



A STUDY OF ROLE OF NEUROBICS AND AEROBICS IN POSTMENOPAUSAL BONE LOSS

Physiology

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ABSTRACT

Introduction- The proportion of menopausal women is rising since the aging population is expanding rapidly. Thus, the health of menopausal women becomes a prime concern worldwide.

Method- This was a intervention pre and post study.

Result- BMI finding in two groups at pre and post test. Finding in both the groups is significant with mean difference more in study 2 group. The findings of serum calcium are significant. BMD findings in two groups are not significant. WHO-QOL finding is statistically significant.

Conclusion- The combination of aerobic and neurobic exercise can be advised to all postmenopausal women who are not on oestrogen therapy

KEYWORDS

Aerobics, Neurobics , Postmenopausal women.

INTRODUCTION

After menopause, the period of time after a woman has experienced 12 consecutive months without menstruation is called as postmenopause. The proportion of menopausal women is rising since the aging population is expanding rapidly. Thus, the health of menopausal women becomes a prime concern worldwide(1).

Osteoporosis is the most prevalent disease in menopausal women, and is strongly associated with low quality of life. Osteoporosis, a multifactorial systemic skeletal disease, is characterized by low bone mineral density (BMD) and micro-architectural deterioration of bone tissue resulting in bone fragility. Postmenopausal women are susceptible to primary osteoporosis since osteoporosis is closely related to estrogen deficiency..(1)

While estrogen therapy (ET) has been applied to postmenopausal women to assist them to maintain or increase their bone density levels, or to slow down the rate at which they lose bone mass, and is effective in increasing this, ET causes more side-effects. (2).

Increased physical activity is considered a beneficial therapy for osteoporosis (3). However, studies examining the effects of aerobic exercise (AEx) alone on BMD in older women have utilized different modes, frequency, intensity, and duration of exercise with disparate results. Despite this, exercise is generally recognized as beneficial to bone(4).

During the first phase of menopausal bone loss women are in marked negative calcium balance. All calcium supplements may cause constipation and gastrointestinal upset. Recent studies have suggested that higher doses of calcium supplementation may cause increase kidney stone formation and myocardial infarction (5).

Neurobics uses the full range of senses (often marginalized by modern conveniences and daily routines) to help forge new connections among the different sensory structures of the brain. (6). Neurobics can be practiced as **Guided visual Imagery**(7).

Objectives of the study were–

1. To find out the difference in Body mass index(BMI) , serum calcium, Bone mineral density(BMD) and Quality of life(QOL) at post intervention ,in AE plus NE group.
2. To find out the difference in BMI , serum calcium, BMD and QOL at post intervention ,in AE group
3. To relate intergroup difference.

METHOD-

This was a intervention pre and post study.

Forty women between the ages of 45 and 60 yr who were at least 2 yr postmenopausal and not on any medication, including hormone-replacement therapy, were recruited for the study.

Study setting was Department of Physiology, Jawaharlal Nehru Medical College, Wardha.

The study were approved by the Institutional Ethical committee of Datta Meghe University of Health Sciences(DMIMS).. Each participant provided written informed consent At the outset, basic characteristics including sex, age, education, marital status, physical activity, body mass index (BMI), systolic blood pressure, diastolic blood pressure , pulse, family medical history, and other prescribed medication was documented.

2 groups were made by chit method. 20 subjects were assigned each group. The first group was named as Study1 who performed both aerobic and neurobic exercises both. Subjects performed aerobic exercise in form of walking for 30 minutes a day for 5 days a week. Neurobics was performed as guided self imagery. Subjects visualized golden yellow light falling on all bones in their body and that their bone density is becoming normal.

The second group was labelled as study2 . In this group the subjects performed aerobic exercise in form of walking for 30 minutes a day for 5 days a week (only).

The intervention was for 3 months. Compliance was checked with log book. Post test was analyzed after the completion of the study.

Measurement

Primary outcome of this study was difference in BMI , serum calcium, BMD between pre & post test in all the groups. Secondary outcome was QOL in both the groups.

Change in body mass index(BMI) was calculated by comparing measurement data, namely height and weight, at the initiation of the study and the conclusion of the study.

Serum calcium was measured by calcium kit – method namely 0-resolphthalein complexone method.

All bone density tests were done after an overnight fast during one visit both before and after the interventions.

DEXA scanner and software (DEXA; model DPX-L LUNAR Radiation, Madison, WI) were used to scan the Vertebral bone, Forearm Trabecular bone and Forearm cortical bone . All scans were analyzed by using the LUNAR version 1.3z DPX-L.

Quality of life assessment was done using the WHOQOL-Bref(8).

Statistical analysis

Statistical analysis was done by using descriptive and inferential statistics using student's paired t test, one way ANOVA and Multiple Comparison Tukey Test and software used in the analysis were SPSS 24.0 version and $p < 0.05$ is considered as level of significance.

Observation-**Table 1: Age wise distribution of patients in two groups**

Age Group(yrs)	Study 1(A+N)	study2(A)
31-40 yrs	6(30%)	6(30%)
41-50 yrs	8(40%)	8(40%)
51-60 yrs	6(30%)	6(30%)
Total	20(100%)	20(100%)
Mean±SD	45.75±8.63	45.75±8.63
Range	32-60 yrs	32-60 yrs

Table 2: Comparison of BMI in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study 1	24.15±4.63	23.65±4.28	0.50±0.82	2.70 p=0.014,S
Study 2	24.15±4.68	22.40±3.74	1.75±1.83	4.27 p=0.0001,S

Table 3 – Comparison of serum calcium in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	p-value
Study 1	9.4±0.113	9.6±0.085	0.20±0.028	0.014,S
Study 2	9.2±0.085	9.0 ±0.112	0.20±0.027	0.0001,S

Table 4: Comparison of Vertebral bone density (g/cm2) in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	p-value
Study 1	1.133±0.152	1.145±0.131	0.012±0.021	1.000,NS
Study 2	1.126±0.134	1.123±0.156	0.003±0.022	0.606,NS

Table 5: Comparison of Forearm Trabecular bone density (g/cm2) in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	p-value
Study 1	0.741±0.112	0.762±0.114	0.012±0.021	0.887,NS
Study 2	0.768±0.190	0.757±0.184	0.011±0.006	0.606,NS

Table 6: Comparison of Forearm cortical bone density (g/cm2) in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	p-value
Study 1	1.115±0.085	1.125±0.166	0.01±0.081	1.000,NS
Study 2	1.116±0.086	1.116±0.084	0.00±0.002	0.706,NS

Table 7. Comparison of mean difference in WHO-QOL domain in two groups

WHO-QOL domains	Group	Mean Difference	SD	z-value	p-value
Domain 1	Study 1 Group	16.68	12.14	9.22	0.000 S,p<0.05
	Study 2 Group	1.00	5.60		
Domain 2	Study 1 Group	25.12	16.67	10.87	0.000 S,p<0.05
	Study 2 Group	0.33	6.70		
Domain 3	Study1 Group	12.34	19.54	5.23	0.000 S,p<0.05
	Study 2 Group	1.43	7.07		
Domain 4	Study 1 Group	24.74	14.82	11.05	0.000 S,p<0.05
	Study 2 Group	1.10	7.89		

DISCUSSION-

In our study BMI findings in two groups at pre and post test was statistically significant with mean difference more in study 2 group. The findings of serum calcium in two groups at pre and post test were statistically significant. All BMD findings were not statistically significant. Comparative findings in all the 4 domain of WHO-QOL in study 1 was statistically significant. This beneficial effect can be explained by the fact that regular weight-bearing and muscle-strengthening reduces the risk of falls and fractures by improving agility, strength, posture, and balance, as well as general health benefit(5).

Alice S. Ryan et al in their study examined the effects of weight loss by caloric restriction (WL) and aerobic exercise plus weight loss (AEx+WL) on total and regional bone mineral density (BMD) in older women. They suggested that the addition of exercise to weight-loss programs may reduce the risk for bone loss(9).

In our study no extra supplementation of calcium was given. However a statistically significant difference was found at post test in both the groups. This indicates that aerobic exercise has a role to play in calcium up regulation. As per NIH Consensus Statement calcium intake though was similar between groups in a study there were no changes in calcium intake after either intervention.(10).

Aerobic exercise training maintains or slows the loss of BMD in older women (11), with both high- and low-impact exercise effective in maintaining BMD in early postmenopausal women (12).

Blumenthal J. A et al conducted a study in the group of postmenopausal women who were aerobically trained. They found that BMD of the lumbar spine and femoral neck tended to increase and BMD in the other femoral regions was maintained (11).

Caplan GA et al assessed the effects of a twice-weekly aerobic weight-bearing exercise program on bone density in postmenopausal women. This study adds strong evidence that twice-weekly weight-bearing aerobic exercise has a protective effect on bone density in postmenopausal women as well as being associated with other measurable benefits(13).

Soghra Nikpour and Hamid Haghani studied the effect of exercise on quality of life in postmenopausal women. They concluded that quality of life on postmenopausal women could be improved with a regular and controlled exercise program of 8 weeks (14).

Neha Dighe et al conducted a study on the effect of weight-bearing and neurobic exercises on bone health and physical function in elderly individuals. Result was Intergroup statistical analysis for serum calcium finding was significant (15).

CONCLUSION-

It can be concluded that the beneficial effects of combination of aerobic exercise and neurobic exercise as compared to aerobic exercise only is negligible. However considering the positive effects of neurobic exercise, the combination of aerobic and neurobic exercise can be advised to all postmenopausal women who are not on oestrogen therapy.

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