

# An Assessment of Vitamin D Deficiency in Cases of Cirrhosis of Liver

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## ABSTRACT

**Objective:** To assess the vitamin D deficiency in cases of cirrhosis of liver at territory care hospital.

**Material and methods:**

Between April 2021 to October 2021, total 163 patients of liver cirrhosis either gender, aged 20-60 years were recruited from Department of Medicine, Sheikh Zaid Hospital, Rahim Yar Khan. Vitamin D deficiency was assessed in selected patients.

**Results:**

Total 163 patients suffering from cirrhosis of liver were recruited. Age range was 20-60 years and mean age was  $38.67 \pm 11.46$  years. Out of 163 patients, deficiency of vitamin D was found in 76 (47%) patients. Out of 84 (51.53%) patients of age group 20-40 years and 79 (48.47%) patients of age group 41-60 years, vitamin D deficiency was found in 37 (44.05%) patients and 39 (49.37%) patients respectively in both age groups. Male patients were 59 (36.20%) and female patients were 104 (63.80%). Total 32 (54.24%) male patients and 44 (42.31%) female patients were found with vitamin D deficiency.

**Conclusion:**

Results of this study revealed that there is high proportion of deficiency of vitamin D in patients of liver cirrhosis. Most of the cirrhotic patients were between 20-40 years. Females were prominent as compared to males. CP class C was most common.

**Keywords:** liver cirrhosis, hepatitis C, hepatitis B, obesity

## INTRODUCTION

Cirrhosis of the liver has wreaked havoc on public health around the world, ranking as the fourth biggest cause of mortality in several nations.<sup>1</sup> Cirrhosis of the liver is thought to be responsible for roughly one million deaths each year.<sup>2</sup> In many nations around the world, in liver cirrhosis cases, hepatitis is very common.<sup>3</sup> autoimmune diseases, chronic vascular obstructive illnesses, cholestatic disorders, nonalcoholic steatotic hepatitis and hepatitis B are the factors to develop cirrhosis.<sup>4</sup> Cirrhosis of the liver affects the musculoskeletal system by forming a complex interaction between parathyroid hormone, phosphate, serum calcium and vitamin D levels.<sup>5</sup> These skeletal symptoms of liver disease are known as hepatic osteodystrophy. Cirrhotics with hepatic osteodystrophy have an increased risk of fractures, which has an adverse effect on their morbidity.<sup>6</sup> Hepatic osteodystrophy is exacerbated by vitamin D deficiency.<sup>7</sup> Oral supplements, eggs, fish all contain vitamin D, but sun exposure is the most significant source. Pro-vitamin D3 (cholecalciferol) is stored in fat cells until it undergoes the first stage of hydroxylation in liver, which results in the formation of 25-hydroxy cholecalciferol. The kidneys create 1,25-dihydroxy cholecalciferol (active vitamin D) during the final phase of hydroxylation.<sup>1</sup>

Vitamin D is required for the proper functioning and wellness of our bones and muscles. Vitamin D also has a variety of non-skeletal properties. Because many cells in the body, such as immune B and T cells, macrophages, hepatocytes express vitamin D receptors on their surfaces, many chronic diseases, such as chronic infections, malignancy and diabetes mellitus are less likely to develop when adequate stores of vitamin D are present.<sup>8</sup> Vitamin D deficiency is common among chronic liver disease patients. Vitamin D insufficiency is predicted to affect one-third of cirrhotic patients.<sup>8</sup>

There is scarcity of data in existing literature regarding frequency of vitamin D deficiency in cases of liver cirrhosis. We plan this study to see the magnitude of the vitamin D deficiency in liver cirrhosis cases in population of northern Punjab. Results of this study may help us to decrease the morbidity related to vitamin D deficiency in cases of liver cirrhosis.

## MATERIAL AND METHODS

Between April 2021 to October 2021, total 163 patients of liver cirrhosis either gender aged 20-60 years were recruited from Department of Medicine, Sheikh Zaid Hospital, Rahim Yar Khan.

Patients taking calcium, antiepileptic drugs, vitamin A and D supplements, steroids and patients of kidney disease were

exclude. An approval was taken from review committee of the hospital before start of study. Written informed consent was taken from every patient. Detailed history (diabetes mellitus, hypertension or heart disease) was taken. The blood samples of patients was taken and sent to laboratory for 25-hydroxyvitamin D. Findings were noted on pre-designed proforma in term of vitamin D deficiency (Yes/No).

Analysis of data was done by using SPSS version 20. Age was presented as mean and SD while qualitative data was presented in form of frequencies.

## RESULTS

Total 163 patients suffering from cirrhosis of liver were recruited. Age range was 20-60 years and mean age was  $38.67 \pm 11.46$  years. Out of 163 patients, deficiency of vitamin D was found in 76 (47%) patients. (Fig. 1)

Two age groups: 20-40 and 41-60 years were created. Out of 84 (51.53%) patients of age group 20-40 years and 79 (48.47%) patients of age group 41-60 years, vitamin D deficiency was found in 37 (44.05%) patients and 39 (49.37%) patients respectively in both age groups. Association of vitamin D deficiency with age groups was insignificant ( $P = 0.496$ ). (Table 1)

Male patients were 59 (36.20%) and female patients were 104 (63.80%). Total 32 (54.24%) male patients and 44 (42.31%) female patients were found with vitamin D deficiency. No association ( $P = 0.142$ ) was detected between gender and vitamin D deficiency. (Table 2)

Child pugh class A, B and C patients were 78 (47.85%), 28 (17.18%) and 57 (34.97%) respectively. Vitamin D deficiency was noted in 34 (43.59%) patients, 14 (50%) patients and 28 (49.12%) patients respectively in child pugh class A, B and C but no association was detected ( $P = 0.756$ ). (Table 3)

Total 109 (66.87%) patients were infected with hepatitis B while 54 (33.13%) patients infected hepatitis C. Vitamin D deficiency was found in 52 (47.71%) patients of hepatitis B and 24 (44.44%) patients of hepatitis C. Insignificant ( $P = 0.694$ ) association between hepatitis serology and vitamin D deficiency was noted. (Table 4)

Obese patients were 55 (33.74%) and non-obese patients were 108 (66.26%). Vitamin D deficiency was noted in 32 (58.18%) obese patients 44 (40.74%) non-obese patients. Association between obesity and vitamin D deficiency was significant ( $P = 0.035$ ). (Table 5)

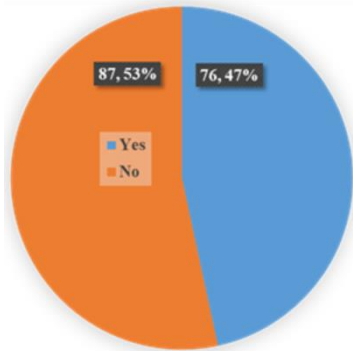


Fig 1: Frequency of vitamin D deficiency

Table 1: Stratification for age

Age group	Vitamin D deficiency		Total (%)	P. value
	Yes (%)	No (%)		
20-40 Years	37 (44.05)	47 (55.95)	84 (51.53)	0.496
41-60 Years	39 (49.37)	40 (50.63)	79 (48.47)	
Total	76 (47)	87 (53)	163	

Table 2: Stratification for gender

Gender	Vitamin D deficiency		Total (%)	P. value
	Yes (%)	No (%)		
Male	32 (54.24)	27 (45.76)	59 (36.20)	0.142
Female	44 (42.31)	60 (57.69)	104 (63.80)	
Total	76 (47)	87 (53)	163	

Table 3: Stratification for child pugh class

Child pugh class	Vitamin D deficiency		Total (%)	P. value
	Yes (%)	No (%)		
CP class A	34 (43.59)	44 (56.41)	78 (47.85)	0.756
CP class B	14 (50)	14 (50)	28 (17.18)	
CP class C	28 (49.12)	29 (50.88)	57 (34.97)	
Total	76 (47)	87 (53)	163	

Table 4: Stratification for hepatitis serology

Hepatitis serology	Vitamin D deficiency		Total (%)	P. value
	Yes (%)	No (%)		
Hepatitis B	52 (47.71)	57 (52.29)	109 (66.87)	0.694
Hepatitis C	24 (44.44)	30 (55.56)	54 (33.13)	
Total	76 (47)	87 (53)	163	

Table 5: Stratification for obesity

Obesity	Vitamin D deficiency		Total (%)	P. value
	Yes (%)	No (%)		
Obese	32 (58.18)	23 (41.82)	55 (33.74)	0.035
Non-obese	44 (40.74)	64 (59.26)	108 (66.26)	
Total	76 (47)	87 (53)	163	

**DISCUSSION**

This study was aimed to assess the vitamin D deficiency in patients of liver cirrhosis. Total 163 patients of liver cirrhosis were included in this study. Age range was 20-60 years and mean age was 38.67 ± 11.46 years. Vitamin D deficiency was found in 76 (47%) patients. Paternostro et al<sup>9</sup> recruited 199 patients of liver cirrhosis and examined the vitamin D levels in these selected patients. They found deficiency of vitamin D in 40% patients which is comparable with our study. Similarly Kumar et al<sup>10</sup> selected 160 patients of liver cirrhosis and examined the vitamin D level and found deficiency of vitamin D among 51.85% patients which is also in agreement with our findings. Stokes et al<sup>11</sup> examined 65 cirrhotic patients for vitamin D deficiency. Age range was 19-76 years, male patients were 66% rest of the patients were female. Child-Pugh stage C patients were 46%. They found deficiency of vitamin D in 86% patients (cut off value of Vitamin D = 20 ng/ml). While in our study, male patients were 59 (36.20%) and female

patients were 104 (63.80%). Total 32 (54.24%) male patients and 44 (42.31%) female patients were found with vitamin D deficiency. No association (P = 0.142) was detected between gender and vitamin D deficiency. In our study child pugh class A, B and C patients were 78 (47.85%), 28 (17.18%) and 57 (34.97%) respectively. Vitamin D deficiency was noted in 34 (43.59%) patients, 14 (50%) patients and 28 (49.12%) patients respectively in child pugh class A, B and C but no association was detected (P = 0.756). Finkelmeier et al<sup>12</sup> enrolled 251 patients of liver cirrhosis and assess vitamin D levels. They found vitamin D deficiency among 68.9% patients. Out of 251 patients 68.1% were males and 31.9% were females. Age range was 25-84 years. Hepatitis C and B was found in 29.5% and 13.5% patients. CP class A patients were 20.3%, CP class B were 47.0% and CP class C patients were 32.7%. In our study total 109 (66.87%) patients were infected with hepatitis B while 54 (33.13%) patients infected hepatitis C. Vitamin D deficiency was found in 52 (47.71%) patients of hepatitis B and 24 (44.44%) patients of hepatitis C. Insignificant (P = 0.694) association between hepatitis serology and vitamin D deficiency was noted. Putz-Bankuti<sup>13</sup> enrolled 75 cases of liver cirrhosis and found vitamin D deficiency in 71% patients.

**CONCLUSION**

Results of this study revealed that there is high proportion of deficiency of vitamin D in patients of liver cirrhosis. Most of the cirrhotic patients were between 20-40 years. Females were prominent as compared to males. CP class C was most common.

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