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# PREVALENCE OF VITAMIN D DEFICIENCY IN PATIENTS OF CHRONIC HEPATITIS C.

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**ABSTRACT… Objectives:** To determine and compare vitamin D status in chronic hepatitis C patients and normal healthy matching controls. **Study Design:** A case control study. **Setting:** A private clinic of Peshawar. **Period:** 1st November 2015 to 31st January 2016. **Material & Methods:** Fifty clinically normal young adults and fifty non cirrhotic chronic hepatitis C patients were included in the study. Vitamin D was determined by electro chemiluminescence. Student t test was used to analyze the data in SPSS version 21. **Results:** The mean age of the study population was 30.68+ 5. Vitamin D deficiency was divided into three categories. 21% of the study population had severe vitamin D deficiency, 33% had mild to moderate deficiency and 46% of the study population had normal levels. Females population were more vitamin D deficient as compared to males (p-value<0.05). Vitamin D levels were comparatively decreased in the non cirrhotic chronic hepatitis C patients. Statistically significant (p value <0.05) results were obtained while comparing means of serum vitamin D of non-cirrhotic chronic hepatitis C patients with healthy matching controls. **Conclusion:** It is concluded from this study that a significant number of apparently healthy individual have low vitamin D level and some even fall in the severely deficient group without any active complains. Patients with chronic hepatitis C had rather increased levels of vitamin D as compared to normal healthy adults There might be some genetic factors underlying which affects the availability of Vitamin D.

**Key words:** Chronic Hepatitis C, Vitamin D, Vitamin D Deficiency.

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## INTRODUCTION

Vitamin D is a pro hormone produced in liver and epidermal cells of the skin.[1] It is a fat soluble vitamin. It was identified in 1921 having two main types namely vitamin D3 and D2 called cholecalciferol collectively.[2]

25, hydroxyl vitamin D is considered as an indicator of vitamin D status due to its half-life of 15-35 days.[2,3] It can be made in the skin from exposure to sunlight.[4] The vitamin synthesized in the skin needs to be hydroxylated in the liver by the hydroxylase enzyme, in the presence of parathormone it is than further hydroxylated in the kidney to form active form of vitamin D i.e 25, hydroxy vitamin D[5] This active form of vitamin D stimulates the absorption of calcium in the intestine.[6] Normal vitamin D level is related with normal level of serum calcium, alkaline phosphatase, phosphorus and parathyroid hormone.

Vitamin D deficiency is an emerging problem worldwide and it is an epidemic in South Asia[7] and Pakistan.[8,9] Therefore vitamin D deficiency should be dealt with as early as possible.

Chronic hepatitis C is a major cause of mortality and morbidly worldwide.[10] It is caused by an RNA virus having six major genotypes.[11,12] Nearly 200 million people worldwide are chronically infected with hepatitis C which could lead to the development of cirrhosis, end stage liver disease, hepatocellular carcinoma and liver transplantation.[13] Luo et all suggested in their study that vitamin D deficiency plays an important

role in progression of liver disease severity especially of chronic hepatitis C.[14] It has been suggested that many patients of chronic liver disease have insufficient serum level of 25 OH vitamin D.[15]

## OBJECTIVE

To determine and compare vitamin D status in chronic hepatitis C patients and normal healthy matching controls.

## METHODOLOGY

A simple descriptive study was carried out in a private clinic of Peshawar. Data was collected from 1st November 2015 to 31st January 2016. A total of 100 subjects completed the study protocol. Fifty clinically normal young adults and fifty were non cirrhotic chronic hepatitis C patients were included in the study. Inclusion and exclusion criteria were defined for each category. For controls, apparently clinically normal young adults screened negative for hepatitis B and C were included and subjects diagnosed as diabetics, hypertensive, having autoimmune diseases, renal diseases, bone disorders or any other known metabolic disorders were excluded from the study. Non cirrhotic chronic hepatitis C patients without clinical and ultrasound evidence of cirrhosis were included and Chronic hepatitis C cirrhotic patients, patients of chronic hepatitis B were excluded.

Categories were made on the basis on vitamin D levels and frequencies and percentages were calculated for each category. Simple t test was applied to find out the statistical difference.

Venous blood samples were taken from all the study participants and serum vitamin D levels were determined by Electro-chemiluminescence binding assay (ECLIA).

## RESULTS

In the present study, vitamin D status of non cirrhotic chronic hepatitis C patients and apparently clinically normal adults was determined. A comparison between the two groups was also made. In a sample of 100 subjects, 50 were non cirrhotic chronic hepatitis C patients categorized as group A and 50 age and gender matched healthy controls were included in group B. Twenty five males and twenty five females were included in each group.

The subjects were grouped into the following categories on the basis of serum vitamin D level.

- Severely deficient
- Moderately deficient
- Normal

Those subjects who had vitamin D levels of 1-10 mg/dl were categorized as severely deficient patients, while those having serum vitamin D level between 10.1 to 20 mg/dl were categorized as mild to moderate deficient. Subjects with vitamin D levels of 20.1 mg/dl and above were categorized as normal.

Among the 100 participants, 21 subjects were in the severely deficient category. Out of these 21 subjects 28.6% were non-cirrhotic chronic hepatitis C patients and 71.4% were young adults. This difference was statistically significant with a p-value of 0.001.

Thirty three percent of the study participants had moderate vitamin D deficiency. Among them 45.5% were healthy adults and 54.5% were non cirrhotic chronic hepatitis C patients. The statistical difference was not significant with a p-value of 0.54 ($p > 0.05$).

Forty Six percent of the study population had normal level of vitamin D levels.

Females were more severely vitamin D deficient as compared to males. Seventeen females and 5 males had severe vitamin D deficiency; their statistical difference was significant with a p-value of 0.01 ($p<0.05$)

### VITAMIN $D_3$ CATEGORIES WITH REFERENCE VALUES

| Vitamin Status | Reference Range |
|---|---|
| Severe deficiency | 1-10mg/dl |
| Mild to moderate deficiency | 10.1-20mg/dl |
| Normal | 20.1mg/dl and above |

| Vitamin D3 Categories | Subjects | | Total |
|---|---|---|---|
| | A | B | |
| Severe | 6 | 15 | 21 |
| | 28.60% | 71.40% | 100% |
| Moderate | 18 | 15 | 33 |
| | 54.50% | 45.50% | 100% |
| Normal | 26 | 20 | 46 |
| | 56.50% | 43.50% | 100% |
| Total | 50 | 50 | 100 |
| | 50% | 50% | 100% |

**Table-I. Percentage distribution of vitamin $d_3$ categories**

| Groups | Vitamin D3 Categories | Male | Female |
|---|---|---|---|
| A | Severe deficiency | 6% | 6% |
| | Mild to moderate deficiency | 14% | 22% |
| | Normal | 30% | 22% |
| | Total | 50% | 50% |
| B | | | |
| | Severe deficiency | 8% | 22% |
| | Mild to moderate deficiency | 20% | 10% |
| | Normal | 22% | 18% |
| | Total | 50% | 50% |

**Table-II. Males and females of group A and B**

## DISCUSSON

Vitamin D deficiency is an emerging problem in Pakistan. In the present study a comparison was made between the vitamin D status of non cirrhotic chronic hepatitis C patients and healthy individuals aged between 18-40 years.

Sunlight is the major source of vitamin D. Most of the study participants had an adequate exposure to sunlight with mean exposure of 50 minutes per day. Since the study data was collected in winter season i.e. in the months of November till January in which people find it comfortable to sit in the sun therefore it completes their daily requirement of exposure to it as compared to summer season. In summers due to increased temperature and use of sunscreens, the exposure to sun rays is limited; hence vitamin D synthesis is impaired. These findings are similar to a study conducted by Vivk Arya and his co workers in 2004. They conducted a study on the Indian population and 66.6% of their study participants had decreased levels of vitamin D, despite the fact that India is situated on a low latitude near the equator.[16] In contrast a study conducted on a British population in which their vitamin D levels were considerably decreased in winter season as compared to summer season.[17] This may be explained on the presumption that in winters the intensity of sunlight is low and it is snow mostly so people find it difficult to go out for sun bathing. In contrary in summer season, body exposure is more as compared to winters, and people go to beaches for sun bathing, these can be contributing factors fir increase synthesis of vitamin D in British population.

In this study fifty four percent of the total study population had vitamin D deficiency. This percentage is almost similar to a study conducted by M. Akhtar Baig and his colleagues in Dow Medical University Karachi. In their study almost 60% of the total study population had vitamin D deficiency. Since both these studies are OPD based therefore their results show similarity[18] However another observational study conducted in medical unit of Shifa International Hospital showed that almost 90% of the study population had some form of vitamin D deficiency.[19]

In our study 60% of the non cirrhotic chronic hepatitis C patients had some form of vitamin D deficiency. These results are similar to the study findings of Fischer et al in which they reported that 68% of patients with chronic hepatitis had vitamin D deficiency.[20] A review by Lei Yuan and co workers found that patients with chronic liver disease had a limited exposure to sunlight therefore it might be a cause of hypo vitaminosis D in these patients.[15] However, in our study most of the participants had an adequate exposure to sunlight.

Females are usually more vitamin D deficient as compared to the males. In our study majority of the females had sub normal vitamin D levels with a p-value of $<$ than 0.05. These findings are similar to the results of a study conducted in Kulsoom International Hospital by Haroon and his colleagues. In their study 57% of the females had vitamin D deficiency.[8]

## CONCLUSION

It is concluded from this study that a significant number of apparently healthy individual have low vitamin D level and some even fall in the severely deficient group without any active complains. Patients with chronic hepatitis C had rather increased levels of vitamin D as compared to normal healthy adults. There might be some genetic factors underlying which affects the availability of Vitamin D.



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The **greatest enemy** of knowledge is not **ignorance**, it is the **illusion** of knowledge.

***"Stephen Hawking"***

## AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author(s) Full Name | Contribution to the paper | Author(s) Signature |
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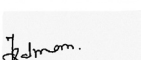
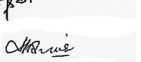
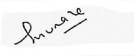
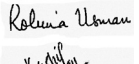
| 1 | Najib Ul Haq | Conceptualization. |  |
| 2 | Momina Haq | Main article writing. |  |
| 3 | Farzana Salman | Abstract and recording. |  |
| 4 | Mohsina Haq | Data analysis, editing. |  |
| 5 | Munaza Khattak | Drafting and analysis of samples. |  |
| 6 | Robina Usman | Approval of final version. |  |
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