

Research Article

# The Deficiency of Vitamin-D: An Unresolved Issue of the Current Era Affecting the Children and the Elderly

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## ABSTRACT

The Vitamin D, a fat-soluble vitamin has been documented to be involved in major health processes, despite the fact an easy process of synthesis, communities have been reported to be deficient or insufficient levels of the vitamin globally. This observational Study was conducted in different cities of Sindh province design over one year from January 2024-January 2025. There were 1000 patients analyzed for serum vitamin D levels with age groups from 5 years to 60 years as age range using purpose technique for sampling. Statistical tests were applied using SPSS version 22 for data analysis generating mean, SD and other measures. We found the study population as deficient 70%, insufficient 20% and normal in 10%. Non-significant difference was observed between the adults and children for vitamin D deficiency p-value 0.094.

**Conclusion:** Majority of the population is suffering from the deficiency of vitamin D

**Keywords:** Vitamin D, Sufficiency, Insufficiency, Deficiency, Children.

## INTRODUCTION

The normal levels for this vitamin range between 30-50 ng/ml for the healthy development in children in terms of bones and teeth and bones while bone mineralization is also dependent in adults [1, 2]. A number of health disorders like rickets, Osteomalacia, arthralgia, osteoporosis, arthritis and many other diseases are strongly associated with the low levels of this vitamin in children and adults. Vitamin-D is a cholesterol derivative endogenously produced after sun light exposure converting 7-Dehydrocholesterol into the cholecalciferol then hepatic conversion into 25-hydroxycalciferol occurs followed by the renal conversion into 1, 25 dihydroxycalciferol occurs. Eggs, milk, fish and the liver are the

dietary sources of this vitamin with a daily requirement of 15ug/day till the age of 70 years [2-5]. Vitamin D is an essential component in treating Rickets, hypoparathyroidism, renal osteodystrophy and Osteomalacia modulating the immune system through cathelicidin and amplifying the macrophages and B-cells [1,6]. Vitamin D is considered deficient at serum levels below 20ng/ml while insufficient at less than 30 ng/ml whereas the serum levels between 30 to 50 ng/ml are considered as sufficient but levels above 150ng/ml are considered as toxic [3]. The global prevalence for the vitamin-D3 deficiency ranges between 30%-90% as reported in literature [2, 3]. Infections in children specially the respiratory infections are reported the associated with deficient Vitamin

D [4, 5]. The deficiency of Vitamin –D3 results as a consequence of reduced dietary intake or the reduced synthesis due to lesser sun exposure or both [7]. Vitamin D deficiency has very old background reported by Dr. Daniel in 1645 from England describing the relationship of rickets with diet and sun light exposure [8]. The deficiency may affect all age groups sex difference was also reported [9]. The deficiency remains symptom less until diagnosed as a disease or accidentally observed [10]. There were few studies available from this region on limited data and population we tried to extend this work to a relatively a larger group of people including men, women and children with the hope to add in the available literature on this topic.

**METHODOLOGY**

Blood samples were collected from 1000 patients under inclusion and exclusion guidelines with aseptic measures following the consent was taken. Vitamin –D3 assessment was done in local laboratories on Architec Abbot 2000. Children with age group above 5 years and adults less than 60 years were

included with other were excluded, patients on vitamin D therapy were also excluded. International protocols were strictly followed in dealing with blood samples. Data analysis was accomplished through SPPSS version 22 for measures of central tendency and measures of dispersion and results were presented in tables and figures.

**RESULTS**

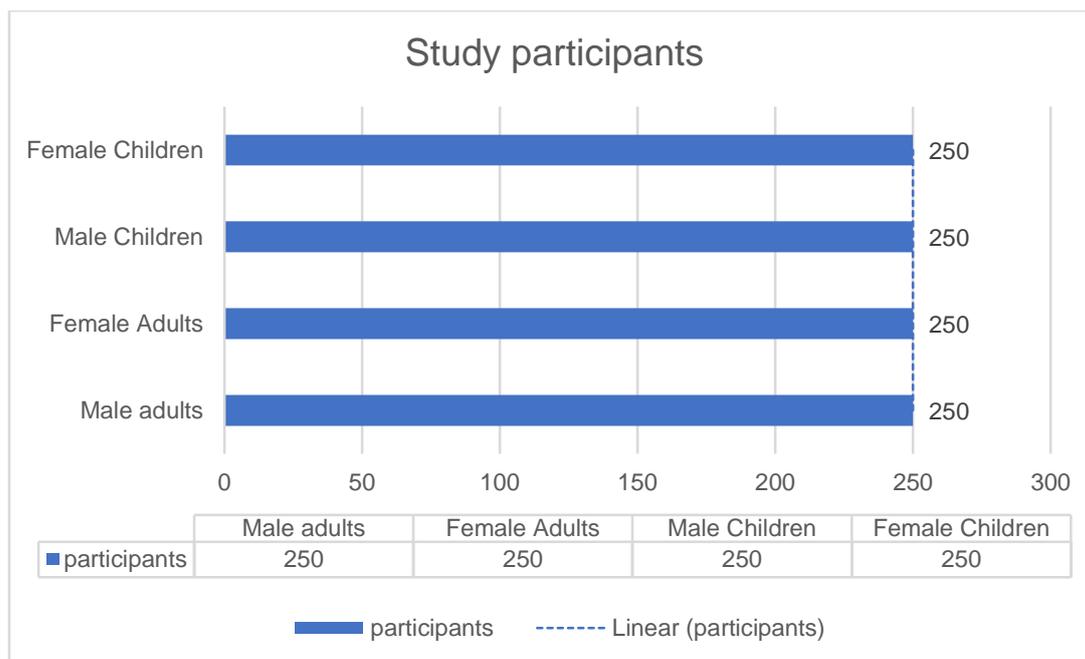
There were 500(50%) children and 500(50%) adults similarly 50% (500) were females and 50% (500) were male [Table-1],[Figure-1]. The mean vitamin-D levels in the study population were found to be 19.37±10.63 with 3.7 the minimum and 49.39 the maximum in study population. The mean vitamin D level in adults was 17.20 ± 8.32 while it was 15.35+11.31 in children [Table-2]. We found 70% (700) of the study population deficient (<20ng/ml), 20% (200) insufficient (<30ng/ml) whereas 10% (100) patients with normal (30-50ng/ml) vitamin D levels. There was none-significant difference among the children and adults with a p-value of 0.094

Table 1: Equal Distribution of Study Population

	<b>Male</b>	<b>Female</b>	<b>Total</b>
Adults	250(25%)	250(25%)	500(50%)
Children	250(25%)	250(25%)	500(50%)
Total	500(50%)	500(50%)	1000(100%)

Table-2: Comparison of means among various study groups

	<b>Children</b>	<b>Adults</b>	<b>P-Value</b>
Male	14.13+9.4	15.33+10.12	0.05
Females	15.27+10.3	16.10+9.43	0.18
Overall	15.35+11.31	16.40 ± 8.32	0.094



**DISCUSSION**

Majority of the participants (70%) were found to be deficient for vitamin D which seems to be consistent with Edmondo F et al 2012 reporting 61% of their study population suffering from this vitamin however the difference between the two studies was that they had CLD (Chronic liver disease) patients as study participants [11]. Similar dominance of vitamin D deficient participants was reported by Rahmoon AG et al in 2015 (57.14%) while their focused population was the alcohol users [12]. As for as the deficiency in children is concerned our results are consistent with study by Ghazal A et al (2015) as they found 83.9% of their study children suffering from vitamin D deficiency [13]. Farhan J D et al (2018) in their study based in KSA (kingdom of Saudi Arabia) also reported the deficiency as 64% in their population which stands consistent with our results [14]. Consistent results were reported by Scott MG et al (2015) from USA (United States of America) showing their 50% of the hospitalized population suffering from vitamin D deficiency [15]. The 50% of the Australian population was reported to be deficient of vitamin D by Boyages SC (2016) suggesting some ways to reduce the burden [16]. The current research work is also consistent with another Pakistan study published by A A Arain et al (2017) reporting similar findings [17]. The goal for managing the vitamin D deficiency is increasing the serum levels vitamin D concentrations above 30ng/ml to normalize the serum calcium and to reverse

hyperparathyroidism. The higher dose of the vitamin D is required (4000 units/day or 50000 units/week) for weeks to treat the both the deficiency and the insufficiency [18]. There are multiple risk factors supposed to the cause of this global problem like lesser sun exposure, closed apartments, improper diet and some diseases. However, the deficiency at global levels needs further research at molecular level to exactly find the reason behind. Vitamin D screening and treating the deserving population as required is recommended till the exact cause is known. Educational and awareness programs are needed about the proper dosage, self-medication and duration of treatment to avoid under and over dose both at the physician and community levels.

**CONCLUSION**

The majority of the study population both adults and children are suffering from vitamin D deficiency with non-significant difference.

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