

Impact of versatile intervention programme on osteoporosis among working and non-working women in urban areas of Mysuru

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Abstract

Introduction

Bone loss occurs universally with aging which makes aging the primary risk factor. The other risk factors for osteoporosis are sedentary life style, low dietary intake of calcium and vitamin D, early menopause, immobility, excessive caffeine intake and their working & living environment. In India the prevalence of osteoporosis among women aged between 30-60 years is 30%. It is more frequently found in women than men at the ratio of 4:1. One of every woman will experience fractures at some point during her life.

Methodology

Aim of the study was to assess the Bone Mineral Density (BMD), and serum vitamin D among working and non-working women and to administer and to assess effectiveness of the versatile intervention programme (Nutrition education + Exercise for group A and Exercise + drug therapy for group B) based on BMD and Serum Vitamin D. Evaluative approach was used in the first phase of research. Pre – experimental design was used in the second phase. BMD was checked by using DEXA scan on ankle joint was checked for 78 women and serum Vitamin D was checked for 38 women who had Osteopenia and Osteoporosis. Osteopenia women were included in the intervention group A and Osteoporosis women were included in Group B.

Results

Study findings revealed that out of 78 working and non working women 19 (24.35%) have osteopenia , 17 (21.79%) of them have osteoporosis and remaining 42 (53.84%) have normal bone mineral density. In group A during pretest majority women 15(78.94%)have serum vitamin D less than 10mg/dl in and in post test it is observed 8(47.05%) of samples have serum vitamin D between 10-20mg/dl and less than 10mg/dl respectively. Similarly in group B also it is found that majority 14(82.35%) have serum vitamin D less than 10mg/dl during pretest and in post test 9(64.28%) of samples have serum vitamin D between 10-20mg/dl. No samples have normal serum vitamin D level in both groups. There was significant difference in mean pretest and posttest BMD and serum vitamin D values within the group. Findings also revealed that there is significant difference between mean pretest and posttest BMD status and the serum vitamin D values.

Discussion

It is evident in the study whether the women are osteopenia or osteoporosis stage none of them had normal serum vitamin D value. This was the important factor influenced the study subjects to continue the drug therapy and to practice the nutrition and exercise programme. Regular reminders and follow ups are essential to be adherence with the drug therapy. Hence the study emphasizes the need for sensitizing not

only women but everyone especially the vulnerable group such as geriatrics, those who not exposed to sun and those suffer with chronic disease.

Key words : Osteoporosis, Bone Mineral Density, Serum Vitamin D, Versatile Intervention

INTRODUCTION

In India the prevalence of osteoporosis among women aged between 30-60 years is 30%. It is more frequently found in women than men at the ratio of 4:1. One of every woman will experience fractures at some point during her life. In Karnataka the prevalence of osteoporosis was 62%. Osteoporotic fractures are common cause of morbidity and mortality in adult men and women.¹

A women's risk of developing an osteoporosis related hip fracture is equal to her combined risk of developing breast, uterine and ovarian cancer. by the age of 90 one third of all women and 17% of men have sustained a hip fracture.²

NEED OF THE STUDY

Currently it is estimated that over 200 million people worldwide suffer from osteoporosis. Approximately 30% of all postmenopausal women have osteoporosis in the United States and in Europe.³ Osteoporosis accounts for 70% of all fracture cases in people over the age of 45 years in U. S.¹ According to estimates there are about 300 million people in India with osteoporosis. The evidence based on ageing population indicates that there may be a 50% increase in the number of people with osteoporosis in India in the next 10 years³ and over 30 million women in India have osteoporosis.⁴ According to the World Health Organization, one out of three adult females in India suffers from osteoporosis, making India one of the worst affected countries in the world.⁵

Bone loss occurs universally with aging which makes aging the primary risk factor. The other risk factors for osteoporosis are sedentary life style, low dietary intake of calcium and vitamin D, early menopause, immobility, excessive caffeine intake and their working & living environment.⁶ Pilot study was conducted to assess the bone mineral density (BMD) among women in a selected urban area of Mysuru, revealed that 2.2% women between 30-35 years had osteopenia and 1.66% women between 36-40 years had osteoporosis.⁷ In JSS Multi specialty Hospital per month out of 600 orthopedics outpatients 30 patients have osteoporotic change, in an average 20-30 patients undergo fixation because of osteoporosis fractures and more common among elderly is been reported. It was also found that educational, nutritional and drug therapy is required to prevent the complications associated with osteoporosis. Hence, the investigator's has motivated to assess the Bone Mineral Density and serum Vitamin D to determine the risk for osteoporosis and to conduct versatile intervention programme for high risk women.

Methodology

Aim of the study was to assess the Bone Mineral Density (BMD), and serum vitamin D among working and non-working women and to administer and to assess effectiveness of the versatile intervention programme (Nutrition education + Exercise for group A and Exercise + drug therapy for group B) based on BMD and Serum Vitamin D. Evaluative approach was used in the first phase of research. Pre – experimental design was used in the second phase. Ethical clearance from IERB, permission to conduct the study from District Health Officer and informed written consent from samples. BMD by using DEXA scan on ankle joint was checked for 78 women and serum Vitamin D was checked for 38 women who had Osteopenia and

Osteoporosis. Osteopenia women were included in the intervention group A and Osteoporosis women were included in Group B.

Data was collected and analysed by using descriptive and inferential statistics and presented under the following sections.

Section1

Description of BMD scores of working and non working women

Total of 78 women underwent BMD investigation in order to rule out for osteopenia and osteoporosis and the obtained values were categorized as normal BMD, osteopenia and osteoporosis and presented in Table 1.

- **Distribution of working and non working women according to their BMD scores**

Table 1

Distribution of working and non working women according to their BMD scores

Serum vitamin D	Working and non Women	
	f	%
Normal	42	53.84
Osteopenia	19	24.35
Osteoporosis	17	21.79

It is evident from the table 1 that out of 78 working and non working women 19 (24.35%) have osteopenia , 17 (21.79%) of them have osteoporosis and remaining 42 (53.84%) have normal bone mineral density.

Women those who were in osteopenia stage were included in group A and Exercise and Nutrition education was conducted for them and the women those who were in the osteoporosis stage were included fir Group B for Exercise + drug therapy for one year. Monthly follow ups were conducted and post test BMD was conducted after one year.

All group A and Group B samples underwent serum vitamin d test during pretest and post test and the values are described in ine following section .

Section 2

Description of serum Vitamin D values of working and non working women

The BMD revealed totally 19 women have osteopenia (Group A) and 17 women have osteoporosis (Group B). Among these 36 women serum vitamin D was assessed before the versatile interventions and post test was conducted after a year of intervention. The obtained values were categorized as 30-74mg/dl (Normal),20-30mg/dl,10-20mg/dl and less than 10mg/dl and presented in Table 2.

- **Distribution of working and non working women according to their serum vitamin D value**

Table 2

Distribution of working and non working women according to their serum vitamin D values

n=36

Serum vitamin D	Group A				Group B			
	f		%		f		%	
	Pre test	Post test	Pretest	Post test	Pretest	Post test	Pretest	Post test
30-74mg/dl	00	00	00	00	00	00	00	00
20-30mg/dl	01	05.26	01	05.88	00	00	00	00
10-20mg/dl	03	15.78	08	47.05	03	17.64	09	64.28
Less than 10mg/dl	15	78.94	08	47.05	14	82.35	05	35.71

It is evident from table 2 that in group A pretest majority women 15(78.94%) have serum vitamin D less than 10mg/dl in and in post test it is observed 8(47.05%) of samples have serum vitamin D between 10-20mg/dl and less than 10mg/dl respectively. No samples have normal serum vitamin D level.

Similarly in group B also it is found that majority 14(82.35%) have serum vitamin D less than 10mg/dl during pretest and in post test 9(64.28%) of samples have serum vitamin D between 10-20mg/dl. No samples have normal serum vitamin D level in both groups.

SECTION 3

EFFECTIVENESS OF VERSATILE INTERVENTION IN GROUP A AND GROUP B BASED ON BMD AND SERUM VITAMIN D

A) Significance of difference between mean BMD scores of women in group A and group B

In order to find out the significance of difference between the mean post test BMD scores of women in group A and group B independent 't' value was computed. The data are presented in Table 4. To test the statistical significance, the following null hypothesis was stated.

$H_{0(a)}$: There will be no significant difference between mean post test BMD scores of women in group A and group B

TABLE 4

Mean, mean difference, SD difference, SEMD and independent 't' test of post test BMD scores of women in group A and group B

n=36

Group	Mean	SD difference	't' value
Group A	1.87	+ 0.1	
Group B	3.42	+0.15	* 37.8

$t_{(34)} : 2.02; p < 0.05; * \text{Significant}$

The data presented in table 5 shows that there is significant difference between the mean pretest and post BMD scores in both the group. Hence the null hypothesis is not supported inferring that the versatile intervention programme is effective in improving the BMD scores of samples.

B) Significance of difference between pre test and post test serum vitamin D values of group A and group B

In order to find out the significance of difference between the mean serum vitamin D values of pre test and post test, paired 't' value was computed. The data are presented in the Table 8. To test the statistical significance the following null hypothesis was stated

$H_{01(b)}$: There will be no significance difference between mean post test and pre test serum vitamin D values among group A and group B

TABLE 7

Mean, mean difference, SD difference, SEMD, and paired 't' test of pre test and post test serum vitamin D values group A and group B

n=36

Group	Mean	Mean difference	SD difference	SEMD	't' value
Group A					
Pre test	6.05				
		2.10	+ 0.04	0.59	7.9
Post test	8.18				
Group B					
Pre test	9.62				
		1.44	00	1.09	3.80
Post test	8.18				

$t_{(18)} = 2.10$; $t_{(16)} = 2.12$; $p < 0.05$; $p < 0.05$ *Significant;

The data presented in table 4 shows that there is significant difference between the mean pretest and post serum vitamin D levels within the group. Hence the null hypothesis is not supported inferring that the versatile intervention programme is effective in improving the serum vitamin D levels of samples.

C) Significance of difference between mean serum vitamin D values of women in group A and group B

In order to find out the significance of difference between the mean post test serum vitamin D values of women in group A and group B independent 't' value was computed. The data are presented in Table 9. To test the statistical significance, the following null hypothesis was stated.

$H_{02(b)}$: There will be no significant difference between mean post test serum vitamin D values of women in group A and group B

TABLE 8

Mean, mean difference, SD difference, SEMD and independent 't' test of post test serum vitamin D values of women in group A and group B

n=36

Group	Mean	Mean difference	SD difference	't' value
Group A	9.62		+ 2.6	
Group B	8.18		+4.5	1.16

t₍₃₄₎ :2.02;p<0.05; *Significant

The data presented in table 4 shows that there is significant difference between the mean pretest and post serum vitamin D values in both the group. Hence the null hypothesis is not supported inferring that the versatile intervention programme is effective in improving the serum vitamin D values of samples.

Discussion

This study shows that even though most of the women were having normal BMD it is necessary to practice the nutrition education and exercise to prevent the development of Osteoporosis. In both groups the versatile intervention was very effective by analyzing the data study interpreted that there is significant difference within the group before and after the intervention. Study findings also revealed that there is significant difference between mean pretest and posttest BMD status and the serum vitamin D values. It is evident in the study whether the women are osteopenia or osteoporosis stage none of them had normal serum vitamin D values. This was the important factor influenced the study subjects to continue the drug therapy and to practice the nutrition and exercise programme. During the study it was observed subjects were ready to practice exercise and nutrition but it was a difficult task to be adherence with the drug therapy. Regular reminders and follow ups are essential to be adherence with the drug therapy. Hence the study emphasizes the need for sensitizing not only women but everyone especially the vulnerable group such as geriatrics, those who not exposed to sun and those suffer with chronic disease.

Conclusion

This study definitely has influenced the study subjects to continue the versatile intervention programme and to have regular follow up by undergoing free BMD checking, attending women and geriatric clinic. Study also concludes that Serum Vitamin D is the most identifiable diagnostic test in early detection of osteoporosis. Even though the cost of this test is high all must undergo this test to prevent the complications of osteoporosis like fracture and joint pain. Being working women or non working women it is more important is everyone is at risk for developing osteoporosis and all must take preventive and promotive measures.

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