



VITAMIN D, A PREVENTIVE FACTOR OF OSTEOARTHRITIS

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ABSTRACT

Deficiency of Vitamin D is the most common symptom seen in Osteoarthritis patients. In our study, we tried to investigate the effect of Vitamin D on Osteoarthritis patients. Our study is conducted on 100 OA patients with low levels of serum 25(OH) D (< 0.001). After supplementing vitamin D sachets for two months, there is a significant effect on Osteoarthritis patients. VAS score and WOMAC score significant as the muscle pain and stiffness improves in OA patients. Knee OA patients demonstrated significant improvement grip strength and physical performance measurements after vitamin D2 supplementation ($p < 0.05$). Finally the quality of life improved in OA patients.

Keywords: vitamin D2 supplementation; osteoarthritis.

INTRODUCTION:

Pain and disability in the musculoskeletal leads to most important disorder called osteoarthritis. It is mainly due to degradation of articular changes like formation of osteophytes, narrowing the space between joints. Changes in subchondral bones and synovial inflammation [1]. Osteoarthritis leads to pain in the joints, knee muscle wasting and reduced motion which finally leads to pain and disability in later life [2]. In healthy individuals, risk factors like deficiency in vitamin D leads to structural changes in knee of the individual. Adequate Vitamin D levels are required to avoid future complications. Vitamin D is a hormone which is synthesized endogenously by the skin with the help of sunlight. In the age group of 65years, the dermal capacity to synthesized vit D is about only 25% and it is predicted that more than 25% is seen in the age group of 25-30 years when exposed to sunlight [3,4]. This is due to decrease in the mass of epidermis with aging which causes reduction in 7dehydrocholesterol in skin. Wearing of more concealing clothes, use of more amount of sunscreen lotion and less

Exposures to sunlight due to less physical activity are some other indirect factors which reduce exposure to sunlight in older people [5-7]. People with more age and also in individuals suffering with osteoarthritis (OA), vitamin D supplementation plays an important role as it increases the concentration of serum 25hydroxy cholesterol and also the absorption of calcium. Malabsorption of calcium is due to deficiency of vit D in older people. Some studies have shown that Vit D supplementation reduces OA and its complications.

In our study, we tried to investigate the role of Vit D on muscle strength and also reduce the complications of OA.

AIM OF THE STUDY

The aim of our study is to evaluate the role of Vit D in OA patients.

MATERIALS AND METHODS

Our study is a cohort study which is conducted in the outpatient clinic of the Department of Orthopaedics at

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Sree Balaji Medical College and Hospital, Chrompet, Chennai during the period of 2 months I.e; March – April 2021. 100 participants who are suffering with OA are taken in our study.

Inclusion criteria

Participants having symptomatic knee OA and low Vit D status

Exclusion criteria

Patients having Neurological conditions, inability to perform physical activity, history of knee surgery and any other inflammatory arthritis are not included in our study. Out of 100 participants, 18 patients are excluded due to lost in follow up and 82 participants are analysed. Study protocol was approved by institutional Review Board of Faculty of Medicine and written informed consent was obtained from all the participants prior to the participation of the study.

60000 IU units of vitamin D taken once a week for eight weeks as it is necessary to increase the levels of serum 25(OH) cholecalciferol to about 30 ng/ml in adults. Each subject was asked to take Vitamin D sachet mixed in one cup of milk once a week till eight weeks and then evaluated Vit D level. All participants are evaluated for knee pain [using instruments WOMAC and VAS. These are the](#) two scores which we can able to appreciate the severity of pain. Visual analogue score is based on 0-10 point scale with a high score indicating higher level of pain. 0 indicates no pain, 10 indicates severe pain. Based on this, pain can be assessed.

WOMAC score average of three sub scales i.e, pain, stiffness and physical function.Higher WOMAC score indicates worse pin, more stiffness and increased functional limitations. Height, weight, and waist circumference were determined using standard measurement techniques.BMI was calculated by using weight(kg) by the square of height. Venous blood was collected and centrifuged to evaluate calcium, phosphorous by using auto analyser. 25hydroxy cholecalciferol assessed by chemiluminescent immunoassay method and PTH was determined by electro chemiluminescence method.

Vitamin D deficiency was defined as less than 20 ng/ml, Vitamin D insufficiency as 20-30 ng/ml whereas more than 30 ng/ml considered as Vit D sufficiency.

STATISTICAL ANALYSIS

Data was analysed by using SPSS Version. Data was summarised as Mean Std deviation. As P value is less than 0.05, result was considered as statistically significant.

RESULTS

A total of 82 participants with mean age around 66.31±2.55 years are included in our study. WOMAC score and VAS score was conducted in all participants where as VAS score decreased significantly after supplementation of Vitamin D.

Out of 82 participants, 61 participants had vitamin D deficiency whereas 21 participants had Vitamin D insufficiency. After Vitamin D supplementation for 2 months, there was statistically significant increase in mean serum 25(OH) cholecalciferol.

Demographic data before and after vitamin D2 supplementation in two months.

	Baseline	2 months	Mean Difference	p-Value
Age years	66.31 ± 2.55	66.31 ± 2.55		
Waist circumference (cm)	87.87 ± 0.73	83.12±0.72	-0.05	0.75
Weight (kg)	60.38 ± 0.59	61.70 ± 0.18	-0.68	0.02

VAS and WOMAC score before and after Vitamin B12 supplementation

	Baseline	2 months	Mean Difference	p-Value
VAS (0–10)	3.946 ± 0.07	3.04 ± 0.07	-0.51	0.002
WOMAC Pain (0–10)	2.45 ± 0.15	2.59 ± 0.15	0.14	0.33
Stiffness (0–10)	2.56 ± 0.18	2.26 ± 0.16	-0.29	0.08

VAS score and WOMAC score shows that there is a difference after the supplementation of Vitamin D. We could have got significant results if our study is for long time. Due to shorter duration, we have less significant results.

Biochemical markers before and after Vitamin B12 supplementation

	Baseline	2 months	Mean Difference	p-Value
25(OH)D (ng/mL)	19.73 ± 0.16	30.14 ± 0.29	10.01	<0.001
Calcium (mg/dL)	8.05 ± 0.03	9.34 ± 0.04	0.09	0.03
Phosphorus (mg/dL)	4.62 ± 0.01	4.69 ± 0.01	0.06	0.10

DISCUSSION

In our cohort study, it clearly showed that vitamin D supplementation improves muscle strength and also physical activity in OA patients. By using VAS Score, it clearly shows that pain is reduced and quality of the life improved after supplementation of Vit D. Out of 82 patients, 67 participants improved Vit D levels and remaining 25 had still Vit D deficiency. Our participants had Vit D sachets orally once in a week and also exposed to morning sunlight daily.

Supplementation of Vit D affects both calcium and PTH. Serum calcium level increases after vitamin D supplementation. This is similar to the study of Pacharee Manoy who says 3 of the cases had mild hypercalcemia whereas Pietra's et al reported that there is no toxicity with Vit D supplementation and normal levels of calcium is seen after treatment with Vitamin D [8]. In our patients, there is a reduction in weight in most of the participants due to change in their lifestyle and also physical activity. This is also in correlation with the study of pietras et al which is also similar with the study of Lagari et al who reported higher fat mass with lower levels of serum Vitamin D [9]. This says higher doses and longer treatment is required to treat OA patients.

Our patients are reported with the reduction in pain in VAS score by Vit D supplementation. This is

similar to the study of Sanghi et al who says WOMAC and VAS decreased significantly after vitamin D supplementation [10]. This is in contrast with other studies saying that no reduction in pain, no volume loss of cartilage with supplementation [11,12]. Our study has several limitations like sample size, shorted duration and also no control group. This may be one of the reason for less significant results.

In conclusion, our results says that vitamin D supplementation improves physical activity and quality of life. Based on our findings, we can say Vit D is very important in order to avoid OA which has poor physical activity.

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Conflict Of Interest

The authors declare no conflict of interest.

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