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Assessment of Vitamin D status in patients attending tertiary care hospital in Northern Andhra Pradesh with musculoskeletal pain

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Introduction: 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. 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 comorbid condition is the present study. **Methodology:** A cross-sectional study was conducted among 468 adult patients above the age 20 years attending the 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 tests such as complete blood count, ESR, BI, sugar, RFT were normal. **Results:** out of 468 patients tested, 386 (82.4%) of the study population had below-normal vitamin D, of the 49.1% had deficiency, 33.3% had insufficiency and 17.5% had sufficient vitamin D level. The proportion of patients Vitamin D deficiency is higher in the age group 30-59 whereas insufficiency was higher in the age group 20-39 compared to other age groups and it was found statically significant. **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, Myalgia

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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 extraskeletal 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 the high prevalence of vitamin D in the Indian general population [4,5,6].

The present study was undertaken 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 nonspecific symptoms of body pain and low back pain without any other comorbid condition.

Methodology

Study Setting and Type of Study: Orthopedic Department of a Tertiary Care Hospital, Cross-Sectional Study.

Duration of the Study and Sample Size: January 2017 to January 2018, 468 Adult patients above the age of 20 years. The sample size was worked out based on the studies with the prevalence of vitamin D deficiency in Indians varies between 70-100% in different age groups [7].

Inclusion Criteria: Adult patients above the age of 20 years with non-specific complaints of general body pain/back pain/tiredness/weakness on working and walking as well as with no joint pains are Included in the study.

Exclusion Criteria: Adult patients above the age of 20 years with symptoms such as injury, fever, GIT problems, or known medical illness and Patients below the age of 20 years are excluded from the study.

Data Collection and Procedure: Patients are screened for Vitamin D levels when other routine tests 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 the level of >100 ng/ml according to recent consensus [4,5,6].

Statistical analysis: The recorded data was compiled and entered into a spreadsheet computer program (Microsoft Excel 2007) and then exported to the data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means, and standard deviations.

Results

About 468 patients above the 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 186 (39.8%) were males and 282 (60.2%) were females. The mean age of the participants was 48.28 (± 12.47) years and for male, it was 49.86 (±14.72) years and females it was 44.36 (±15.17) years. The majority of them i.e., 44.4% were in the age group above 40-59 years followed by 32.9% in 20-39 years age group. The mean value of Vitamin D among males was 25.14 ng/mL and in females, the mean value is 24.86 ng/mL.

Table 1: Age and sex distribution of the study participants.

Age Distribution	Male (%)	Female (%)	Total (%)
20-39	64 (34.4)	90 (31.9)	154 (32.9)
40-59	80 (43)	128 (45.4)	208 (44.4)
60 and Above	42 (22.6)	64 (22.7)	106 (22.6)

Total	186 (100)	282 (100)	468 (100)

Table 2. Depicts the vitamin D level of the 468 patients tested, 386 (82.4%) of the study population had below-normal vitamin D, of the 49.1% had deficiency, 33.3% had insufficiency and 17.5% had sufficient vitamin D level.

Table-2: Sex distribution and vitamin D level.

Level of Vitamin D (ng/mL)	Male (%)	Female (%)	Total (%)
<20	82 (44)	148 (52.5)	230 (49.1)
20-30	72 (38.7)	84 (29.8)	156 (33.3)
>30	32 (17.2)	50 (17.7)	82 (17.5)
Total	186 (100)	282 (100)	468 (100)

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 is higher in the 30-49 group whereas insufficiency was higher in the age group 20-39 compared to other age groups and it was found statically significant.

Table-3: Age distribution and vitamin D level.

Age Distribution/ Vit D Level	20-39 Years (%)	40-59 Years (%)	60 and Above (%)	Total (%)
Deficiency	70 (45.5)	116 (55.7)	44 (41.5)	230 (49.1)
Insufficient	54 (35)	64 (30.7)	38 (35.8)	156 (33.3)
Sufficient	30 (19.5)	28 (13.4)	24 (22.6)	82 (17.5)
Total	154 (32.9)	208 (44.4)	106 (22.6)	468 (100)

Discussion

In the present study the prevalence of Vitamin D deficiency among adult patients attending the orthopedic department of a tertiary care hospital with non-specific complaints of general body pain/back pain/tiredness/weakness on working was 41.9% with 44% among males and 52.5% among females but other investigators such as Babita Ghai et al. [8] reported 66% of the men and 73% of the women found to be deficient levels of Vitamin D.

HalimYilmaz 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 and 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 were insufficient between 20-30 ng/ml across the age and sex similar findings reported by Natasja M. [1] and Ritu et al. [4] of low serum level of vitamin D was noted especially 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 a 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.

Limitations

Keeping the limitations in view, the present study was planned and executed effectively to obtain results which are not affected by seasonal variation, diet, and exposure to sunlight or other confounders because population recruited for this study were selected from the same geographic territory who had unique racial and cultural backgrounds, with similar diet and sunlight exposure. Therefore, more studies should be done in different geographical areas. It would enable us to correlate these studies thereby leading to a more valid conclusion.

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.

What does the study add to the existing knowledge

In the present study, it is proven that adequate vitamin D3 Supplementation in patients of musculoskeletal pain is highly important in the

Management. Hence, Empirical supplementation of Vitamin D3 is advisable in all patients of musculoskeletal pain.

Author's contribution

Dr. V. Naveen Kumar formulated the aims and objectives along with study design and helped in data collection and analysis.

Dr. Siva Ram Raju contributed to the manuscript.

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