DOI: https://doi.org/10.53350/pjmhs22167572

ORIGINAL ARTICLE

Prevalence of Hyponatremia in Patients Presenting with Chronic Liver Disease

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ABSTRACT

Background: A liver illness that worsens over time and affects the liver's ability to function is known as chronic liver disease. Hyponatremia has been linked to higher rates of morbidity and death in cirrhotic patients

Objective: To assess the prevalence of Hyponatremia in patients presenting with Chronic Liver Disease

Methodology: The current study was cross-sectional, carried out at the department of medicine, Qazi Hussain Ahmad Medical Complex, Nowshera for duration of one year from July 2021 to July 2022. Blood samples of 5ml were taken from all the enrolled patients and sent to the hospital diagnostic laboratory for the examination of sodium level. All the data including demographic details were recorded on a pre-designed Performa. All the data analysis was done by using IBM SPSS version 23.

Results: In the current study, the average (SD) level of sodium was 141.96 (11.22) mmol/L. The overall frequency of Hyponatremia was 73 (34.76%) in chronic liver disease patients. Based on the severity of hyponatremia, mild, moderate and severe hyponatremia was observed in 105 (50%), 101 (48.10%) and 4 (1.90%) respectively. Hyponatremia was observed in 18 (23.68%) patients of Child-Pugh class A, in 23 (39.66%) in Child-Pugh class B while hyponatremia was observed in 28 (36.84%) patients of Child-Pugh class C (p>0.05).

Conclusion: Our study concludes that the frequency of hyponatremia in patients of chronic liver disease was high

Keywords: Prevalence; Hyponatremia; Chronic Liver Disease

INTRODUCTION

A liver illness that worsens over time and affects the liver's ability to function is known as chronic liver disease (CLD). These liver processes include the elimination of toxic metabolic waste products, bile excretion, and the production of proteins and clotting factors. Fibrosis and cirrhosis are the results of a continual process of inflammation, liver parenchymal damage, and regeneration. In the last stage of CLD, known as cirrhosis, the architecture of the liver is disrupted, nodules proliferate widely, the blood vessels are reorganized, new blood vessels are formed, and an extracellular matrix is deposited [1].

The major cause of death and morbidity worldwide is cirrhosis. In 2016, it was the eleventh largest cause of mortality and the fifteenth major cause of morbidity, responsible for 2.2 percent of fatalities and 1.5 percent of disability-adjusted life years globally [2]. In 2017, 1.32 million people died from CLD, with around two-thirds of the fatalities occurring in males and one-third in women [3].

Various factors, including toxins, persistent alcohol misuse, hepatitis B and C infection, autoimmune illnesses, hereditary conditions, and metabolic problems, may cause CLD [1]. The most frequent cause of cirrhosis has been shown to be alcohol, while the most frequent cause of non-cirrhotic CLD and hepatocellular cancer has been found to be hepatitis B virus [4]. The signs and symptoms are generic, and they include anorexia, exhaustion, and a loss of weight; however, the severity of these symptoms may vary depending on the complications that the patient may have acquired. Portal hypertension, hepatic insufficiency, and hepatocellular cancer are the three major consequences of CLD [1]. Hyponatremia, which is defined as a reduction in blood sodium < 130 mmol/L, is a frequent indication in decompensated cirrhotic patients because of an aberrant control of body fluid balance. It may be caused by hypovolemia from extracellular fluid loss brought on by the usage of diuretics or by an increased extracellular fluid volume from the kidneys' failure to remove solute-free water in a proportional quantity to the quantity of free water consumed [5]. Recent research has linked hyponatremia to more severe cirrhosis consequences, such as "difficult-to-control ascites", and to more post-transplant issues, such as neurologic problems, kidney failure, and complications of infections [6]. Additionally, hyponatremia has been linked to higher rates of morbidity and death in cirrhotic patients [5]. This research was undertaken to determine the prevalence of hyponatremia in patients with chronic liver disease since there were no research examining the impact of hyponatremia in chronic liver disease in the current study setting.

MATERIALS AND METHODS

The current study was cross-sectional, carried out at the department of medicine, Qazi Hussain Ahmad Medical Complex, Nowshera. The study duration was one year from July 2021 to July 2022. This study was approved by the research and ethical committee of the hospital. The inclusion criteria of the current study were all the patients of both the gender having age 18-75 years presenting with chronic liver disease. The exclusion criteria were all the patients with restricted to salt and valvular heart disease patients. Totally 210 patients were included based on the WHO sample size calculator. Both the inclusion and exclusion criteria were followed strictly. The study was explained to all the enrolled patients and then informed consent was taken in written form. All the data including demographic details were recorded on a pre-designed Performa. Blood sample of 5ml was taken from all the enrolled patients and sent to the hospital diagnostic laboratory for the examination of sodium level. Hyponatremia was defined as sodium level of less than 135mmol/L. Hyponatremia patients were managed according to the protocol of the hospital. All the data analysis was done by using IBM SPSS version 23. Means and standard deviations were computed for the age, chronic liver disease duration and level of sodium while percentages and frequencies were computed for the sex, hyponatremia and Child-Pugh class. Comparison of hyponatremia with the Child-Pugh class was done by using chi square test and p value of less than 0.05 was taken as significant.

RESULTS

In the current study, a total of 210 patients were included. There were 126 (60%) males and 84 (40%) females. (Figure 1) The mean (SD) age in the current study was 47.9 (8.11) years. The

mean (sd) duration of chronic liver disease was 5.62 (1.62) years. On the basis of Child- Pugh grade, 76 (36.19%) patients were observed in grade A, 58 (27.62%) in grade B while 76 (36.19%) patients were observed in grade C. (Figure 2) The average (SD) level of sodium was 141.96 (11.22) mmol/L. The overall frequency of Hyponatremia was 73 (34.76%) in chronic liver disease patients. (Figure 3) Based on the severity of hyponatremia, mild, moderate and severe hyponatremia was observed in 105 (50%), 101 (48.10%) and 4 (1.90%) respectively. (Figure 4) Hyponatremia was observed in 18 (23.68%) patients of Child-Pugh class A, in 23 (39.66%) in Child-Pugh class B while hyponatremia was observed in 28 (36.84%) patients of Child-Pugh class C (p>0.05). (Table 1)

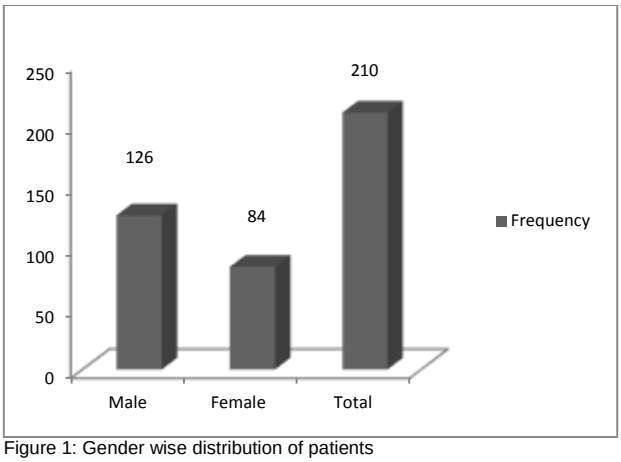

Figure 1: Gender wise distribution of patients

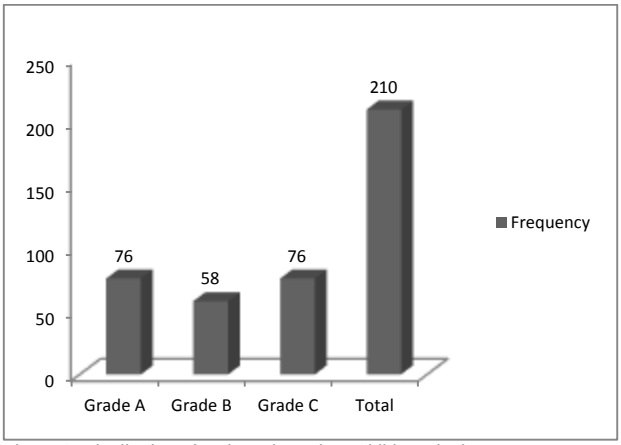

Figure 2: Distribution of patients based on Child-Pugh class

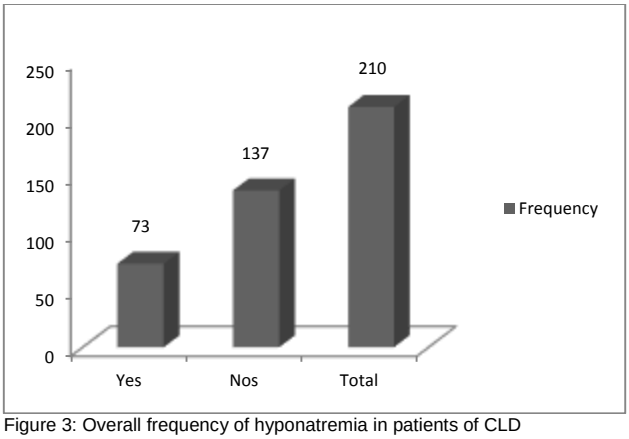

Figure 3: Overall frequency of hyponatremia in patients of CLD

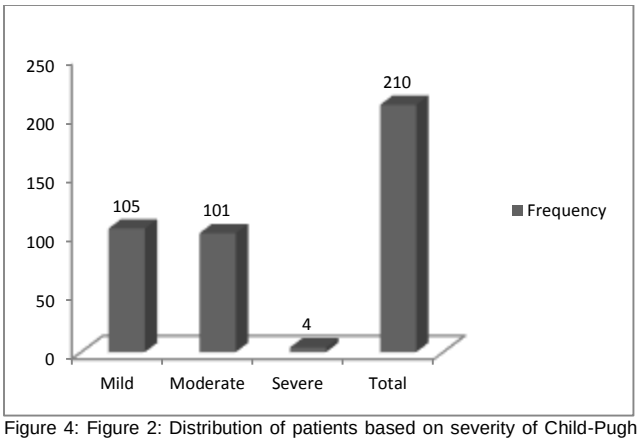

Figure 4: Figure 2: Distribution of patients based on severity of Child-Pugh class

Table 1: Association of hyponatremia with Child-Pugh class

Hyponatremia	Child-Pugh class		
	Class A	Class B	Class C
Yes	18 (23.68%)	23 (39.66%)	28 (36.84%)
No	58 (76.32%)	35 (60.34%)	48 (63.16%)
P value	0.091		

DISCUSSION

A typical consequence of advanced cirrhosis is hyponatremia, which is caused by the kidneys' inability to excrete solute-free water. This leads the body to retain more water than sodium, which lowers sodium levels and produces hypoosmolality. High rates of morbidity and death are predicted by hyponatremia in patients with chronic liver disease (CLD) [5, 7]. It is also clear from earlier research that hyponatremia may impair cognitive function and cause hepatic encephalopathy. As it is associated with a large number of problems and a lower short-term survival rate after liver transplantation, hyponatremia may potentially be a potential risk for liver transplantation. The current standard of treatment, which is centered on fluid restriction, is inadequate [7, 8].

In the current study, a total of 210 patients were included. There were 60% males and 40% females. On the basis of Child-Pugh grade, 36.19% patients were observed in grade A, 27.62% in grade B while 36.19% patients were observed in grade C. The average (SD) level of sodium was 141.96 (11.22) mmol/L. The overall frequency of Hyponatremia was 34.76% in chronic liver disease patients. Based on the severity of hyponatremia, mild, moderate and severe hyponatremia was observed in 50%, 48.10% and 1.90% respectively.

In accordance with our study, a previous study carried out in Hyderabad reported hyponatremia in 51.6% patients of chronic liver disease. They also reported that mild hyponatremia in 48.4% patients, moderate hyponatremia in 24.9% patients and severe hyponatremia in 26.7% patients with CLD [9]. Another study from Karachi reported hyponatremia in 46% patients with CLD [10]. In comparison to our study, another study reported high frequency (60%) of hyponatremia in CLD patients. They also reported that mild hyponatremia in 25% patients, moderate hyponatremia in 20% patients and severe hyponatremia in 15% patients with CLD [11].

A very high frequency of hyponatremia (70%) in comparison to our study was reported from Hyderabad in patients with liver cirrhosis [12]. A previous study carried out in Multan reported mean (SD) level of sodium of 133.93±3.8mmol/L in CLD patients with 48.4% frequency of hyponatremia. In their study high frequency of hyponatremia was observed in patents of Sindh ethnicity than Punjab ethnicity [13]. In another study carried out in USA reported hyponatremia in 30% patients with chronic liver disease [14]. In our study, hyponatremia was observed in 23.68% patients of Child-Pugh class A, in 39.66% patients in Child-Pugh class B while hyponatremia was observed in 36.84% patients of Child-Pugh

class C (p>0.05). In accordance with our study, a previous study done in Bangladesh reported hyponatremia in 30% patients of liver cirrhosis. They reported non-significant association between hyponatremia and Child Pugh score (p>0.05) [15].

CONCLUSION

Our study concludes that the frequency of hyponatremia in patients of chronic liver disease was high. Our research recommends that chronic liver disease patients be screened for sodium levels in blood on a regular basis to avoid hyponatremia, which may affect a patient's mental state and lead to potentially harmful outcomes.

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