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VITAMIN D DEFICIENCY IN PATIENTS WITH CHRONIC LIVER DISEASE: A SINGLE CENTRE CROSS SECTIONAL STUDY

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Abstract

Background: Chronic liver disease is a medical disorder characterized by a lack of certain nutrients. Those with more severe forms of this disease are more likely to have vitamin D deficiency.

Objective: The aim of the study was to determine the vitamin D Deficiency in Patients with Chronic Liver Disease.

Methodology: This cross-sectional study was carried out at Department of Medicine Mekran Medical College Turbat from January 2023 to June 2023 after taking permission from the ethical committee of the institute. A total of 143 chronic liver diseases individuals of both genders and different age groups (20 to 80 years) were included. Three groups of CLD patients were created using Child-Pugh scores. Using medical records, demographic information such as age, gender, Child-Pugh Class, frequency of CLD, and primary cause of CLD were recorded. The data was analyzed using the statistical application IBM SPSS 22.

Results: There were 143 individuals participating in this research. Thirty individuals (20.9%) had both Class A and Class B of Child-Pugh chronic liver disease, whereas 84 of them (58.7%) had Class C. CLD was most often caused by HCV in 81 cases (56.64%), followed by HBV in 32 cases (22.37%), HBV+HCV in 11 cases (7.69%), Primary Biliary Cirrhosis in 5 cases (3.49%), hemochromatosis, NAFLD, Wilson, or no underlying etiology in 14 cases (9.79%). A total of 96 individuals (67.13%) were vitamin D deficient. There was no relationship between age and vitamin deficiency in this research ($p = 0.818$). Vitamin D deficiency was associated with gender ($p = 0.025$).

Conclusion: From the current study we concluded that Vitamin D was deficient in the majority (67.13%) of Chronic liver diseases participants and mostly female and participants with severe fibrosis had vitamin D deficiency.

Key words: vitamin D; Deficiency; Chronic Liver Disease.

Introduction

Chronic liver disease is a medical disorder described by a lack of certain nutrients. CLD patients are prone to both macro and micronutrient deficiencies, which can include shortages in minerals like selenium and iron as well as protein and numerous vitamins. It is also common to see (fat-soluble vitamin) deficiencies.[1] Those with more severe forms of this disease are more likely to have vitamin D deficiency, however those with less severe forms may also have it.[2] A lack of vitamin D promotes mortality, morbidity, and the repercussions of CLD, including recurrent bacterial infections and portal hypertension issues.[3]

Individuals with CLD illness may have a lack of vitamin D because of changes in their liver's metabolism of vitamin D.[4] The skin produces inactive forms of vitamins D2 and D3 when exposed to UV light, which the liver then hydroxylates to make them active. Low vitamin D levels are much more prevalent in individuals with Child-Pugh Class C .[5] A diet low in vitamin D, a decrease in intestinal absorption of vitamin D, and less sunlight exacerbate the condition.[6] The fibrosis stage in individuals with chronic liver disease influences vitamin D insufficiency. Falak et al. discovered that 13.6% of compensated cirrhotic patients and 55.2% of decompensated ones had vitamin D inadequacy.[7] 92% of patients with chronic liver disease, who were mostly Afro-American, had vitamin D inadequacy, according to Arteh et al.[8] Few research have been conducted in our nation on vitamin D deficiency in individuals with chronic liver disease and how it relates to the severity of liver disease.

Methodology

This cross-sectional study was carried out at Department of Medicine Mekran Medical College Turbat from January 2023 to June 2023 after taking permission from the ethical committee of the institute. 143 chronic liver diseases individuals of both genders and different age groups (20 to 80 years) were included. Participants with chronic kidney diseases, medical history vitamin-D deficiency and those who were using steroid for the last six months were not enrolled. Patients were diagnosed with CLD if they exhibited any or all of the following: (1) If they exhibit risk factors for CLD in addition to biochemical and synthetic function abnormalities indicative of CLD. (2) On ultrasonography, characteristics of CLD include surface nodules, hypertrophic or atrophic liver segments and coarse heterogeneous echo texture. (3) CLD was indicated by a liver biopsy or medical records. Three groups of CLD patients were created using Child-Pugh scores. Class A patients had a Child Pugh score of 6 or below, Class B patients had a score between seven and nine, and Class C patients had a score more than nine. [9]

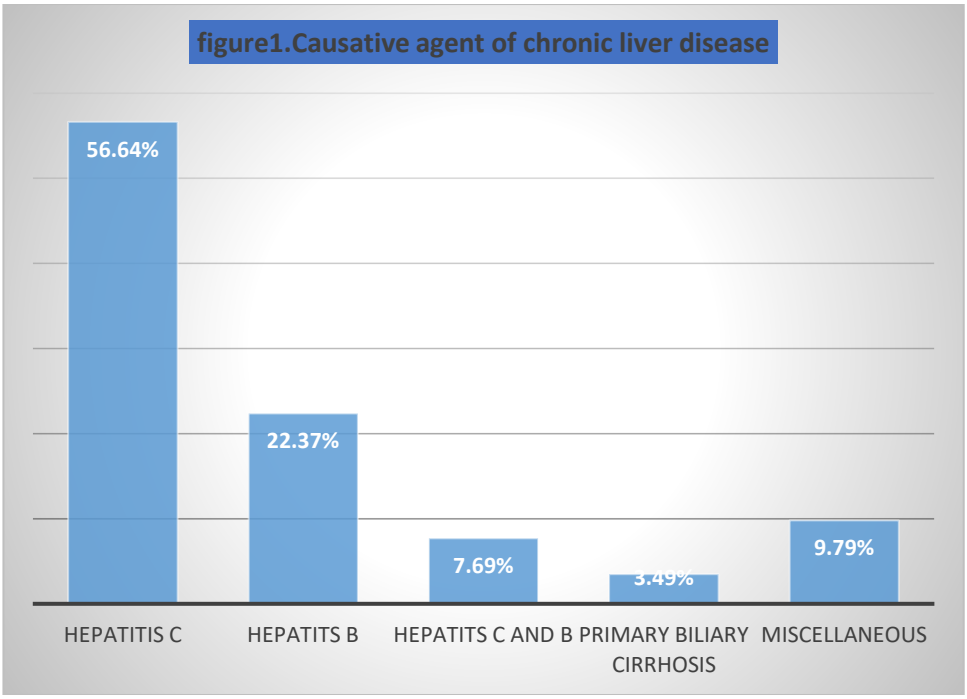
Using medical records, demographic information such as age, gender, Child-Pugh Class, frequency of CLD, and primary cause of CLD were recorded. After gathering pertinent medical history of vitamin D insufficiency, such as bone fractures, a thorough physical examination was conducted to look for any indications of hypovitaminosis D.

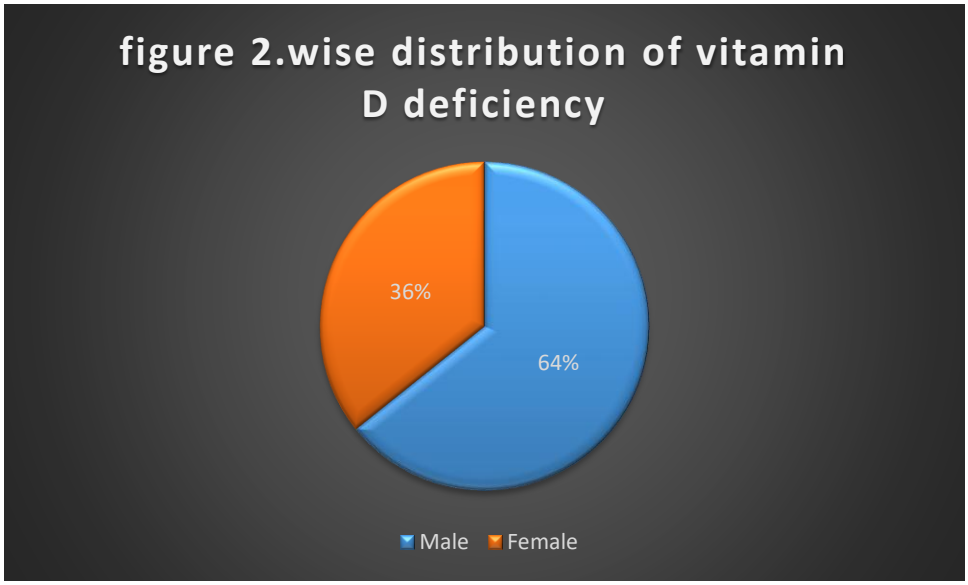
The patient's blood sample's vitamin D level was measured at the hospital lab. Levels of serum vitamin D 25,OH, D less than thirty nmol/L are deemed insufficient. The data was analyzed using the statistical application BM SPSS 22. Frequencies and percentages were calculated for qualitative characteristics such gender, Child Pugh Class, CLD etiology, and low vitamin D levels. For quantitative variables such age, the length of CLD, and blood vitamin D levels, mean ± SD were computed. Student T-tests for continuous variables and Chi-Square testing for categorical variables were also used to assess statistical significance. P-values less than 0.05 were considered significant .

Results

There were 143 individuals participating in this research. The patient was 53.40 ± 12.194 years old on average. The patients ranged in age from 20 to 80 years. Of them, 43 (30.0%) were women and 100 (69.9%) were males as shown in **table 1**. Thirty individuals (20.9%) had both Class A and Class B of Child-Pugh chronic liver disease, whereas 84 of them (58.7%) had Class C. CLD was most often caused by HCV in 81 cases (56.64%), followed by HBV in 32 cases (22.37%), HBV+HCV in 11 cases (7.69%), Primary Biliary Cirrhosis in 5 cases (3.49%), hemochromatosis, NAFLD, Wilson, or no underlying etiology in 14 cases (9.79%),**(figure 1).** These 14 patients' etiology was classified as miscellaneous. A total of 96 individuals (67.13%) were vitamin D deficient. 76 (53.14%) were between the ages of 41 and 60, and 50 (52.0%) had vitamin D deficiency. There was no relationship between age and vitamin deficiency in this research (p = 0.818). Vitamin D deficiency was associated with gender (p = 0.025). 35 (23.7%) women and 62 (42.6%) men were vitamin D deficient.(**figure 2)**

Tables 1.Demograpic features of the study Population n =143	
Variables	Frequency percentage
Age in years	
Mean	53.41
Range	20 to 80
SEX	
Female	43 (30.0%)
Male	100 (69.9%)
Agents responsible for chronic liver disease	
HCV	81(56.64%)
HBV	32(22.37%)
HBV + HCV	11(7.69%)
Primary Biliary Cirrhosis	5(3.49%)
Miscellaneous	14(9.79%)





Discussion

To fulfill the body demands Vitamin D is absorbed from food via the digestive tract and can produced endogenously in the skin's epidermal cells by exposure to UV light[10] The resulting inactive vitamin is then sent to the liver for hydroxylation by a protein known as vitamin D binding proteins, which is an album in analog. The liver's natural parenchyma is replaced by fibrous tissue in fibrotic disorders like chronic liver diseas, which impairs the liver's synthetic function and lowers vitamin D binding proteins, which ultimately results in vitamin D insufficiency.[11]

There were 143 individuals participating in this research. The patient was 53.40 ± 12.194 years old on average. The patients ranged in age from 20 to 80 years. Of them, 43 (30.0%) were women and 100 (69.9%) were males. Thirty individuals (20.9%) had both Class A and Class B of Child-Pugh chronic liver disease, whereas 84 of them (58.7%) had Class C. CLD was most often caused by HCV in 81 cases (56.64%), followed by HBV in 32 cases (22.37%), HBV+HCV in 11 cases (7.69%), Primary Biliary Cirrhosis in 5 cases (3.49%), hemochromatosis, NAFLD, Wilson, or no underlying etiology in 14 cases (9.79%),**.** These fourteen participants etiology was classified as miscellaneous .In the current research we revealed 67.13% vitamin D deficiency. The findings of this research are not similar to the study conducted by Arteh et al[5] in which they reported 92.4% of vitamin D deficiency in their study. Similarly, in the research of Falak et al.[8] 76.5% of patients exhibited vitamin D inadequacy. Because more women than men took part in these studies, vitamin D deficiency may be very common. Vitamin D insufficiency is often influenced by gender, and individuals with chronic liver failure are not a variance to this norm.. According to research by Johnson and colleagues, women with CLD are more likely to have vitamin D insufficiency.[12]

The data that we collected indicates that vitamin D insufficiency is more common in women with CLD compared to men ($p < 0.025$). The majority of the food consumed by the people in our community is protein, which may be the reason of vitamin deficiency. Women are less likely to be exposed to sunlight because to sociocultural and religious beliefs, which also results in vitamin D deficiency. There was an inverse relationship between vitamin D deficiency and patient Child-Pugh scores (value of p less than 0.001). The study carried out by Jamil et al. reported comparable findings.[13]

Conclusion

From the current study we evaluated that Vitamin D was deficient in the majority (67.13%) of Chronic liver diseases participants. Its deficiency was more common in women and people with severe fibrosis. To evaluate vitamin D deficiency among individuals with chronic liver disease, the scientific community should do comprehensive multicenter study.. Individuals with CLD should

have their vitamin D levels examined, and if a deficiency is identified, treatment should begin right once.

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