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Clinical Audit

Vitamin-D levels for all the patients (including elderly patients with fracture neck of femur) attending Kauvery Specialty Cantonment Tertiary care hospital: An audit report

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Abstract: This abstract presents the findings of an audit examining Vitamin D levels in patients attending a tertiary care hospital, specifically focusing on fracture patients. The study addresses the widespread issue of Vitamin D deficiency, particularly prevalent among the elderly and house-bound populations. Vitamin D deficiency has been implicated in the pathogenesis of various illnesses and disorders, including an increased risk of fractures and psychiatric conditions. The audit aims to assess the prevalence and severity of Vitamin D deficiency in fracture patients, providing valuable insights into the potential relationship between Vitamin D status and fracture risk. By analyzing Vitamin D levels in this specific patient population, the study contributes to the growing body of evidence on the importance of Vitamin D in bone health and overall well-being. The findings of this audit may have implications for clinical practice, potentially informing screening protocols and preventive strategies for Vitamin D deficiency in high-risk populations.

Keywords: Pediatric cardiology; cardiac management; cardiac arrhythmia; genetic disorders; congenital heart disease

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1. Introduction

Vitamin D deficiency has emerged as a significant health concern, particularly among the elderly population and individuals confined to their homes. This essential nutrient plays a crucial role in maintaining bone health, immune function, and overall well-being. Recent studies have highlighted the widespread prevalence of Vitamin D deficiency and its potential implications in various health conditions, including an increased risk of fractures and psychiatric disorders.

The elderly are particularly susceptible to Vitamin D deficiency due to factors such as reduced skin synthesis, limited sun exposure, and decreased dietary intake. Similarly, house-bound patients often face challenges in obtaining adequate sunlight exposure, a primary source of Vitamin D synthesis in the body. This deficiency can have far-reaching consequences, affecting not only bone health but also potentially contributing to the development or exacerbation of various illnesses and disorders.

Recognizing the importance of Vitamin D in maintaining optimal health, particularly in vulnerable populations, this study presents the findings of an audit titled "Audit of Vitamin D Levels in Patients Attending Tertiary Care Hospital (fracture patients)." This audit aims to assess the prevalence and severity of Vitamin D deficiency among patients with fractures seeking care at a tertiary hospital. By examining Vitamin D levels in this specific patient population, we hope to gain insights into the potential relationship between Vitamin D deficiency and fracture risk, as well as inform strategies for prevention and management.

The results of this audit will contribute to the growing body of evidence on Vitamin D deficiency and its clinical implications, particularly in the context of bone health and fracture risk. Furthermore, these findings may help guide clinical practice in terms of Vitamin D screening, supplementation, and overall patient care strategies for individuals at risk of fractures and other related health issues.

2. Prevalence of Vitamin D Deficiency

1) Epidemiological studies in children have reported Vitamin D deficiency (VDD) prevalence ranging from 50% to 94%, suggesting a high unmet Vitamin D requirement.
2) Nearly 76% of the Indian population suffers from Vitamin D deficiency.
3) The prevalence of patients with Vitamin D deficiency is highest in the elderly, obese patients, nursing home residents, and hospitalized patients.
4) Vitamin D deficiency may be related to populations who have higher skin melanin content and who use extensive skin coverage

Nearly 30 min of sunlight exposure of skin over the arms and face, without application of sunscreen, preferably between 10 am to 2 pm daily is reported to be adequate to avoid Vitamin D (Vitamin. D) deficiency for an average healthy adult.

Vitamin D has a crucial role in

1) Normal growth & puberty,
2) Regulation of immune response,
3) Cancer prevention,
4) Controlling insulin metabolism.
5) Reducing the risk of Alzheimer's disease & protects against depression/ schizophrenia
6) Reduces the cardiovascular risk - CAD, reduces the risk of developing high BP
7) HELPS in normal muscle function
8) Reduces inflammation but deficiency triggers asthma/wheezing
9) Protection against diabetes,maintains bone health, deficiency causes rickets and osteomalacia
10) Boosts immunity &Reducing the chance of cancer
11) REDUCES risks of developing RA.

How to Diagnose a Vitamin D Deficiency?

In great number of cases one may find on blood tests that 25 hydroxy Vitamin D (25 OH Vitamin D) levels are low, but 1,25 dihydroxyVitamin D 1,25 OH Vitamin D) is normal or elevated. This occurs because PTH is actively transforming 25 OH Vitamin D to 1,25 OH Vitamin D. It has been considered as the best indicator of overall Vitamin D status.

Some patients can increase their Vitamin D levels by taking supplements either by using daily or weekly doses. And some will find that taking Vitamin D supplements makes them feel worse; probably because the high PTH turns the supplements into high concentrations of 1, 25 dihydroxy Vitamin D which is the active form, causing symptoms of Vitamin D toxicity. When taking Vitamin D makes you feel worse, you should immediately stop. In either scenario, parathyroidectomy will not only correct the calcium/PTH imbalance (PHPT) but also the Vitamin D deficiency.

Classification	Sr. 25-hydroxyVitamin D (25(OH)D) levels
Normal	>30 to 100 ng/mL
Toxicity	> 100 ng/mL
Insufficiency	20-30 ng/mL
Mild deficiency	10-20 ng/mL
Moderate deficiency	5-10 ng/mL
Severe deficiency	<5 ng/mL

Management of Vitamin D deficiency

Initial supplementation for 8 weeks with Vitamin D3 either 6,000 IU daily or 50,000 IU weekly can be considered.

Aim

1) To audit the investigation of Serum 25-hydroxy Vitamin D levels,
2) To know the Prevalence of Vitamin D deficiency in all the patients including Femoral Neck Fractures attending Kauvery speciality tertiary care hospital, Trichy.

3. Materials & Methods

This was a Retrospective review of computerised patient records, for all in and out patients who had done check-up and underwent treatment for the last 1 year (from 1st September 2022 - 31st August 2023).

Measurement of Serum 25-hydroxy Vitamin D levels was assessed.

Vitamin D levels of 777 patients, who attended outpatient department and admitted patients who underwent treatments including Femoral Neck Fractures attending Kauvery speciality Tertiary care Hospital [Cantonment] Trichy, for a period of 12 months from 1st September 2022 - 31st August 2023 were collected and entered in an excel sheet and the data was analysed.

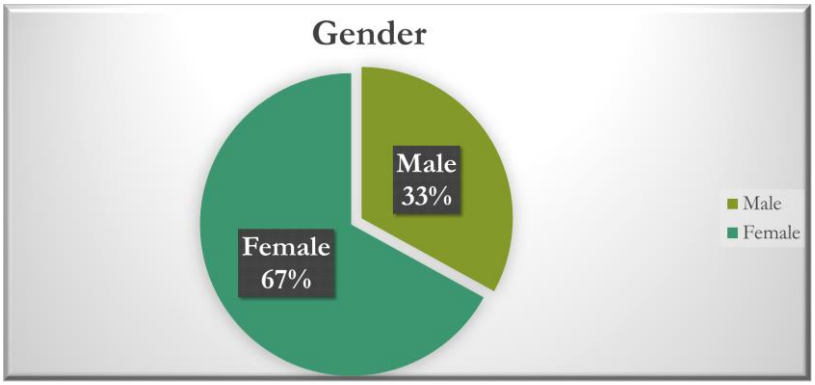
This Audit cum Study analysis divided in to 3 parts

1) Firstly – All the 777 pts (done Vitamin D d levels) were analyzed
2) Secondly –All the femoral neck fracture pts with available results of Vitamin D levels were analyzed
3) Finally, all the consecutive case cohort of femoral neck fracture in pts (IP) who underwent treatment in the last 3 months were analyzed (without the margin of error)

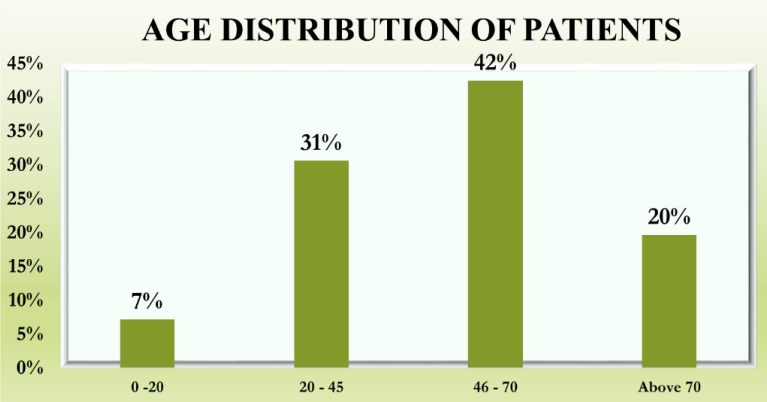
The patients were categorized as follows:

Mild Deficiency	10-20 ng/mL
Moderate Deficiency	5-10 ng/mL
Severe Deficiency	<5 ng/mL
Insufficiency	20-30 ng/mL
Normal	>30 to 100 ng/mL
Toxicity	> 100 ng/mL

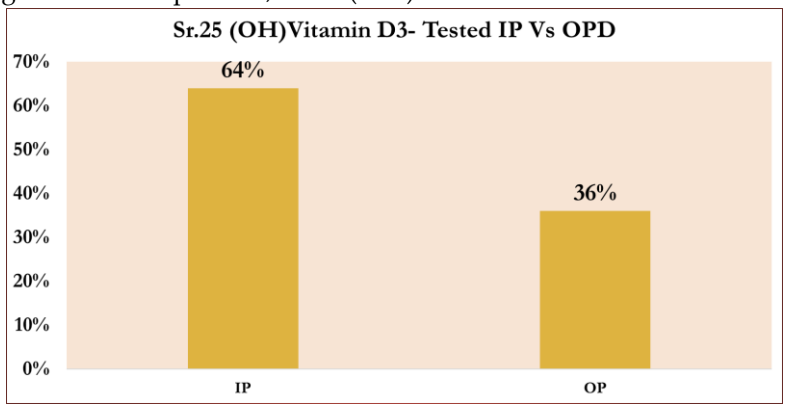
Among the total 777 patients 257 were males and 520 were females.



The most common age group tested was below 45 (62%) followed by 20-45 (31%) as shown here.



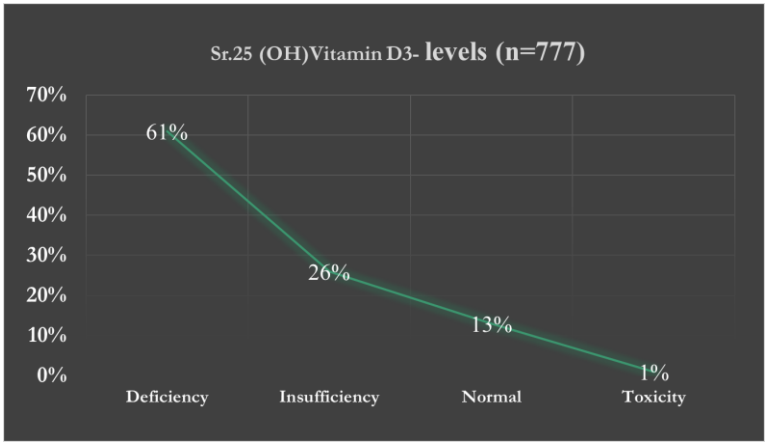
Among the total 777 patients, more (64%) were tested on IP basis.



4. Results

Analysis of Vitamin-D levels in total of 777 pts

1) Among 777 patients, 61% were 25(OH) D deficient; 26% were insufficient and only 13% were having normal serum levels of 25(OH) D.
2) Majority of deficient patients were females (61%) .
3) Most common age group with deficiency were > 45 years.
4) Females were more [in both deficient and insufficient levels of Vitamin D group].

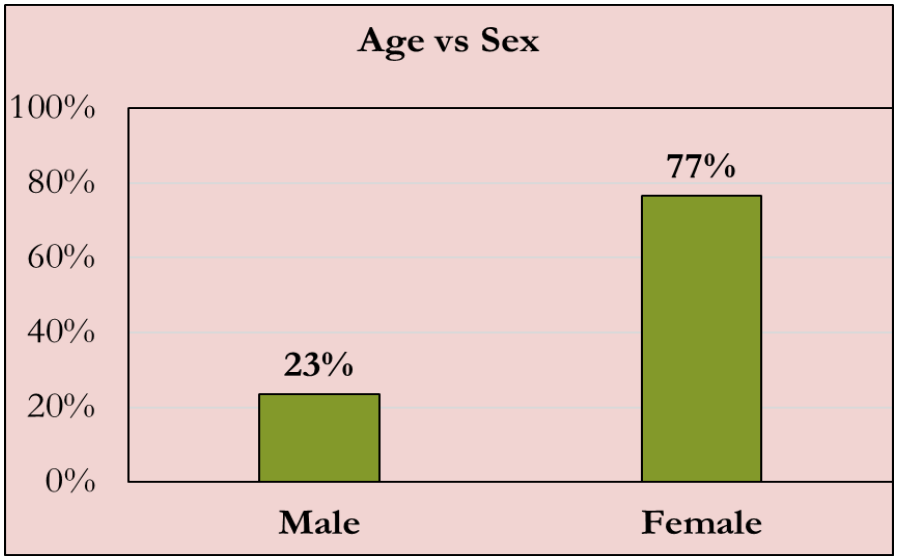


Majority of deficient patients were females (61%)

Result	Male (%)	Female (%)	Total	%
Deficiency	166 (21%)	309 (40%)	475	61%
Insufficiency	66 (8%)	134 (17%)	200	26%
Normal	24 (3%)	74 (10%)	98	13%
Toxicity	1 (0%)	3 (0%)	4	1%
Over All	257 (33%)	520 (67%)	777	

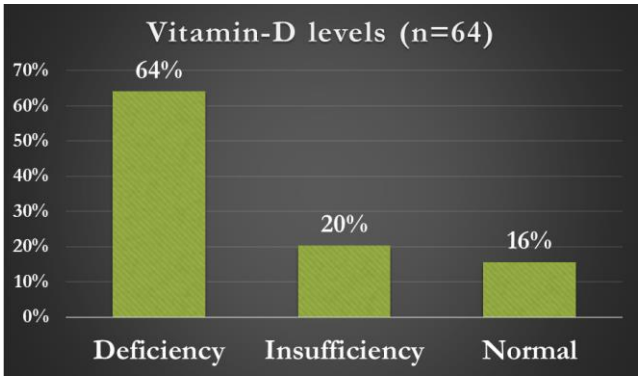
Analysis of Vitamin-D levels in Femoral neck fracture with available results of Vitamin D level pts (N=64).

Age vs Sex				
Age	**Male**	**Female**	**Total**	**%**
45-60	2	3	5	8%
Above 60	13	46	59	92%
Total	15	49	64	

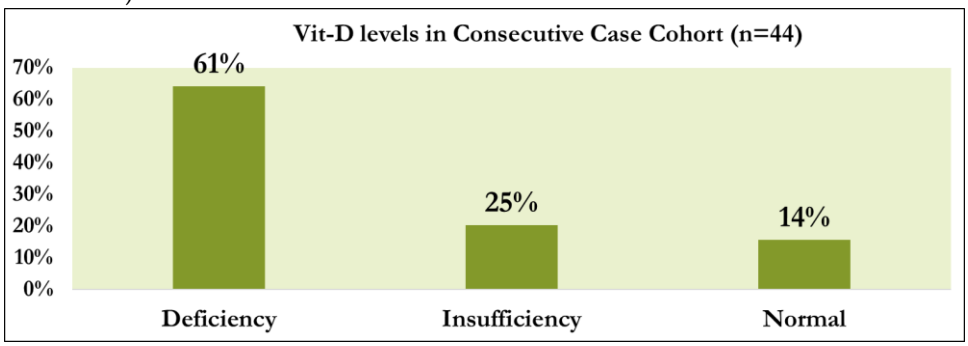


Vitamin D levels in Femoral neck fracture with available results of Vitamin D level pts (N=64) [last 1 yr.].

Age	Deficiency	Insufficiency	Normal	Total
45 - 60	5%	3%	0%	8%
Above 60	59%	17%	16%	92%
Over All	64%	20%	16%	



Analysis of Vitamin-D levels in Consecutive Case Cohort of Femoral neck fracture pts (last 3 months).

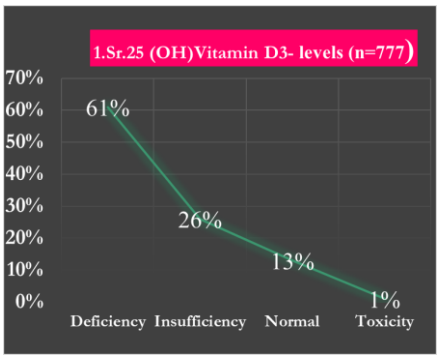


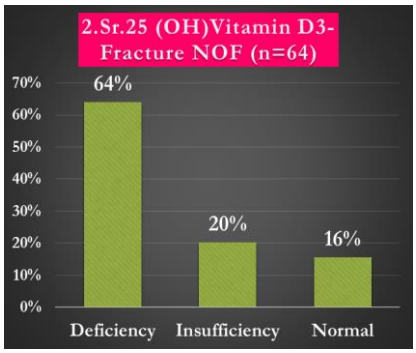
Literature Review

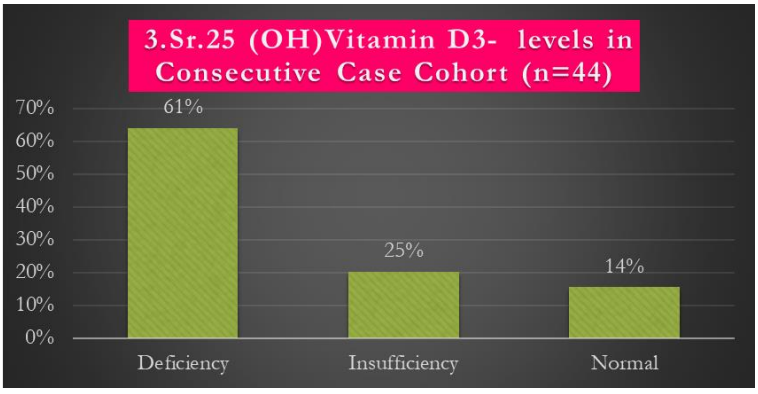
1) Here in this analysis, the general trend is approx. 61 -65% were 25(OH) D deficient.
2) Several Studies indicate approximately 80–90% of hip fracture patients are Vitamin D deficient.
3) Literature shows that 25(OH) D insufficiency over 5 years was associated with an increased 10-year risk of hip and major osteoporotic fractures in elderly women.

5. Conclusion

1) We conclude that the prevalence of Vitamin-D deficiency in-hospitalised pt presenting with #NOF is approx 61-65% in a tier II city (Trichy) in central part of Tamilnadu.
2) We recommend either tested or treated for Vitamin-D deficiency in # NOF pts.
3) Wide Spread Community based Multidimensional study is needed to evaluate the detailed analysis of Vitamin- D Deficiency prevalence.







Here in our ortho dept, we now routinely either do blood test or directly give treatment (in elderly people with # NOF). We recommend to introduce this as a Kauvery Guidelines, based on our study in our local population. This may be a protocol in "other units of Kauvery".

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