



VITAMIN-D LEVELS AND LOW BACK PAIN; PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL OF PAKISTAN

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ABSTRACT... Objectives: To determine the number of patients with low back pain who have low serum Vitamin-D levels along with associated risk factors in our local population. **Study Design:** Descriptive Study. **Place and Duration:** At the Department of Orthopedics, Benazir Bhutto Hospital, Rawalpindi, for a duration of 01 year from 20th March 2016 to 19th March 2017. **Patients and Methods:** 600 patients were included in the study who met the inclusion criteria, i.e. patients presenting to the Out Patient Department (OPD) with low back pain for a duration of less than six months aged between 15 to 55 years. Venous blood withdrawn and serum levels of Vitamin-D measured. According to serum Vitamin-D levels, categorized as deficient, sufficient or excess. **Results:** Mean age of patients included in the study 44.21 ± 11.92 years. Out of the total, 337 (56.17%) were males and 263 (43.83%) females. Out of the total, 20.67%, 26.17% and 28.83% had mild, moderate and severe Vitamin-D deficiency, respectively. Predominantly patients with severe Vitamin-D deficiency presented in winters (October – February) (17.16%) as compared to other seasons. The most pre-dominant risk factor in patients with low Vitamin-D levels was smoking (21.33%). **Conclusion:** Vitamin D plays a crucial role in the musculoskeletal framework of the body. The deficiency is more prevalent in the youth due to sedentary lifestyle and indoor preference.

Key words: Low Back Pain, Vitamin-D, Venous Blood.

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INTRODUCTION

Chronic lower back pain (CLBP) is one of the most common complains which warrants visits to the outpatient clinic.¹ It has detrimental effects on productivity. It is neither a disease instead it is a syndrome characterized by pain localized in the area below the costal margins and above the inferior gluteal folds which may or may not be accompanied by leg pain, motor, sensory, and reflex deficits in nerve root distribution for ≥ 12 weeks.²

Vitamin-D has been implicated in a host of musculoskeletal abnormalities. Upto 83% patients with complains of CLBP have a deficiency in Vitamin-D.³ The exact pathogenic mechanism remains unclear⁴ however studies have shown positive results. Its deficiency has been subject to substantial research, with some researchers putting the numbers to 1 billion

worldwide⁵; others claim it affects more than 50% of the world's population.⁶ Medical literature is ambiguous about the definite levels which define deficiency. A widely acceptable reference range puts sufficient levels at >40 ng/L and deficient levels at <40 ng/L.^{7,8} Since these levels are influenced by sunlight exposure, dietary intake and the individual's metabolic status, the deficiency can be circumvented by improving light exposure, food fortification with Vitamin-D, oral and parenteral supplementation.^{9,10}

Investigating back pain can be a challenging task because of the various factors that contribute to its development. Pharmacologic options available to treat back pains are endless but the efficiency in eradicating the problem is wavering. Hence all patients with back pain without a known etiology must be investigated for Vitamin-D levels, especially in the subcontinent where

the deficiency prevails despite ample sunlight exposure. Therefore this study was conducted to determine the number of patients with low back pain who have low serum vitamin-D levels along with associated risk factors in our local population.

MATERIAL AND METHODS

This descriptive study was conducted in the Department of Orthopaedics, Benazir Bhutto Hospital and Holy Family Hospital, Rawalpindi, Pakistan for a duration of 01 year, i.e. from 20th March 2016 to 19th March 2017. All patients presenting to the Out Patient Department (OPD) with low back pain for duration of less than six months aged between 15 to 55 years were included in the study. Patients having disc prolapse, spinal stenosis, degenerative pathologies of spine or any signs of neurological involvement were left out of the study. 5 mL of venous blood was withdrawn from each patient and serum vitamin-D levels were measured. Results were interpreted as follows; if levels were less than 30 ng/dL they were termed as deficient. Deficiency was further categorized into mild, moderate and severe for levels between 20-30 ng/dL, 10-19.9 ng/dL and <10 ng/dL, respectively. If Vitamin-D level between 30 – 100 ng/dL, it was termed as sufficient. And if > 100 ng/dL, labelled as having

excess levels of Vitamin-D.

All information was recorded on a pre-formed questionnaire. Data was entered into SPSS version 23. Results of quantitative variables like age and body mass index (BMI) were presented as frequency and percentages.

RESULTS

A total of 600 patients who fulfilled the inclusion criteria were included in the study. Out of the total, 337 (56.17%) were males and 263 (43.83%) females. Mean age of patients included in the study 44.21 ± 11.92 years. Patients divided into age groups of 15-25, 25-35, 35-45 and 45-55 years. Patients with low back pain having deficient Vitamin-D levels belonged to the younger age-group (15-35 years, 49.7%). Out of the total, 20.67%, 26.17% and 28.83% had mild, moderate and severe Vitamin-D deficiency, respectively (Table-I).

The most pre-dominant risk factor in patients with low Vitamin-D levels was smoking (21.33%) (Table-II).

Predominantly patients with severe Vitamin-D deficiency presented in winters (October – February) (17.16%) as compared to other seasons (Table-III).

Age	Serum Vitamin-D Levels					Total (n)
	<10 ng/dL	10 – 19.9 ng/dL	20 – 30 ng/dL	30 – 100 ng/dL	100> ng/dL	
15-25 years	57	41	29	47	00	174
25-35 years	64	56	51	61	00	232
35-45 years	33	39	28	31	01	132
45-55 years	19	21	16	05	01	107
Total (n)	173 (28.83%)	157 (26.17%)	124 (20.67%)	144 (24%)	02 (0.33%)	600

Table-I. Vitamin-D levels according to age-groups

Risk Factors	No. of Patients (n)	Percentage
Smoker	128	21.33%
Cardiovascular disease	45	7.5%
Diabetes Mellitus	54	9%
Renal disease	17	2.83%
Hepatitis B	12	2%
Hepatitis C	15	2.5%
HIV	02	0.33%

Table-II. Risk factors associated with low Vitamin-D levels

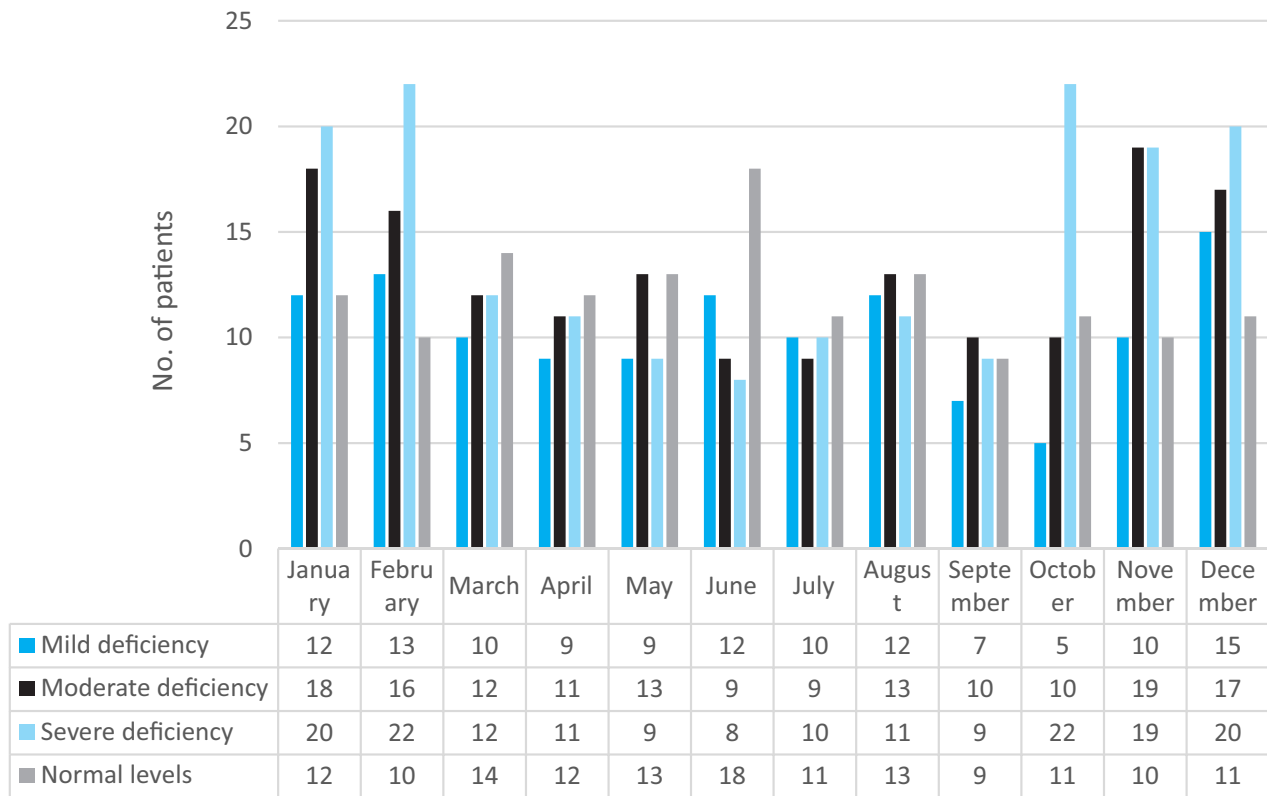


Figure-1. Monthly distribution of patients with Vitamin-D deficiency

DISCUSSION

Vitamin-D, one of the four fat-soluble vitamins, is an integral part of maintaining the body’s calcium and phosphate homeostasis.¹¹ It strengthens bones, cartilage, teeth and muscles.¹² A vast spectrum of pathologies are attributed to its low levels in the Orthopaedic arena such as osteoporosis, rickets, fractures, etc.¹³ It also has many systemic manifestations such as diabetes and cardiovascular disease.¹⁴ Some findings suggest vitamin-D prevents malignant change and slows down the process of aging.¹⁵ Its anti-inflammatory effects have been used to alternatively treat allergies and infections.¹⁶ Pregnant women are advised supplementations prophylactically to prevent bone and joint deformities in the newborn.¹⁷

Our study aimed to show a link between Vitamin-D levels and the corresponding severity of pain. Out of all 600 patients presenting to the Orthopaedic clinic with complains of lower back pain, approximately 81% were found to be deficient in

Vitamin-D. Similar results were cited by Faraj et al¹⁸ in Saudi Arabia with 83% of studied patients being deficient. Most of the patients were male (56%) which is consistent with the results compiled by a study done by Afsar et al in Peshawar, Pakistan. The mean age was 44 and about 50% patients belonged to the younger age group i.e. between 15-35 years of age. The same results were cited by a study done in Iran with a mean age of 41 and most of the patients belonging in the same age bracket. They also reported decreased levels in the winter month (November- February) which was a common finding in our study as well.¹⁹

The reason for increased deficiency in a sunny area like the subcontinent could be due to cultural standards of dressing as most women prefer various forms of veiling and it is mandatory by law to dress modestly. The trend of outdoor activities is on the decline and people prefer living in apartments which further decreases their sun exposure. The elderly have near-normal levels of Vitamin-D which could be in part due to regular

multivitamin tablets consumed and the sun exposure they received during adulthood when outdoor activities were the norm. Air pollution is also another factor; the pollutants in air decrease the amount of sunlight reaching the atmosphere. The cumulative effect of style of clothing, housing, limitation of outdoor activities and air pollution is the culprit in the prevalence of Vitamin-D deficiency in the sub-continent and Middle East.

As the likelihood of modification of lifestyle factors²⁰ and culture is slim, food fortification and multivitamin preparations are the only solution. Outdoor activities should be encouraged but the fear of tanning and skin cancer compels people to be non-compliant.

CONCLUSION

Vitamin-D plays a crucial role in the musculoskeletal framework of the body. The deficiency is more prevalent in the youth due to sedentary lifestyle and indoor preference. Its low levels contribute to lower back pain by decreasing bone density, promoting micro fractures and other mechanisms which are yet understood. Adequate levels can be achieved by lifestyle modifications and dietary supplementation.

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

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Do not judge a book by its cover.

– Unknown –

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Rahman Rasool Akhtar	Concept, Study design and proof reading.	
2	Junaid Khan	Article writing, Data analysis.	
3	Tehreem Zahid	Data collection.	
4	Riaz Ahmed	Final Draft.	