Original Research Article

Prevalance of Vitamin D deficiency among adolescent, young adult and middle aged adult population of Jammu region along with gender differences

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Abstract

Background: Vitamin D deficiency is prevalent among across all the age groups with significant variation with gender differences. Now a days, this is highly concerned and investigational topic as the role of vitamin D deficiency has been associated with the high risk of many diseases including osteomalacia, osteoporosis, hip fracture, arthritis, poor general health etc.**Materials and methods:** The study was conducted in the OPD of Department of Orthopedics, GMC Hospital, Jammu from July 2019 to March 2020.The study sample consists of 300 patients divided into three age groups viz adolescent (10-19yrs),young adult(19-35yrs) and middle aged adult(36-55yrs) with [n=100] taken in each age group divided into female [n=50](50%) male[n=50](50%) for comparative analysis.Data was collected with respect to serum 25(OH)D level in all the three groups on age and gender parameter and sent for statistical analysis.**Results:** In adolescent age group 64% falls in the mean range of 14-19ng/ml, in young adult 74% falls in the mean range of 13-18ng/ml, in middle aged adult 79% falls in the mean range of 13-16ng/ml with the predominance in female subjects in all categories.**Conclusion**:High prevalence of Vitamin D deficiency in population of Jammu region with predominance in female and advancing age subjects.

Keywords: Vitamin D deficiency, serum 25(OH) Dlevel, adolescent, young adult, middle aged adult.

Introduction

Vitamin D is a fat-soluble prohormone, responsible for the absorption of calcium from the gut[1].There are two forms of vitamin D Vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol)[2].It is also described as “the Sun Vitamin” as 50 to 90% of vitamin D is produced by sunshine exposure of skin and other we get from diet. The important sources of vitamin D are egg yolk, fatty fish, fortified dairy products and beef liver[3]. Vitamin D islargely responsible for the growth and development of body. in addition to bone metabolism, vitamin D has many roles in the body, including cell growth modulation, neuromuscular and immune function, and inflammation reduction[4].Vitamin D deficiency simply means that you are not getting enough vitamin D to stay healthy. Vitamin D deficiency is a worldwide epidemic and yet, it is a problem that is largely unknown by majority of population[5] widespread prevalence in all age groups including toddlers, school children, men, women, elderly, pregnant women, and their neonates in both rural and urban areas has been documented[6].During childhood, this deficiency can cause growth retardation and skeletal deformities, while in adults, muscle weakness and fractures may ensue [7,8]. One of the major reasons for the worldwide spread of this nutritional disorder has been lack of awareness about the importance of vitamin D, its health benefits, and prevention of deficient states across populations [9,10].

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Other specific reasons for Vitamin D deficiency are inadequate exposure to sunlight; malabsorption; accelerated catabolism from certain medications; and, in infants, the minimal amount of vitamin D found in breast milk. Vitamin D plays a vital role in human health[11]. Low levels of vitamin D can drastically impact a person's physical and mental well-being [12,13].Vitamin D deficiency has been linked to various health problems, including cognitive decline, depression, osteoporosis, cardiovascular disease, hypertension, diabetes, and cancer[13,14]. As persons age, the risk for vitamin D deficiency significantly increases. The percent of older adults suffering from vitamin D deficiency ranges from 20 to 100% in the United States (US)[15].Risk factors contributing to vitamin D deficiency in older adults include reduced nutritional intake of vitamin D, increasing adiposity, decreased cutaneous synthesis of vitamin D, and less time spent outdoors[12,16]. The number of individuals aged 65 and older is expected to more than double from 2012 to 2060[17]. This paper highlights the relationship of vitamin D deficiency with gender and age differences and is based on adolescent, young adult and middle aged adult population of Jammu region.

Material and methods

The study was conducted in the OPD of Department of Orthopedics, GMC Hospital, Jammu from July 2019 to March 2020.The study sample consists of 300 subjectsin total [n=300].The sample is studied under three age groups viz adolescent (10-19yrs), young adult(19-35yrs)and middle aged adult(36-55yrs).Each of the subgroup comprises of 100 subjects [n=100] which were again divided into 50 females [n=50](50%) and 50 male[n=50](50%) in all subgroups for comparative analysis on gender basis.For analysis of Vitamin D level two forms of vitamin D can be measured in the blood, 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D. The 25-hydroxyvitamin D is the major form found in the blood and is the

relatively inactive precursor to the active hormone, 1,25-dihydroxyvitamin D. Because of its long half-life and higher concentration, 25-hydroxyvitamin D is commonly measured to assess and monitor vitamin D status in individuals. So while assessing vitamin D status, serum 25(OH)D was taken as the measurement of choice. Vitamin D is measured using one of two measurements: nanomoles per litre (nmol/l) or nanograms per millilitre (ng/ml).

Table 1 : **Range of Vitamin D levels**

Level	Blood Test Result
Low	30nmol/l or12ng/ml or below
Adequate	50nmol/l or20ng/ml or below
High	125nmol/l or50ng/ml or below

Data was collected with respect to serum 25(OH)D level in all the three sub groups of Jammu region and sent for statistical analysis on age and gender parameter and results were obtained.

Observation and result

Case1:Statistical analysis revealed that the in adolescent age group (10-19yrs) with n=100 64%(n=64) of the subjects have Vitamin D level in the category of low level i.e30 nmol/l or 12 ng/ml or below and 36%(n=36) of the subjects have Vitamin D level in the category of adequate leveli.e50 nmol/l or 20 ng/ml or above. It is also revealed that out of 64 subjects with low level Vitamin D females were 45 which means females were predominant for Vitamin D deficiency.

Table 2:Data of Adolescent age group(10-19yrs) of Jammu region

Adolescent age group (10-19yrs)	Low Vitamin D level 30 nmol/l or 12 ng/ml or below	Adequate Vitamin D level 50 nmol/l or 20 ng/ml or above	High Vitamin D level 125 nmol/l or 50 ng/ml or above
Male(n=50)	19	21	0
Female(n=50)	45	15	0
Total(n=100)	64	36	0

The statistical analysis on the comparative study between male and female adolescent subjects revealed that there is significant p value of< 0.05

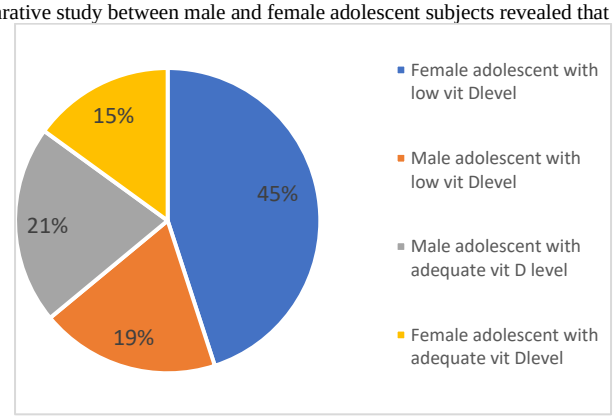

Fig 1:Percentage of Vitamin D level in case1(n=100) with gender difference

Case 2: Statistical analysis revealed that the in young adult age group (19-35yrs) with n=100 74%(n=74) of the subjects have Vitamin D level in the category of low level i.e.,30 nmol/l or 12 ng/ml or below and 26%(n=26) of the subjects have Vitamin D level in the category of adequate level i.e50 nmol/l or 20 ng/ml or above. It is also revealed that out of 74 subjects with low level Vitamin D females were 51 which means females were predominant for Vitamin D deficiency.

Table 3: Data of Young adult age group(19-35yrs)of Jammu region

Young adult age group(19-35yrs)	Low Vitamin D level 30 nmol/l or 12 ng/ml or below	Adequate Vitamin D level 50 nmol/l or 20 ng/ml or above	High Vitamin D level 125 nmol/l or 50 ng/ml or above
Male(n=50)	23	17	0
Female(n=50)	51	9	0
Total(n=100)	74	26	0

The statistical analysis on the comparative study between male and female Young adult subjects revealed that there is significant p value of< 0.05

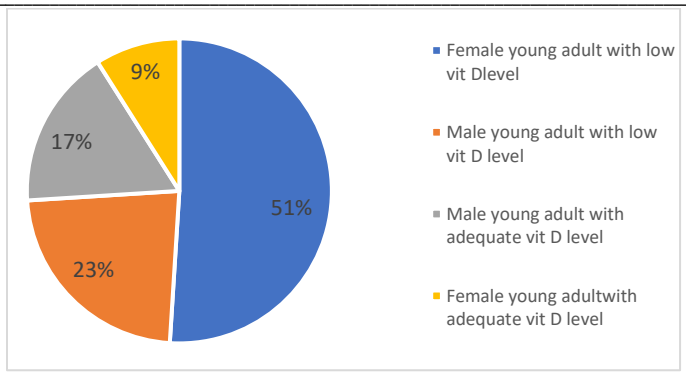

Fig 2:Diagram showing percentage of Vitamin D level in case2(n=100) with gender difference

Case 3: Statistical analysis revealed that the in Middle aged adult group (36-55yrs) with n=100 79%(n=79) of the subjects have Vitamin D level in the category of low level i.e30 nmol/l or 12 ng/ml or below and 21%(n=21) of the subjects have Vitamin D level in the category of adequate level i.e50 nmol/l or 20 ng/ml or above. It is also revealed that out of 79 subjects with low level Vitamin D females were 54 which means females were predominant for Vitamin D deficiency.

Table 4 : Data of Middle Aged adult group(36-55yrs)of Jammu region

Middle Aged adult group(36-55yrs)	Low Vitamin D level 30 nmol/l or 12 ng/ml or below	Adequate Vitamin D level 50 nmol/l or 20 ng/ml or above	High Vitamin D level 125 nmol/l or 50 ng/ml or above
Male(n=50)	25	17	0
Female(n=50)	54	4	0
Total(n=100)	79	21	0

The statistical analysis on the comparative study between male and female Middle aged adult subjects revealed that there is significant p value of< 0.05

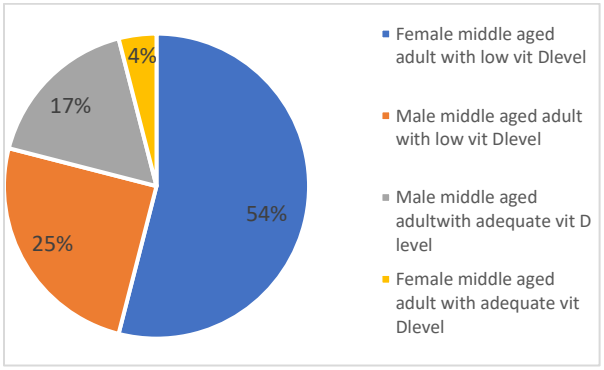

Fig 3:Diagram showing percentage of Vitamin D level in case3(n=100) with gender difference

Table 5 : comparitive analysis of case 1 case2 case3 with respect to vitamin d defficiency in relation with age and gender parameter

Age group	No. of cases taken in study (Male +Female)	Total no. of cases identified with low vitamin D level (out of 100)	Total no. of females identified with low vitamin D level (out of 50)	Total no. of males identified with low vitamin D level (out of 50)
Adolescent age group	100	64	18	19
Young adult group	100	74	27	23
Middle aged adult group	100	79	29	25
Total	300	217	74	67

Comparative analysis revealed that middle aged adult group show high prevalence of Vitamin D deficiency among all the three categories viz adolescent, young adult and middle aged adult with the predominance of females in all the three categories.

Discussion

Vitamin D, a prohormone, plays key role in the maintenance of bone mineral homeostasis.Apart from this it is found to portray pleiotropic effects as an anti-inflammatory, antiapoptotic, and antifibrotic agent. Further, it has been shown to play a major role in the regulation of cardiac, renal and immune functions. Vitamin D deficiency has been found to be associated with increased risk for occurrence of diseases such as diabetes, schizophrenia, and malignancies[18-21]..Inthe studies it was revealed that vitamin D deficiency rate increase with age from adolescent to middle aged

group with the predominance of females in jammu region. It was also revealed that vitamin D deficiency is highly related to systemic disorders in elderly population.While doing study it was also revealed that the population with Vitamin D deficiency have problems like chronic pain ,muscle weakness, erectile dysfunction ,respiratory issues which is highly ignored by the population which means intervention is needed to taken at the level of awareness and prevention too.This worldwide pandemic remains generally unrecognized and untreated and ultimately seems to predispose to hypertension, diabetes and the metabolic syndrome, left ventricular hypertrophy, congestive heart failure, and chronic vascular inflammation [22] Epidemiologic studies have also recently linked vitamin D deficiency with increased risk of major adverse CV events[22,23].The treatment line once disease is recognized is initiated with giving of 50,000 IU of vitamin D2 or D3 weekly for a period of 8 to 12 weeks. Once the initial repletion phase is complete, maintenance therapy can be continued in 1 of 3 ways: 1) 50,000 IU vitamin D2 or D3 every 2 weeks; 2) 1,000 to 2,000 IU vitamin D3 daily; and 3) sunlight exposure for 5 to 10 min for Caucasians (longer times required for people with increased skin pigmentation) between the hours of 10 am to 3 pm (spring, summer, and fall) [23,24].

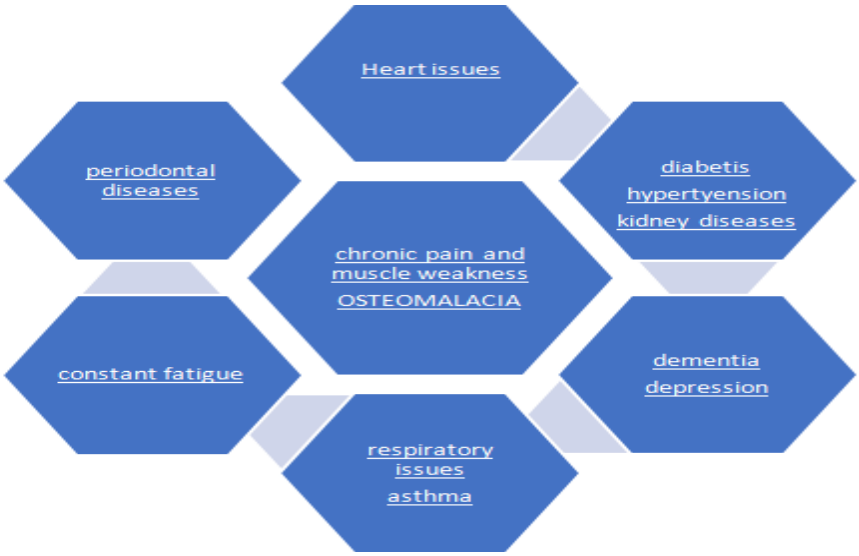

Fig 4: Diagram showing various symptoms of VITAMIN D deficiency

Conclusion

Statistical analysis of the study sample reveals significant relationship of vitamin D deficiency with the age and gender .Study reveals rise in percentage of vitamin D deficiency from adolescent to middle aged population from 64% in adolescent age group ,74% in young adult age group and 79% in middle aged adult group of Jammu region with the predominance of females in all groups. Vitamin D deficiency is like pandemic now having world wide distribution and is prevalent in practically every segment of the population, including children , young adults and elderly and needs to be treated to avoid the deleterious consequences it causes.

Ethical approval and informed consent

Ethical approval was taken from the institutional ethical committee and informed consent was taken from all subjects included in the study.

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