EFFECT OF CALCIUM SUPPLEMENT AND PHYSICALEXERCISES ON SELECTED PARAMETERS OF POSTMENOPAUSAL OSTEOPOROSIS IN WOMEN

ABSTRACT:

The aim of this study to identify the effect of the calcium supplement & physical exercises selected parameters in postmenopausal women.

Material and Methods: The study used a descriptive evaluative approach with a pre-experimental control before-after research design, in which investigators assessed the effects of calcium supplementation and physical exercise on selected parameters in postmenopausal women in the outpatient departments. The research comprised 30 postmenopausal women from orthopaedic outpatient clinics. A basic random sampling method was employed to select the sample. ECOS 16 Questionnaire and Mini Osteoporosis Scale were used to obtain data. Describing and inferential statistics were used to analyses the data.

Result: According to the findings of this research, Posttest mean blood calcium level 8.64 with SD of ±0.302 was higher than the Pretest mean blood calcium level 8.22 with SD of ± 0.370. In the t-test study the gap in Pretest and Posttest average blood calcium level was found to be considerable at the level of 0.05 ($t=3.45$; $p<0.00001$). This means that calcium supplements and exercise havea positive influence on postmenopausal women's calcium levels. Posttest mean BMD level -2.18 with SD of ±0.58412 was higher than the Pretest mean BMD level -2.35 with SD of ± 0.8773. In the t-test study the gap in Pretest and Posttest average BMD level was found to be considerable at the level of 0.05 ($t=2.95$; $p<0.00001$). This means that calcium supplements and exercise have a positive influence on postmenopausal women's calcium levels.
Conclusion: The results revealed that calcium supplementation and exercise had a substantial favorable impact on BMD levels of menopausal women.

Keywords---calcium supplementation, physical exercise, bone mineral density.

INTRODUCTION:

It is becoming more and more common knowledge that non-communicable diseases like HIV/AIDS, which are on the rise in developing countries like India, are linked to globalization. When a systemic skeletal disease progresses, bone fragility and fracture susceptibility increase because of the disease's impact on microarchitectural bone tissue degeneration. Osteoporosis affects the wrist, spine, and hip the most frequently, with the wrist being the most common site. Osteoporosis is a major public health issue that affects the entire population and affects an estimated 200 million people worldwide. Osteoporosis strikes women more often than men, as evidenced by numerous scientific investigations. There is a difference in bone mass between men and women because the peak bone mass of women is lower and the bone mass of men is larger. Female bone mineral density declines significantly faster than male bone mineral density in middle age because of the significant drop in oestrogen levels that occurs during menopause.[1]

Other changes in the body could take place after the ovaries have stopped producing oestrogen, which could have a greater long-term impact on overall health. This can lead to osteoporosis, which is a bone-thinning disorder, as a result of these changes in strength and density in bones. Oestrogen has a critical role in the development of bone strength and fracture resistance in the female skeleton. Osteoporosis fractures in women are more common than hot flushes or vaginal dryness in men, which are more common indications of the disease in men. It is because of this phenomenon that osteoporosis has been dubbed "the silent pandemic."[2]

For the duration of skeletal maturation, which lasts until the early twenties, the human skeleton gains calcium at a rate of about 150 mg per day. It is essential to maintain calcium homeostasis in order to avoid bone loss and other issues during a person's life. According to the American Osteopathic Association, male bone balance begins to degrade after age 50, whereas female bone balance begins to deteriorate around menopause. As a result of this deterioration, bone loss occurs throughout the skeletal system. Fractures are more common as a result of bone loss, beginning with non-hip fractures in women after menopause and progressing to hip fractures in both men and women over time. Science is unsure of the cause of bone loss that occurs after menopause and as a result of the ageing process.[3]

Ca calcium supplementation is usually prescribed as a result, for persons of any age who may be at risk of poor dietary calcium intake or osteoporosis, and notably for postmenopausal women in order to avoid bone disintegration.[4]

According to the World Health Organization's definition of osteoporosis, a person's bone mass decreases and bone tissue degradation occurs simultaneously. Thus, bone fragility rises, and the chance of fracture increases (WHO). Only cardiovascular diseases pose a greater threat to the general public's health. A period of time precedes the development of osteopenia, which refers to bone density that is lower than normal but not to the point of osteoporosis. Osteoporosis reduces bone density, but not to the point where osteopenic bone loss occurs. There's a good chance that it will progress to osteoporosis if it isn't addressed. To identify if you have osteopenia or osteoporosis, a DEXA Scan may be performed on you. In trials, the combination of calcium and exercise has been found to be more effective than calcium alone in preventing femoral neck fractures.[5]

It's expected that the number of women suffering from osteoporosis after menopause would increase considerably over time because of the ageing global population. 17 Around 8.9 million fractures are caused by osteoporosis every year, with an osteoporotic fracture occurring approximately every three seconds. 17 There will be an increase in hip fractures from 1.66 million in 1990 to 6.26 million by 2050 as a result of the growing global senior population due to longer life expectancies in every region. 17 Osteoporosis in women following menopause can be accelerated by oestrogen insufficiency. One of the many effects oestrogen exerts on the body is the stimulation of bone metabolism and formation. There is an increase in bone loss of 2 to 5 percent each year in women who are going through menopause, which can extend for up to 10 years beyond the menopause. In women, osteoporosis is more common and more severe than in men as they age. According to the National Institute of Health and Family Welfare, 42.5 percent of men and 24.6 percent of women over the age of 50 in India have osteoporosis.[6]

Description of the Tool

Tool comprises of 4 sections:

- Section a:
  - Part I- Menopausal women who meet the inclusion criteria and visit the Orthopaedic Outpatient Department (OPD) were studied for their demographic characteristics. It consists of eight questions.
  - Part II- Height, weight, BMI, blood calcium level, and bone mineral density (BMD) of postmenopausal women who meet the inclusion criteria and visit the Orthopaedic Outpatient Department (OPD) will be measured.
- Section b:
  A total of 12 items from QUALEFFO and 4 items from OQLQ are included in the ECOS 16 Questionnaire. There are 16 things in ECOS, and they are organised into four categories. ECOS – 16 delivers subscale domain scores as well as an overall score for each domain.
- Section c:
  Mini Osteoporosis QOLQ- This Questionnaire was created in order to decrease the amount of time required in clinical practice to administer the OQLQ in patients with osteoporosis. It has ten items that are a condensed version of the original thirty-item OQLQ.

Section I: Assessment of demographic variables.
Section II: Assessment of Clinical parameters among the women attending orthopedic OPD.
Section III: Evaluation of Effectiveness of calcium supplement & physical exercise of clinical parameters among the women attending orthopedic OPD.
Section IV: Association of pre-test blood calcium level and BMD with selected demographic variables.

SECTION I: ASSESSMENT OF DEMOGRAPHIC VARIABLES

Table 1: Distribution of menopausal women according to socio demographic variables.

N=30(15+15)

Demographic Variables		Control group	Experimental group
Age (Years)	45-59 years	4(26.66%)	3(20.00%)
	50-54 years	6(40.00%)	6(40.00%)
	55 years & above	5(33.33%)	6(40.00%)
Educational status	Illiterate	2(13.33%)	1(6.66%)
	Primary education	4(26.66%)	3(20%)
	Secondary Education	5(33.33%)	7(46.66%)
	College	4(26.66%)	4(26.66%)
Occupational Status	Labour	3(20.00%)	4(26.66%)
	Office	2(13.33%)	5(33.33%)
	Housewife	10(66.66%)	6(40.00%)
	Retired	00(00.00%)	00(00.00%)
Socioeconomic status	Low income (Less than 5,000)	3(20%)	1(6.66%)
	Lower middle income(6000 to10,000)	4(26.66%)	3(20%)
	Middle income (11,000 to 20,000)	8(53.33%)	9(60.00%)
	High income (21,000 & above)	00(00.00%)	02(13.33%)
Dietary Patter	Vegetarian diet	3(20.00%)	4(26.66%)
	Non-Vegetarian diet	2(13.33%)	5(33.33%)
	Mixed diet	10(66.66%)	6(40.00%)
Any bad Habits	Not at all	4(26.66%)	5(33.33%)
	Smoking	00(00.00%)	00(00.00%)
	Drinking alcohol	00(00.00%)	00(00.00%)
	Tobacco Chewing	7(46.66%)	6(40.00%)
	Excessive intake of tea, coffee	4(26.66%)	4(26.66%)
Marital Status	Married	11(73.33%)	13(86.66%)
	Unmarried	0(00.00%)	0(00.00%)

	Widow	4(26.66%)	2(13.33%)
How long did you breast fed to your child?	Not Breastfed	1(6.66%)	3(20.00%)
	1 Month to 6 Month	3 (20.00%)	6 (40.00%)
	7 Month to 12 Month	5 (33.33%)	3 (20.00%)
	13 Month to 18 Month	2 (13.33%)	2(13.33%)
	19 Month and above	4(26.66%)	1(6.66%)

Table no 1 shows that, in control group majority 40.00% of respondents belongs to 50-54 years of age group where as in experimental group majority of 40.00% belongs to 50-54 years of age group, 55 years and above age group respectively. In control group majority of 33.33% completed their secondary education where as in experimental group majority of 46.66% respondents also completed their secondary education. In control group majority of 66.66% respondents were housewife and in experimental group 40.00% were housewife too. In control and experimental group majority of respondents belongs to the middle socioeconomic status. In control group 66.66% took mixed type of diet and in experimental group 40.00% took non-vegetarian diet. In control and experimental group majority of respondent bad habit of chewing tobacco. In both the group majority of respondents were married. In control group majority of respondent fed their child for 7 months to 12 month and experimental group majority respondents fed their child for 1 months to 6 months. (Table no 1)

SECTION II: ASSESSMENT OF CLINICAL PARAMETERS AMONG THE WOMEN ATTENDING ORTHOPEDIC OPD.

Table 2: Distribution of menopausal women according to socio Clinical parameters

N= 30(15+15)

Clinical Parameters		Control group	Experimental group
Height	≥ 151 cm	3(20.00%)	2(13.33%)
	152cm to 155cm	2(13.33%)	4(26.66%)
	156cm to 159cm	3(20.00%)	2(13.33%)
	160cm to 165 cm	4(26.66%)	3(20.00%)
	165cm & above	3(20.00%)	4(26.66%)
Weight	50kg & below	2(13.33%)	1(6.66%)
	51-56 kg	4(26.66%)	3(20%)
	57-62 kg	5(33.33%)	7(46.66%)
	63 kg & above	4(26.66%)	4(26.66%)
BMI	Below 18.5	00(00.00%)	01(6.66%)
	18.5-24.9	5(33.33%)	4(26.66%)
	25.0-29.9	7(46.66%)	6(40.00%)
	30.0 & above	3(20.00%)	4(26.66%)
Recent Blood	Less than 8.0mg	4(26.66%)	4(26.66%)

Calcium level	8.1 mg to 8.4 mg	9(60.00%)	7(46.66%)
	8.5mg to 8.8mg	02(13.33%)	3(20.00%)
	More than 8.9 mg	00(00.00%)	1(6.66%)
Current BMD level T-score	-1 & above	1(6.66%)	2(13.33%)
	Between -1 & 2.5	5(33.33%)	3(20.00%)
	-2.5 & below	9(60.00%)	10(66.66%)

Table no 2 shows that, In control group majority of 26.66% had height between 160cm to 165 cm where as in experimental group majority of 26.66% had height between 152 to 155 cm. In control group majority of 33.33% respondents belongs to 57-62 kg group and in experimental group majority of 44.66% belongs to 57-62 kg group. In control group majority of 46.66% had BMI between 25.0-29.9 where as in experimental group majority of 40% had BMI between 25.0-29.9. In control group majority of 60.00% blood calcium level is between 8.1 mg to 8.4 mg and in experimental group 46.66% had between 8.1. mg to 84 mg. In control group current BMD level T-score of majorities of 60% had between -2.5 & below and in experimental group 66.66% ha between -2.5 & below. (Table no 2)

SECTION III: EVALUATION OF EFFECTIVENESS OF CALCIUM SUPPLEMENT & PHYSICAL EXERCISE OF CLINICAL PARAMETERS AMONG THE WOMEN ATTENDING ORTHOPEDIC OPD

Table No 3: Assessment of effectiveness in control group

Test	Mean	SD	T	DF	P value	Result
Pretes tblood calcium level (O1)	8.15	0.324844	1.07	14	0.145925	NS P>0.05
Posttest 2 blood calcium level (O3)	8.28	0.354293				

Table no. 3 shows that, effectiveness on the basis of blood calcium level In the t- test study the gap in pretest (O1) and Posttest (O3) average blood calcium level was found to be considerable at the level of 0.05 (t=1.07; p>0.05). Hence it predicts that there no significant change in the blood calcium level in control group.(Table 3)

Table No 4: Assessment of effectiveness in control group

Test	Mean	SD	T	DF	P value	Result
Pretest (O1)	-2.26	0.574	0.34641	14	0.365812	NS P>0.05
Posttest 2 (O3)	-2.18	0.685				

Table no. 4 shows that, effectiveness on the basis of BMD level In the t-test study the gap in Pretest (O1) and Posttest 2 (O3) average BMD level was found to be considerable at the level of 0.05 (t=0.34641; p>0.05). Hence it predicts that there no significant change in the BMD level in control group.(Table no 4)

Table No 5: Assessment of effectiveness in experimental group

Test	Mean	SD	T	DF	P value	Result
Pretest (O1)	8.22	0.370	3.45568	14	<0.00001 (0.000884)	S P<0.05
Posttest (O3)	8.64	0.302				

Table no 5 shows that, Posttest (O3) mean blood calcium level 8.64 with SD of ±0.302 was higher than the Pretest (O1) mean blood calcium level 8.22 with SD of ± 0.370. There has been an increase in the mean blood calcium level since administration of the blood calcium supplementation and physical excesise. In the t-test study the gap in Pretest (O1) and Posttest (O3) average blood calcium level was found to be considerable at the level of 0.05 ($t=3.45$; $p<0.00001$). Hence null hypothesis is rejected. This signifies the calcium supplementation and physical excersise has +ve effect on the blood calcium level of the postmenopausal women. (Table no 5)

Table No 6: Assessment of effectiveness in experimental group

Test	Mean	SD	T	DF	P value	Result
Pretest (O1)	-2.35	0.87731	2.95	14	<0.00001 (0.0001342)	S P<0.05
Posttest 2 (O3)	-2.18	0.58412				

Table no 6 shows that, Posttest (O3) mean BMD level -2.18 with SD of ±0.58412 was higher than the Pretest (O1) mean BMD level -2.35 with SD of ± 0.8773. There has been an increase in the mean BMD level since administration of the blood calcium supplementation and physical exercises. In the t-test study the gap in Pretest (O1) and Posttest (O3) average BMD level was found to be considerable at the level of 0.05 ($t=2.95$; $p<0.00001$). Hence null hypothesis is rejected. This signifies the calcium supplementation and physical exercise has +ve effect on the blood calcium level of the postmenopausal women. (Table no 6)

SECTION IV: ASSOCIATION OF PRE-TEST BLOOD CALCIUM LEVEL AND BMD WITH SELECTED DEMOGRAPHIC VARIABLES.

Table no 7: Association of pre-test blood calcium level with selected demographic variables. (Control Group)

Demographic variables	No of samples	Blood calcium level				DF	P value	χ^2 value	Result
		A	B	C	D				
Age in years						4	0.35	4.4375	NS
45-49 years	4	1	2	1	0				
50-54 years	6	3	3	0	0				
55 years & above	5	0	4	1	0				
Educational Status						6	0.2771	7.5	NS
Illiterate	2	0	1	1					

Primary ed.	4	2	2	0					
Secondary ed.	5	2	2	1					
College	4	0	4	0					
Occupational Status						4	0.05515	9.25	S
Labour worker	3	2	0	1	0				
Office worker	2	0	1	1	0				
Housewife	10	2	8	0	0				
Retired	00	0	0	0	0				
Socioeconomic status						4	0.05956	9.0625	S
Low income	3	2	0	1	0				
Lower middle income	4	2	2	0	0				
Middle income	8	0	7	1	0				
High income	0	0	0	0	0				
Dietary Pattern						4	0.1308	7.09722	NS
Vegetarian diet	3	1	1	1	0				
Non-vegetarian diet	2	1	0	1	0				
Mixed diet	10	2	8	0	0				
Any Bad Habits						4	0.5469	3.065	NS
Not at all	4	2	2	0	0				
Smoking	0	0	0	0	0				
Drinking alcohol	0	0	0	0	0				
Tobacco chewing	7	2	4	1	0				
Excessive intake of tea, coffee	4	0	3	1	0				
Marital status						2	0.7213	0.653	NS
Married	11	3	7	1	0				
Unmarried	0	0	0	0	0				
Widow	4	1	2	1	0				
How long did you breast fed to your child?						8	0.1792	11.4167	NS
Not Breastfed	1	0	1	0	0				
1-6 months	3	2	0	1	0				
7-12 months	5	2	3	0	0				
13-18 months	2	0	1	1	0				
19 and above months	4	0	4	0	0				

Table No 7 depicts that in control group there has been a significant association between Occupational status and socio-economic status with the blood calcium level of postmenopausal women and age, educational qualification, marital status, dietary pattern, any bad habits, how long did you breastfed to your child? did not demonstrate the association between the blood calcium level of the postmenopausal women. Therefore, the null is rejected and the alternative hypothesis accepts that the blood calcium level and chosen demographic variables are significantly associated.(Table no 7)

Table no 8: Association of pre-test blood calcium level with selected demographic variables. (Experimental Group)

Demographic variables	No of samples	Blood calcium level				DF	P value	χ^2 value	Result
		A	B	C	D				
Age in years						6	0.2167	8.3035	NS
45-49 years	3	1	2	0	0				
50-54 years	6	2	4	0	0				
55 years & above	6	1	1	3	1				
Educational Status						9	0.2203	11.8776	NS
Illiterate	1	0	1	0	0				
Primary ed.	3	2	1	0	0				
Secondary ed.	7	0	4	3	0				
College	4	2	1	0	1				
Occupational Status						4	0.6177	2.65179	NS
Labour worker	4	2	1	1	0				
Office worker	5	1	2	2	0				
Housewife	6	1	4	1	0				
Retired	0	0	0	0	0				
Socioeconomic status						9	0.5893	7.46032	NS
Low income	1	0	1	0	0				
Lower middle income	3	2	0	1	0				
Middle income	9	2	4	2	1				
High income	2	0	2	0	0				
Dietary Pattern						6	0.3766	6.4315	NS
Vegetarian diet	4	1	2	0	1				
Non-vegetarian diet	5	2	1	2	0				
Mixed diet	6	1	4	1	0				
Any Bad Habits						6	0.1324	9.82143	NS
Not at all	5	0	3	2	0				
Smoking	0	0	0	0	0				
Drinking alcohol	0	0	0	0	0				
Tobacco chewing	6	2	4	0	0				
Excessive intake of tea, coffee	4	2	0	1	1				
Marital status						3	0.457	2.63736	NS
Married	13	4	5	3	1				
Unmarried	0	0	0	0	0				
Widow	2	0	2	0	0				
How long did you breast fed to your child?						12	0.6784	9.28571	NS
Not Breastfed	3	1	1	1	0				
1-6 months	6	2	2	2	0				
7-12 months	3	1	1	0	1				
13-18 months	2	0	2	0	0				
19 and above months	1	0	1	0	0				

Table No 8 depicts that in experimental group there has been a no significant association between age, educational qualification, occupation, socioeconomic status, dietary pattern, marital status, any bad habits, how long did you breast fed to your child? did not demonstrate the association between the blood calcium level of the postmenopausal women. Therefore, the null hypothesis accepts that the blood calcium level and chosen demographic variables has no-significantly associated. (Table no 8)

Table no 9: Association of pre-test BMD level with selected demographic variables.(Control Group)

Demographic variables	No of samples	BMD level			DF	P value	χ^2 value	Result
		A	B	C				
Age in years					4	0.06423	8.87778	NS
45-49 years	4	1	3	0				
50-54 years	6	0	1	5				
55 years & above	5	0	1	4				
Educational Status					6	0.2102	8.400	NS
Illiterate	2	1	1	0				
Primary ed.	4	0	1	3				
Secondary ed.	5	0	2	3				
College	4	0	1	3				
Occupational Status					4	0.06751	8.75556	NS
Labour worker	3	0	2	1				
Office worker	2	1	0	1				
Housewife	10	0	3	7				
Retired	0	0	0	0				
Socioeconomic status					4	0.2278	5.68889	NS
Low income	3	0	2	1				
Lower middle income	4	1	0	3				
Middle income	8	0	3	5				
High income	0	0	0	0				
Dietary Pattern					4	0.1182	7.35556	NS
Vegetarian diet	3	0	1	2				
Non-vegetarian diet	2	1	0	1				
Mixed diet	10	2	4	6				
Any Bad Habits					4	0.7095	2.14286	NS
Not at all	4	0	1	3				
Smoking	0	0	0	0				
Drinking alcohol	0	0	0	0				
Tobacco chewing	7	1	3	3				
Excessive intake of tea, coffee	4	0	1	3				
Marital status					2	0.09196	4.77273	NS
Married	11	0	5	6				
Unmarried	0	0	0	0				

Widow	4	1	0	3				
How long did you breast fed to your child?					8	0.7971	4.6222	NS
Not Breastfed	1	0	0	1				
1-6 months	3	0	1	2				
7-12 months	5	1	2	2				
13-18 months	2	0	0	2				
19 and above months	4	0	2	2				

Table No 9 depicts that in control group there has been a significant association between Marital status with the BMD level of postmenopausal women and age, educational qualification, occupation, socioeconomic status, dietary pattern, any bad habits, how long did you breast fed to your child? did not demonstrate the association between the BMD level of the postmenopausal women. Therefore, the null is rejected and the alternative hypothesis accepts that the BMD level and chosen demographic variables are significantly associated. (Table no 9)

Table no 10: Association of pre-test BMD level with selected demographic variables. (Experimental Group)

Demographic variables	No of samples	BMD level			DF	P value	χ^2 value	Result
		A	B	C				
Age in years					4	0.2397	5.5	NS
45-49 years	3	1	1	1				
50-54 years	6	1	2	3				
55 years & above	6	0	0	6				
Educational Status					6	0.1846	8.8	NS
Illiterate	1	0	0	1				
Primary ed.	3	1	2	0				
Secondary ed.	7	1	1	5				
College	4	0	0	4				
Occupational Status					4	0.3796	4.2	NS
Labour worker	4	0	2	2				
Office worker	5	1	1	3				
Housewife	6	1	0	5				
Retired	0	0	0	0				
Socioeconomic status					6	0.2223	8.22	NS
Low income	1	1	0	0				
Lower middle income	3	0	1	2				
Middle income	9	1	2	6				
High income	2	0	0	2				
Dietary Pattern					4	0.255	5.325	NS
Vegetarian diet	4	1	1	2				
Non-vegetarian diet	5	1	2	2				
Mixed diet	6	0	0	6				
Any Bad Habits					4	0.03719	10.2	NS
Not at all	5	0	3	2				

Smoking	0	0	0	0				
Drinking alcohol	0	0	0	0				
Tobacco chewing	6	2	0	4				
Excessive intake of tea, coffee	4	0	0	4				
Marital status					2	0.005531	15	S
Married	13	0	3	10				
Unmarried	0	0	0	0				
Widow	2	2	0	0				
How long did you breast fed to your child?					8	0.08177	14	NS
Not Breastfed	3	0	1	2				
1-6 months	6	0	1	5				
7-12 months	3	0	0	3				
13-18 months	2	1	1	0				
19 and above months	1	1	0	0				

Table No 10 depicts that in experimental group there has been a significant association between Marital status with the BMD level of postmenopausal women and age, educational status, occupation, socioeconomic status, dietary pattern, any bad habits, how long did you breast fed to your child? did not demonstrate the association between the BMD level of the postmenopausal women. Therefore, the null is rejected and the alternative hypothesis accepts that the BMD level and chosen demographic variables are significantly associated. (Table no 10)

DISCUSSION

The study on the effect of an exercise program and calcium supplements on low bone mass among young Indian women was carried out by Shweta Shenoy, Neha Dhawan, and Jaspal Singh Sandhu. When we measured the SOS T-score of 104 participants, we discovered that 60.57 percent had low bone density and the remaining 39.43 percent had normal bone mass, according to the findings of a comparison study. After three months, the exercise group demonstrated significant improvement in the distal radius SOS T-score ($t=5.10$, $P<0.001$) and the midshaft tibia ($t=3.71$, $P<0.001$), followed by improvement in the calcium group at the distal radius ($t=6.28$, $P<0.001$) and the midshaft tibia ($t=2.33$, $P<0.05$), as compared to the control group, which demonstrated only a marginal improvement.[12]

The study, conducted by Yannis D, Ioanna P, Georgios T, Anonios G, and Georgios P, on the association of physical activity and calcium intake with bone mass measured by quantitative ultrasound, found that SI values were significantly different between premenopausal groups ($p = 0.016$) and between sedentary and systematically active postmenopausal women ($p = 0.039$) in the study. The QUS T-scores in

systematically active premenopausal women with a daily calcium intake greater than >800 mg/day were significantly higher than those in all other activity groups ($p < 0.05$), regardless of the amount of calcium they consumed.[13]

The authors of Umani SW, et al 2020 sought to summarise the relevant literature on the potential impact of lycopene on postmenopausal bone loss, which included an overview of bone biology and the pathophysiology of osteoporosis, among other things. They used molecular and clinical evidence to accomplish this goal. Many drugs are used in the treatment of osteoporosis, but some of them have undesirable side effects, so it is important to choose carefully. Plant-based phytochemicals found in fruits and vegetables are a good source of micronutrients for bone health, and they can be found in a wide variety of foods, including grains and legumes. An example of one of these antioxidants is lycopene, which has recently been demonstrated in animal tests to have a preventive effect against bone loss. Lycopene is a carotenoid that exists in nature in both all-trans and cis forms in varying concentrations. It is a carotenoid that is lipid-soluble and can be found in both all-trans and cis forms. When it comes to tomatoes and tomato derivatives, lycopene is found in significant proportions. According to a number of epidemiological research, eating a diet high in lycopene and tomatoes may aid to reduce bone loss in humans in both in vivo and in vitro investigations. The influence of the antioxidant lycopene on the prevention of bone loss in postmenopausal women, on the other hand, has only been studied in a small number of research.[7]

Among the procedures performed as part of the experiment were a survey to assess the participants' health status, an evaluation of bone mineral density (BMD), standard blood tests, and a CLCF1 expression level test. In 2021, Xuan Chen and colleagues will present their findings. Clcf1 expression in peripheral blood mononuclear cells (pbmcs) was shown to be significantly downregulated in postmenopausal women with osteoporosis, according to the findings of this study. The study included 360 postmenopausal women ranging in age from 50 to 80 years old, with the majority being in their 50s. Participants in this study were separated into three groups based on their bone health: those with normal bone health, those with osteopenia, and those with osteoporosis. The normal group consisted of 27 individuals (7.5 percent), osteopenia (45.83 percent), and osteoporosis (168 individuals) were found in the osteopenia and osteoporosis groups (46.67 percent). When compared to the osteoporosis group, the CLCF1 protein levels were significantly greater in the normal and osteopenia groups. More specifically, it was discovered that the level of CLCF1 mRNA was positively associated to the BMD of the whole femur as well as the lumbar spinal column. According to the findings, protein levels are positively associated with the BMD of the lumbar spine, the femoral neck, the greater trochanter, and the Ward's triangle in the lower back. The researchers discovered

that osteoporosis development was connected with both the expression of mRNA and the production of protein in one study. Once bone mineral density (BMD) was taken into account, the connection between CLCF1 protein levels and fracture risk was no longer statistically significant.[8]

It is reported that the study assesses the efficacy and safety of recombinant human parathyroid hormone in conjunction with alendronate in the treatment of postmenopausal osteoporosis by Jing Deng and colleagues. A total of 65 osteoporotic postmenopausal women were recruited for the study, and they were separated into two groups. For the length of the trial, the PTH group received a daily subcutaneous injection of rhpth, whereas the ALN group received ALN orally once a week. lumbar spine (1–4), femoral neck, and total hip BMD, serum calcium, phosphorus, total cholesterol, triglyceride, alkaline phosphatase (ALP), N-terminal propeptide of type I collagen (PINP), and C-telopeptide of type I collagen (CTX), and BMD of the lumbar spine (1–4), femoral neck, and total hip BMD of the lumbar spine (1-4), Preliminary and post-treatment blood levels of vascular endothelial growth factor (VEGF) and platelet-derived growth factor-BB (PDGF-BB) were determined before and after treatment. After analysis, it was discovered that the hormone rhpth (1–34) had a similar effect on lumbar spine BMD (1–4) as alendronate in the treatment of postmenopausal osteoporosis in the lumbar spine. Rhpth (1–34) has a less substantial effect on BMD of the femoral neck or the whole hip than ALN does on these measurements. Furthermore, according to the research, rhpth (1–34) increases BMD of the lumbar spine (1–4), possibly by increasing blood VEGF levels, but decreases BMD of the femoral neck and entire hip, possibly by decreasing serum PDGF-BB levels.[9]

MK Chad and colleagues (2018) published a paper titled This article will provide a complete evaluation of the present state of knowledge in the areas of training optimization and performance development through the use of exercise and nutrition. During the discussion, participants learned how ergogenic aids and dietary supplements are defined in terms of government regulation and oversight, how dietary supplements are legally regulated in the United States, how to evaluate the scientific merit of nutritional supplements, general nutrition strategies to optimise performance and enhance recovery, as well as an overview of current understanding of nutritional approaches to augment skeletal muscle hypertrophy and the potentiation of muscle growth factors. ISSN members and anyone else who is interested in sports nutrition can benefit from this revised study, which includes information that can be used in instructional, research, and practical settings to evaluate the efficacy and safety of several popular sports nutrition products and their constituents.[10]

Researchers discovered the f risk factors, which have now been recognized by the World Health Organization and various other international organizations as a credible method of determining fracture vulnerability and vulnerability to fracture. Following up on the findings of Filippo M, et al. published in 2021, an Abayesian network meta-analysis was carried out to assess the influence of current anti-osteoporosis medications on bone mineral density. This systematic review and network meta-analysis, which was published in the Journal of the American Medical Association, was carried out using the Prisma extension statement for reporting systematic reviews, including network meta-analyses of health-care treatments, as well as the Prisma extension statement for reporting systematic reviews of health-care treatments. The information was gathered from 64 RCTS, which represented a total of 82,732 individuals. A total of 29.7 19.6 months was spent on average following up with the clientele. Higher BMD in the spine was observed with the administration of denosumab, pamidronate, and zoledronate. Higher BMD in the hip was observed following the administration of denosumab, alendronate, and ibandronate. Increased femur bone mineral density was observed with the administration of denosumab, alendronate, and ibandronate (BMD). Individuals suffering from postmenopausal osteoporosis benefit from the use of denosumab, which enhances the bone mineral density (BMD) of the spine. Denosumab had the greatest effect on bone mineral density (BMD) in the hip and femur when compared to other drugs.[11]

CONCLUSION

The outcomes of this study support the notion that physical activity and calcium supplements have a beneficial influence on the development of postmenopausal osteoporosis.

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