Exercise groups with the WOMAC scale as the functional outcome.

Also, the study done by He BX and et al in the year 2012 proves that Isometric Quadriceps contraction had an effect in decreasing symptoms, improving joint function, strengthening joint stability and slowing joint degeneration process for treatment of Osteoarthritis. So, there was an improvement in the Therapeutic group than the Control group in their study.

## CONCLUSION:

From the present study we found that there was a significant improvement in the Experimental group than the Control group.

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