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Vitamin D level among patients with non specific musculoskeletal pain attending tertiary care hospital in Tamil Nadu

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Abstract
Introduction: In adult sequelae of vitamin D deficiency involve the musculoskeletal system leading to proximal muscle weakness, bone pain, and osteomalacia which is largely unrecognized by both physicians and patients. Objective: determining the prevalence of vitamin D (<20ng/dl) deficiency among patients attending the orthopedic outpatient department in tertiary care hospital with complaints of non-specific symptoms of body pain and low back pain without any other co morbid condition. **Methodology:** A cross sectional study was conducted among 281 adult patients above the age 20 years attending orthopedic department of a tertiary care hospital with non-specific complaints of general body pain/back pain/tiredness/weakness on working and walking with no other symptoms such as injury, fever, GIT problems or known medical illness and no relief of the pain symptoms with routine treatments with analgesics and rest and physiotherapy were screened for Vitamin D levels when other routine test such as complete blood count, ESR, BI, sugar, RFT were normal.
Results: out of 281 patients tested, 201 (71.5%) of the study population had below normal vitamin D of them 40.2% had deficiency, 31.3% had insufficiency and 28.5 had sufficient vitamin D level. The proportion of patients Vitamin D deficiency and insufficiency was higher in the age group 20-39 compared to other age group and it was found statically significant (p=0.01). Conclusion: Importance has to be given to adequate vitamin D supplementation in the patents vitamin D deficiency

Keywords: Vitamin D, non-specific pain, low back pain

1. Introduction
Serum 25OHD is the most reliable indicator of the vitamin D status of an individual. Serum 25OHD levels less than 20 ng/mL is considered as “deficiency”, the levels between 20 ng/ml and 30 ng/mL considered as insufficiency and levels greater than 30 ng/mL is considered as “normal”. Vitamin D deficiency is a highly prevalent condition in the developed world and in the populous regions of Asia, the Middle East and India with a low serum 25(OH) D especially in women. [1] The skeletal and extra skeletal health benefits of vitamin D and the high prevalence of inadequate levels of vitamin D have been largely unrecognized by both physicians and patients [2] It has been reported inadequate or low levels of 25- Hydroxyvitamin D (25-OH D) among healthy children, young adult and middle and elderly adults worldwide. In adult sequelae of vitamin D deficiency involve the musculoskeletal system leading to proximal muscle weakness, bone pain, and osteomalacia [3] The changes in the lifestyle of the population in terms of socio-cultural practices not facilitating adequate sun exposure and in addition the food consumed are rarely fortified with vitamin D contributing to high prevalence of vitamin D in Indian general population. [4] The present study was under taken with the objective of determining the prevalence of vitamin D (<20ng/dl) deficiency among patients attending the orthopedic outpatient department in tertiary care hospital with complaints of non-specific symptoms of body pain and low back pain without any other co morbid condition.

2. Methodology
A cross sectional study was conducted among 281 adult patients above the age 20 years attending orthopedic department of a tertiary care hospital with non-specific complaints of general

body pain/back pain/tiredness/weakness on working and walking with no other symptoms such as injury, fever, GIT problems or known medical illness and no relief of the Pain screened for Vitamin D levels when other routine test such as complete blood count, ESR, BI, sugar, RFT were normal. The vitamin levels were tested in The Clinical Laboratory Improvement Amendments (CLIA) certified lab and Vitamin D Total test is analyzed on Siemens ADVIA Centaur, standardized against ID-LC/MS/MS, as per Vitamin D Standardization Program (VDSP). Based on the results the patients were classified into deficiency with Vitamin D level (25-OH VITAMIN D) of <20 ng/ml, insufficiency with the levels of 20-30 ng/ml, sufficiency with the level of >30 ng/ml and toxicity with level of >100 ng/ml according to recent consensus. [4, 5, 6] The sample size was worked out based on the studies with prevalence of vitamin D deficiency in Indians varies between 70-100% in different age group [7] prevalence of vitamin D deficiency of 75%, was taken to calculate the required sample within 5% of true prevalence with 95% confidence and inclusion of 20% non-response the total sample sized required was 244 patients.

3. Results

About 281 patients above age of 20 years who have attended orthopedic outpatient department with complaints of bone pain and myalgia with no joint pain were included in the study and screened for the level of vitamin D. In the population studied 100(35.6%) were males and 181(64.4%) were females. The mean age of the participants was 46.15(± 14.72) years and for male it was 47.06(±15.27) years and females it was 45.65 (±14.43) years. Majority of them 45.2% (127/281) were in the age group above 40-59 years followed by 35.2% (99/281) 20-39 years. Mean value of Vitamin D among males was 24.19 ng/mL [95% CI = 22.23ng/mL - 26.16ng/mL] and in females the mean value is 24.147 ng/mL [95% CI =21.95 ng/mL - 26.35 ng/mL]. Figure 1 shows the mean value Vitamin D different age group, in the age group of 20-39 years it was 20.14 ng/mL [95% CI =18.16ng/mL -22.11 ng/mL]. In the age group of 40-59 years the mean vale was 26.81 ng/mL [95% CI = 24.15 ng/mL -29.47 ng/mL]. In age group above 60 years it was 25.30[95% CI=21.78 ng/mL -28.83 ng/mL].

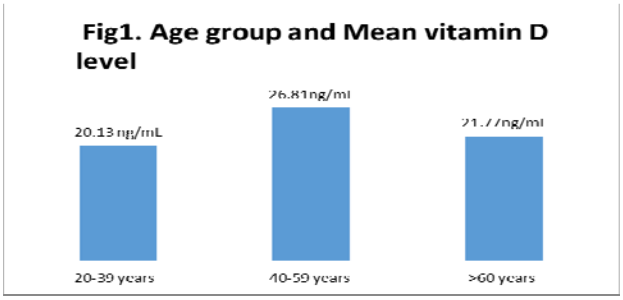

Table 1: Age and sex distribution of the study participants

Age distribution	Male Number (%)	Female Number (%)	Total Number (%)
20-39 years	34 (34.0%)	65 (35.9%)	99 (35.2%)
40-59 years	42 (42.0%)	85 (47.0%)	127 (45.2%)
>60 years	24 (24.0%)	31 (17.1%)	55 (19.6%)
Total	100 (35.6%)	181 (64.4%)	281 (100.0%)

Table 2. Depicts the vitamin D level of the 281 patients tested, 201 (71.5%) of the study population had below normal vitamin D of them 40.2% (113/281) had deficiency, 31.3% (88/281) had insufficiency and 28.5 80/281) had sufficient vitamin D level. About 76% among men and 69% in women had below normal vitamin D level of whom about 46% of the male and 37% of the females had deficiency of vitamin D but there was no statistical significant difference in the vitamin D level between male and females patients.

Table 2: Sex distribution and vitamin D level

Level of vitamin D (ng/mL)	Male	Female	Total	X^2 & p value
<20	46 (46.0%)	67 (37.0%)	113 (40.2%)	$X^2 = 2.47$ df = 2 p = 0.291
20-30	30 (30.0%)	58 (32.0%)	88 (31.3%)	
>30	24 (24.0%)	56 (30.9%)	80 (28.5%)	
Total	100 (35.6%)	181(64.4%)	281(100.0%)	

Table 3 shows the age distribution and vitamin D levels among the patients attending the orthopedic outpatient department. The proportion of patients Vitamin D deficiency and insufficiency was higher in the age group 20-39 compared to other age group and it was found statically significant (p=0.01).

Table 3: Age distribution and vitamin D level

Age distribution	20-39 years	40-59 years	60 years	Total	X^2 & p value
Deficiency	49 (49.5%)	46 (36.2%)	18 (32.7%)	113 (40.2%)	$X^2 = 12.8$ df = 4 p= 0.012
Insufficient	34 (34.3%)	39 (30.7%)	15 (27.3%)	88 (31.3%)	
Sufficient	16 (16.2%)	42 (33.1%)	22 (40.0%)	80 (28.5%)	
Total	99 (35.2%)	127 (45.2%)	55 (19.6%)	281 (100.0%)	

4. Discussion

In the present study the prevalence of Vitamin D deficiency among adult patients attending orthopedic department of a tertiary care hospital with non-specific complaints of general body pain/back pain/tiredness/weakness on working was 40.2% with 46% among male and 37% among females. In contrast higher proportion of reported by other investigators Babita Ghai *et al.* [8] reported 66% of the men and 73% of the women found to be deficient levels of Vitamin D. Halim Yilmaz *et al.* [9] reported 79.8% of the premenopausal women showed vitamin deficiency. *Chittari V Harinarayan et al.* [6] *reported* 44% of men and 70% of women in rural areas 62% of men and 75% women in urban areas had deficient vitamin D and reported 25 (OH) D levels in South Indian subjects are relatively higher compared with the subjects from North India In the present study the mean values of Vitamin D was insufficient between 20-30 ng/ml across the age and sex a similar findings reported by Natasja M. [1] and Ritu *et al.* [4] of low serum level of vitamin D was noted specially among women. Khaled Al-Jarallah *et al.* [10] reported the mean values

of vitamin D was insufficient for both symptomatic with musculoskeletal pain and control without musculoskeletal pain in his study in Kuwait. David Arvold *et al.* [11] reported the mean values of 25-(OH) D was significantly lower with patients complaining of non-specific skeletal pain compared to controls with positive association between defiance and skeletal pain like leg pain, arthralgia and widespread pain with greater positive associations in women compared with men. Babita Ghai *et al.* [8] reported the mean vitamin level 18.4 ng/mL among patients with chronic low back pain with mean values of 17.3 ng/mL for men and 19.6 ng/mL for women.

5. Conclusion

In conclusion the mean value of the study population with musculoskeletal symptoms was lower than the optimal level of 30 ng/mL and several other studies had also proved that the level of vitamin D was low among symptomatic patients with musculoskeletal pain. Importance has to be given to adequate vitamin D supplementation in the patents vitamin D deficiency.

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