

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: -www.journalijar.com</p> <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</p> <p>Article DOI:10.21474/IJAR01/8482 DOI URL: http://dx.doi.org/10.21474/IJAR01/8482</p>	 <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR) ISSN 2320-5407</p> <p>Journal Homepage: http://www.journalijar.com Journal DOI:10.21474/IJAR01</p>
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RESEARCH ARTICLE

VITAMIN D DEFICIENCY IN ORTHOPEDIC TRAUMA PATIENTS.

Abdul Salam, Zeba Choudhary and Mohd Imran Chouhan.

Manuscript Info

Manuscript History

Received: 02 December 2018

Final Accepted: 04 January 2019

Published: February 2019

Abstract

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Introduction:-

Vitamin D is essential for the regulation of phosphate and calcium in the human body and reduced levels have an impact on bone mineralization process. Vitamin D has been the focus of many scientific literature in recent past owing to various studies demonstrating its association with a wide variety of pathological conditions^{1,2}.

The relationship between hypovitaminosis D and rickets was discovered in the early 20th century; however about a century later, vitamin D deficiency has reemerged as a potential global health concern³.

The role of vitamin D in general health is a topic of increasing interest and importance in the medical community. Controversies exist with regard to the actual prevalence of hypovitaminosis D, however in the third world countries the prevalence of vitamin D deficiency is comparatively higher across all age group⁴.

The positive effect of vitamin D play a vital role in the biology of fracture repair and remodeling⁵. The low vitamin D is associated with a reduction in bone strength and increased fracture risk, a high prevalence of vitamin D deficiency is seen in patients with osteoporosis⁶.

Materials And Methods:-

Serum Vitamin D levels of all the patients who presented to the Emergency with fractures from September 2017 to December 2018 at Govt Distt Hospital Rajouri were measured. Patients in the age group 20 to 80 years with orthopaedic injury were included in the study. Patients on prior supplementation of vitamin D, pregnant and lactating women and patients who presented with sepsis/ septic shock, were excluded from the study. Samples were obtained within a few hours of hospitalization. 25 hydroxyvitamin D3 levels were checked on collected samples using Electro chemiluminescence immune assay system (Roche E- 170 modular system).

As per existing literature and recommendations the subjects were classified as Severely deficient < 10 ng/mL, Moderately deficient 11-20ng/mL, Insufficient 21-32ng/mL, Adequate/ Normal > 32ng/mL⁷.

Statistical analysis

For data entry and analysis Statistical software SPSS 20.0 was used.

Corresponding Author:-Abdul Salam.

Results:-**Table 1:** Vitamin D status in all the patients (n = 130).

Demographic characteristic		Vitamin D deficiency (<32 ng/ml)				Adequate/ Normal (> 32ng/mL)	Total
		Severely deficient (<10 ng/mL)	Moderately deficient (11-20ng/mL)	Insufficient (21-32ng/mL)	Total		
Number of patients		32 (24.61%)	42 (32.30%)	41 (31.53%)	115 (88.46%)	15 (11.53%)	130
Gender	Male	15 (11.53%)	25 (19.23%)	25 (19.23%)	65 (50%)	8 (6.15%)	73 (64.7%)
	Female	17 (13.07%)	17 (13.07%)	16 (12.30%)	50 (38.46%)	7 (5.38%)	57 (35.30%)

Vitamin D deficiency (<32 ng/ml) was present in 115 patients (88.46%); among them, 32 patients (24.61%) had vitamin D level <10 ng/ml, 42 (32.30%) had Moderately deficiency (11-20ng/mL), 41 (31.53%) had vitamin D Insufficiency (21-32ng/mL) and only 15 (11.53%) had sufficient levels of vitamin D (> 32ng/mL). Of all the 130 patients, 73 (64.7%) were males and 57 (35.3%) were females. Among 73 males, only 8 (10.95% of males) patients had sufficient levels of vitamin D (> 32ng/mL) whereas among 57 females, only 7 patients (12.28% of females) had sufficient levels of vitamin D (> 32ng/mL).

Table 2:-Age wise distribution of vitamin D status.

Age (years)	Vitamin D deficiency (<32 ng/ml)				Adequate (>32ng/mL)	Total	Mean age
	severely deficient (< 10 ng/mL)	Moderately deficient (11-20ng/mL)	Insufficient (21-32ng/mL)	Total			
20-40	8 (6.15%)	10 (7.69%)	10 (7.69%)	28 (21.53%)	5 (3.84%)	33 (25.38%)	51.27
41-60	13 (10%)	16 (12.30%)	16 (12.30%)	45 (34.61%)	6 (4.61%)	51 (39.23%)	
61-80	11 (8.46%)	16 (12.30%)	15 (11.58%)	42 (32.30%)	4 (3.07%)	46 (35.38%)	

The mean age was 51.27 years. The minimum and maximum age was 20 years and 80 years respectively. Vitamin D sufficiency in patients of 20-40 year age group was 3.84% and in patients of age group 41–60 years and 61–80 years was 4.61% and 3.07% respectively.

Discussion:-

The deficiency of Vitamin D is endemic in India. A number of studies in India have established a high prevalence rate of deficiency of Vitamin D^{8,9,10}.

The lack of Vitamin D and its inadequacy are predominant in patients with orthopedic injury. Understanding the significance of insufficiency of vitamin D can be noteworthy in reducing the threat of inconveniences, including postponed unions and nonunions, with regard to orthopedic injury cases.

Low levels of vitamin D have been highlighted by a number of reports in various population spectrums, including school children, young adults, postmenopausal women, hospital personnel etc.^{11,12,13}.

We conducted this study to determine the Prevalence of vitamin D deficiency in a population of patients with orthopedic trauma. We estimated a high prevalence of vitamin D deficiency in this cohort of orthopaedic patients. We found that vitamin D deficiency (<32 ng/dl) was present in 88.46 % patients, among which 24.61% patients had vitamin D level <10 ng/dl and only 11.53 % patients had sufficient levels of vitamin D.

A similar study was conducted by C.P. Paul et al from Agra, India where they measured vitamin D levels in 1132 orthopaedic patients and found a high prevalence of vitamin D deficiency (91.3%)¹⁴.

Another similar study in orthopaedic trauma patients with hip fracture in Indian patients found very high prevalence (96.7%) of vitamin D deficiency. The study was conducted in AIIMS, New Delhi, India¹⁵.

The results of our study are in consonance with the results from similar studies conducted in other parts of the world like Australia, Germany and USA investigating the Vitamin D deficiency in Orthopedic Surgery patients^{7,16,17,18}.

Simonelli et al. reported prevalence of vitamin D deficiency in 97.4% patients who had minimal trauma fracture and had vitamin D level <30 ng/dl and majority (81%) of patients had 25(OH)D <20 ng/ml¹⁹.

Zellner et al. conducted a study on 652 trauma patients admitted to Orthopaedic Surgery Department in Houston, TX and reported prevalence of vitamin D deficiency (<20 ng/ml) in 53.2% patients and vitamin D insufficiency (<30 ng/ml) in 86.2% patients among 652 trauma patients²⁰.

Conclusion:-

A high prevalence of vitamin D deficiency is seen in orthopedic trauma patients. The overall prevalence of vitamin D deficiency in our study is 88.46% which is alarmingly very high. Deficiency exists across all age groups. So it is important to screen and treat hypovitaminosis D.

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