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STUDY OF EFFECTIVENESS OF BALANCING EXERCISES FOR KNEE OSTEOARTHRITIS IN POST-MENOPAUSAL FEMALE.

Physiology

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ABSTRACT

Objective: To assess the effectiveness of balancing exercises in management of pain, in post-menopausal females with knee osteoarthritis.
Method: Fifty patients of postmenopausal females affected with knee OA were selected from orthopedic outdoor of GMCH .The study was conducted between March 2019 to December 2019. All the participants were aged more than 50 years. Subjects were administered balancing exercises. WOMAC: The Western Ontario and McMaster Universities Arthritis Index (WOMAC) was used in the evaluation of Knee Osteoarthritis. Visual Analogue Scale (VAS): It is a psychometric measuring instrument designed to document the characteristics of disease-related symptom severity in individual patients was also used.
Result: The WOMAC scores were calculated and subjects with WOMAC scores more than 45 were chosen. The WOMAC index: Higher scores indicate worse pain, stiffness, or physical function and the maximum score obtained by the subjects is 96. In our study we calculated the WOMAC score of all the subjects both before and after intervention and results were as follows: WOMAC result before Intervention was 65.44 ± 3.72, WOMAC (After Intervention) 36.88 ± 4.63. In our study we have also used VAS to measure knee pain intensity among the subjects both before and after treatment and have obtained the following results: Before intervention VAS Mean ± SD value is 9 ± 0.83. After intervention VAS Mean ± SD value is 5.06 ± 0.84.

KEYWORDS

Osteoarthritis, Female, Post-menopausal, WOMAC, VAS.

INTRODUCTION

The reproductive system in women responds to stressors, leading to irregular or altogether absent menstrual cycles. Eighty-seven percent of Indian women feel stressed most of the times, with eighty-two percent having insufficient time to relax1.

Osteoarthritis (OA) is a long-term, chronic disorder of cartilage degradation, synovial inflammation,

osteophyte formation, thinning of joint space and sub-chondral sclerosis, resulting in pain in the major joints, especially in the knee joint4,5. Knee OA ranks 4th as the most significant cause of incapability and disability in women and 8th in men world-wide6. India has a higher proliferative rate of OA in the world and is expected to occupy the top rank by 2025.

Osteoarthritis often begins around the time of menopause with ≥3.5-times higher rates in women aged 50–60 years when compared to men of similar age7. Estrogen prevents osteoarthritis8 and reducing estrogen levels during menopause results in a high rate of this symptomatic disease during this time. It is a known fact that OA affects all articular tissues and finally leads to joint failure. From above it is clear that menopause triggers OA of knee in women and due to it they suffer from disability together with mild to severe pain in joints, again menopause also increases the level of stress, anxiety, mood disorder, sleep disturbances, eating habit disorder etc.

MATERIALS AND METHODS

Study Population:
Fifty patients of postmenopausal females affected with knee OA were selected

Study Period: The study was conducted between March 2019 to December 2019.

INCLUSION CRITERIA:

- Age > 50 yrs
- Stiffness
- Bony tenderness
- Bony enlargement
- Synovial fluid signs of OA
- ESRn < 40mm/hr

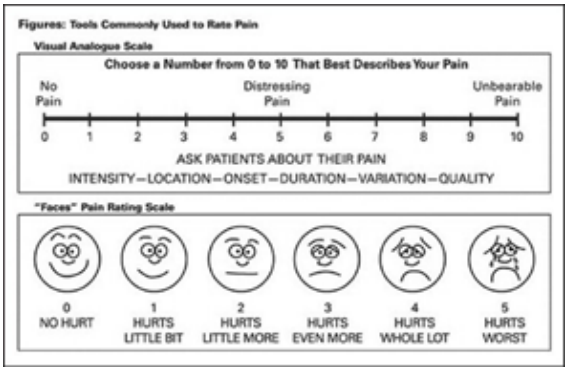
EXCLUSION CRITERIA

- Subjects with rheumatoid arthritis, polyarthritis or systemic inflammatory arthropathy, corticosteroid injection to the quadriceps or patellar tendon in the last month, were not included.
- Patients with history of total knee arthroplasty or major knee trauma injury, unresolved balance disorder, hip or ankle instability, excessive weakness, recent surgery, high risk health status such as uncontrolled hypertension, diabetes, and CAD, were not included.
- Subjects with musculoskeletal problems such as fractures, tendonitis or bursitis, or any significant symptoms affecting the whole lower limb or back were not included.
- Patients with permanent damage/deformity of the knee joint were not included.
- Patients with psychiatric disorder and unable to perform balancing exercise and mindfulness meditation were excluded.
- Clinical and radiographic diagnosis: Knee pain with osteophytes
- WOMAC: The Western Ontario and McMaster Universities Arthritis Index (WOMAC) is widely used in the evaluation of Knee Osteoarthritis. It is a self-administered questionnaire consisting of 24 items divided into 3 subscales2:
- Pain (5 items): during walking, using stairs, in bed, sitting or lying, and standing upright
- Stiffness (2 items): after first waking and later in the day
- Physical Function (17 items): using stairs, rising from sitting, standing, bending, walking, getting in / out of a car, shopping, putting on / taking off socks, rising from bed, lying in bed, getting in / out of bath, sitting, getting on / off toilet, heavy domestic duties, light domestic duties
- Each item is scored on a 5- point Likert scale3
- WOMAC Index was developed in 1982 at Western Ontario and McMaster Universities. WOMAC is available in over 65 languages and has been linguistically validated.

WESTERN ONTARIO AND MCMASTER OSTEOARTHRITIS INDEX (WOMAC)
Please circle the appropriate rating for each item.

	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	
RATE YOUR PAIN WHEN...						HOSPITAL USE ONLY
Walking	0	1	2	3	4	
Climbing stairs	0	1	2	3	4	
Sleeping at night	0	1	2	3	4	
Resting	0	1	2	3	4	
Standing	0	1	2	3	4	TOTAL
RATE YOUR STIFFNESS IN THE...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	HOSPITAL USE ONLY
Morning	0	1	2	3	4	
Evening	0	1	2	3	4	TOTAL
RATE YOUR DIFFICULTY WHEN...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	HOSPITAL USE ONLY
Descending stairs	0	1	2	3	4	
Ascending stairs	0	1	2	3	4	
Rising from sitting	0	1	2	3	4	
Standing	0	1	2	3	4	
Bending to floor	0	1	2	3	4	
Walking on even floor	0	1	2	3	4	
Getting in/out of car	0	1	2	3	4	
Going shopping	0	1	2	3	4	
Putting on socks	0	1	2	3	4	
Rising from bed	0	1	2	3	4	
Taking off socks	0	1	2	3	4	
Lying in bed	0	1	2	3	4	
Getting in/out of bath	0	1	2	3	4	
Sitting	0	1	2	3	4	
Getting on/off toilet	0	1	2	3	4	
Doing light domestic duties (cooking, dusting)	0	1	2	3	4	
Doing heavy domestic duties (moving furniture)	0	1	2	3	4	TOTAL
PATIENT SIGNATURE				DATE		
REVIEWED BY PHYSICAL THERAPIST				DATE		WOMAC TOTAL SCORE /96

Visual Analogue Scale (VAS):
It is a psychometric measuring instrument designed to document the characteristics of disease-related symptom severity in individual patients. It is used to achieve a rapid (statistically measurable and reproducible) classification of symptom severity and disease control and the scale consists of 10 cm horizontal line, anchored with ―no hurts‖ at the left end (i.e., no pain) and ―hurts worst at the right (i.e., unbearable pain).



1. Patients with severe life-threatening conditions with repeated hospitalization for their treatment were excluded.
2. Patients who were already included in another experimental study for the same or related diseases were excluded. 99 Safety issues and degree of risk involved: There was no risk to any subject during study.

METHODS:
Patients having similar symptoms of osteoarthritis were selected from orthopedic outdoor of GMCH and opinions were taken from senior consultant of orthopedic department of GMCH.

1. On the first appointment history of the subject is carefully recorded
2. The WOMAC was used to assess perceived pain, stiffness, and functional ability. The subjects were requested to put a mark on the scale at the point which approximates to the relative intensity of pain experienced. Finally, 50 females with scores above 45 were chosen for the study, as they had a higher degree of the illness.
3. Balancing exercise program

One leg balance ----Standing on affected foot with upright posture and relaxed position, the other leg should be raised to the backside (flexed at 90 degree). The patient should hold this position for 30 seconds and then should take rest for 10 seconds Blind advanced one leg balance---- it is same as one leg balance, but the patient's eyes should be closed completely while performing the exercise Crossbody leg swings---- patient should be asked to lean slightly forward with hands on a wall for support and the weight of the whole body on affected leg. The Other leg should be swung in front of the body, pointing toes upward as foot reaches its farthest point of movement. Then the same leg should be swung backward as far as possible. This is repeated for 15 times after taking 10 seconds rest, 15 similar repetitions of movements should be done with the other leg. 106 Tandem walking-- patient should be asked to walk, placing the heel of one foot just in front of the toe of the opposite foot along a 3-meter line marked on the floor Rocker board exercise--- A rocker board should be placed on a mat near a wall. Then the patient should be asked to stand on it just trying to maintain the balance. Then the patient should be asked to slowly rock it back and forth by hinging at the ankles and avoiding bending at the waist. After that rocking should be done with the feet facing either corner.

4. Each patient was asked to practice balancing exercises for 30 minutes daily. They were followed regularly through mobile and as and when possible, with contact sessions. Patients were re-evaluated after 3 months of treatment.

RESULTS AND ANALYSIS
This study was conducted in the Department of Physiology, Guwahati Medical College and Hospital on 50 females who have reached the postmenopausal stage after taking institutional ethical clearance and informed consent of the subjects. Their WOMAC scores were calculated and subjects with WOMAC scores more than 45 were chosen.

Below is the table showing the mean ± standard deviation parameter of the subjects before and after balancing exercise was administered:

Table 1: Parameters before and after treatment

Age (Mean ± Std Deviation)	57.28 ± 5.22
No. of Subjects	50
WOMAC (Before Intervention)	65.44 ± 3.72
WOMAC (After Intervention)	36.88 ± 4.63
VAS (Before Intervention)	9 ± 0.83
VAS (After Intervention)	5.06 ± 0.84

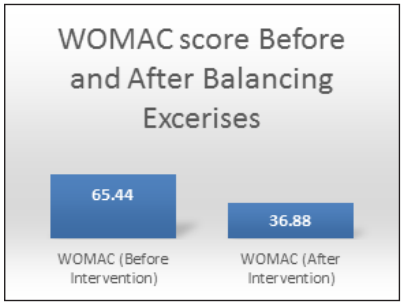


Figure 1: WOMAC score before and after balancing excersices

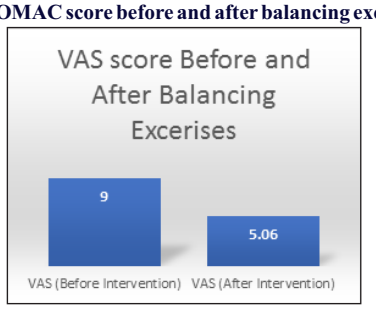


Figure 2: VAS score before and after balancing excersices

Womac And Vas:
The WOMAC index: It is the best validated and most widely used tool to assess the course of disease or response to treatment in patients with knee osteoarthritis9,10. Higher scores indicate worse pain,

stiffness, or physical function and the maximum score obtained by the subjects is 96.

In our study we calculated the WOMAC score of all the subjects both before and after intervention and results are as follows:
Before intervention WOMAC Mean ± SD value is 65.44 ± 3.72
After intervention WOMAC Mean ± SD values is 36.88 ± 4.63

Visual analogue scale (VAS): It is a psychometric measuring instrument designed to document the characteristics of disease-related symptom severity in individual patients.11 In our study we have also used VAS to measure knee pain intensity among the subjects both before and after treatment and have obtained the following results:

Before intervention VAS Mean ± SD value is 9 ± 0.83.
After intervention VAS Mean ± SD value is 5.06 ± 0.84.

DISCUSSION
This study was conducted in the Department of Physiology, Guwahati Medical College and Hospital, on fifty females of post-menopausal age group, after taking institutional ethical clearance and informed consent of the subjects. Subjects were chosen according to their WOMAC scores and only subjects with WOMAC >50 were included in the study. Subjects were administered balancing exercises. WOMAC and VAS of the two groups were computed and compared both before and after intervention. Results were as follows:

1. WOMAC (Mean ± SD) score before intervention was 65.44 ± 3.72 while after intervention was 36.88 ± 4.63. A significant reduction in the overall WOMAC score (~40%) can be observed in the subjects after administering balancing exercises.
2. VAS (Mean ± SD) score before intervention was 9 ± 0.83 while after intervention was 5.06 ± 0.84. A significant reduction in the overall VAS score (~40%)

can be observed in the subjects after administering balancing exercises. Postmenopausal women, due to depletion of estrogen, have an increased risk of osteoarthritis of knee resulting in physical disability. Regular practice of balancing exercises can have considerably good results in postmenopausal women with knee OA.

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