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Original Research Article

The Burden of Liver Disease in Eastern India: Epidemiology and Analysis of Different Biochemical Parameters to Know the Risk Score for CLD Patients

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Conflict of interest: Nil

Abstract

Background and Aim: Chronic liver disease (CLD), with its various etiology and presentation, is a common cause of hospitalization in tropical countries. This CLD study includes etiology diagnosis, clinical feature examination, and associated disease and complications detection. The aim of the present study was to identify aetiological factors of CLD in and around the Eastern Indian population from two centers. Secondly, to investigate clinical, biochemical, ultrasonographic, endoscopic, and histopathological features of various CLDs.

Material and Methods: This was a one-year observational study of 245 patients with CLD who attended the OPD and inpatients at the Dept. of Gastroenterology, SCB Medical College and Dept. of Gastroenterology and Hepatobiliary Sciences, IMS SUM Hospital, Bhubaneswar. A total of 248 patients with CLD were included prospectively for the observation study. Clinical findings, laboratory investigations, ultrasonography, and an upper GI endoscopic study were used to diagnose chronic liver disease (CLD). All the data entered in the excel sheet were analyzed by SPSS version 16 to know the significance value $p < 0.05$.

Results: As observed from the study, the age group that participated was 30-39. A fraction of 54% of patients' Child Purgh Score was in the Class A group, while a fraction of 46% was among the Class B CP scoring group. Among the CLD patients, the High Blood ammonia level was about 58%, and the low normal ammonia level group was about 12%. A fraction of 53% of patients was under the Oesophageal varix Griding, and 41% were under the mild PHG among the selected group.

Conclusion: The current study provides a much-needed and valuable sketch of clinical patterns, aetiologies, regional differences, and overall trends in CLD access and utilization in India. Furthermore, the profile described here serves as a baseline for future comparisons.

Keywords: Chronic liver disease, Bio-chemical parameters, Risk factors, CPS score.

Introduction

More than 1 million people die yearly because of chronic liver disease (CLD) complications, which burdens society with a significant financial and health burden. According to studies, CLD accounts for 1.8–10% of fatalities and a rise in hospital admission rates. The number of deaths from chronic liver disease increased in India, with 268,580 or 3.17% of total deaths being the 83rd rank Globally (Liver Disease in India (worldlifeexpectancy.com). Even though steps have been taken to lessen this load, access to these interventions is poor, and the number of patients has sharply increased.

A liver function test (LFT) and imaging tests, including a CT scan, MRI, ultrasound, liver biopsy, and endoscopy, can all be used to detect chronic liver disease (CLD), which is characterized as a progressive condition that destroys and degrades liver cells [1-3]. Chronic liver disease can be categorized as alcohol-induced, viral, autoimmune, metabolic, hereditary, and fatty, with alcohol-related liver disease accounting for 48% of all fatalities from the chronic liver disease [4,5]. In 2017, there were 1.5 billion cases of CLD worldwide, with NAFLD (60 percent), HBV (29 percent), HCV (9 percent), and ALD being the most frequent causes (2 percent) (Disease GBD 2017). The median cirrhosis prevalence in European countries was 833/100,000 (range 447-1100), but information on cirrhosis prevalence in other regions, particularly in settings with limited resources, is scant [6,7].

The definition of chronic hepatitis is an ongoing, unrelieved liver inflammation for at least six months. However, it is not required to wait six months before starting medication when the diagnosis is clear-cut, as in the case of autoimmune hepatitis. Additionally, it is said that a patient who presents with a shorter clinical course but who otherwise exhibits other signs of chronic liver disease should not have the term of 6 months applied to them [8].

The medications advised now, according to the guidelines, are more efficient, require less time to administer, have fewer side effects, and can even be used at the decompensated stage where Interferon (IFN) therapy is not recommended, directly acting antivirals (DAA) for HCV have revolutionized the treatment. When ribavirin (RBV) is still advised, patients with severe liver disease are more likely to experience antiviral adverse effects [9-12]

Numerous research has been carried out among the western population, and there needs to be more information available from the perspective of India, particularly from rural areas. Furthermore, it has been noted that many people get CLD in its early stages after being exposed to various risk factors, progressing to the disease's advanced stages along with problems that require expensive medical treatment and raise the chance of death. Hence the present study aimed to assess the determinant factors of CLD among patients attending the Dept. of Gastroenterology and Hepatology.

Material and Methods

It was a prospective study conducted at the Department of Gastroenterology, SCB Medical College, Cuttack, India, for over two years. It was a retrospective study carried out at the same hospital from 2018-2021 containing 248 Chronic liver disease patients enrolled in the study. Based on the patient's upper gastrointestinal endoscopy, fibroscan, and liver function tests, the patient was diagnosed with cirrhosis. Complete blood counts, liver and renal function tests, serum electrolytes, coagulation parameters (PT, INR), blood sugar, abdominal ultrasonography, chest x-ray PA view, ascitic fluid - TLC, DLC, cultures, SAAG, Upper GI endoscopy, CECT abdomen or Triple phase

CT scan of the abdomen, and fibroscan were among the laboratory tests performed. All patients' baseline characteristics and clinical information were documented. Every patient underwent the typical course of CLD treatment. In the central laboratory, patients with suspected CLD underwent a hemogram and liver function test (LFT), which included the measurements of alanine transaminase (ALT), aspartate aminotransferase (AST), alkaline phosphatase, serum albumin, and globulin. The investigators created the organized proforma, which was used for data gathering.

Study population

All patients confirmed with CLD according to the diagnostic criteria by the Gastroenterologist are enrolled in the study. About 248 CLD patients were enrolled in the study, and the data were entered into the designed proforma. Patients who did not want to participate in the study were excluded. Patients were advised to withdraw from the study if they wished to retire for personal reasons.

Diagnostic Criteria to enrol in the study

The diagnosis of CLD was made using the combination of clinical features suggestive of CLD and either serological tests (The serum aspartate aminotransferase (AST) to platelet ratio index (APRI) using a threshold of 0.7 as an indicator of significant fibrosis) or ultrasound findings consistent with CLD (presence of an irregular liver surface or liver parenchyma heterogeneity). APRI was computed by multiplying the platelet count (109/L) by the upper reference range of the AST (U/L) by 100.

Statistical Analysis

The collected data were coded, entered, and exported to STATA (16.1), Stata Corp, College Station, Texas, USA., for analysis. Percentages, Chi-square, and Fisher's exact tests were applied for categorical data. A binary logistic regression model was performed to determine the factors associated with respiratory disease, and $P < 0.2$ were considered for multivariable logistic regression analysis.

Unadjusted odds ratio (UOR) and adjusted odds ratio (OR) with a 95% confidence interval were calculated for bivariate and multivariate logistic regression, respectively. A statistically significant association was considered for variables with $P < 0.05$ in regression analysis.

Results

Table 1: Demographic characteristics of CLD patients

Age range	Frequencies	Percentage
30-39	102	41
40-49	78	31
50-59	38	15
60-69	17	7
70-79	4	2
80-89	9	4
Child Purgh Score		Frequency (%)
	Class A	134(54)
	Class B	114(46)
Blood Ammonia Level Group		Frequency
	1. Low normal	30(12)

	2. High normal	74(30)
	3. High	144(58)
Esophageal Varix Griding		Frequency ()
	1. Grade 1	132(53)
	2. Grade 2	42(17)
	3. Grade 3	36(15)
	4. Normal Endo	38(15)
Phg Griding		
	None	146(59)
	Mild	102(41)

Table 2: Child Pugh's score in relation to their survival rates

Child purgh score	Class	Frequency (%)	One year survival	Two-year survival
5-6 Points	Class A	134(54)	100%	90%
7-9 points	Class B	114(46)	85%	70%

Table 3: Child Pugh's score and grading of oesophageal varices in relation to CLD

Child Pugh's score	UGI bleeds with varices				
	Grade 1	Grade II	Grade III	Normal	Total
A	96	0	0	38	134
B	36	42	36	0	114
Total	132	42	36	38	248

Table 4: Independent sample *t-test*

Group Statistics					
	CHILD PURGH SCORE	N	Mean	Std. Deviation(s)	Std. Error Mean
Age	Class A	134	46.15	13.638	1.178
	Class B	114	43.11	2.801	0.262
Blood Ammonia Level	Class A	134	65.96	17.043	1.472
	Class B	114	104.11	11.995	1.123
Total Bilirubin	Class A	134	1.490	0.2866	0.0248
	Class B	114	1.895	0.2887	0.0270
Direct Bilirubin	Class A	134	0.555	0.0837	0.0072
	Class B	114	0.832	0.2010	0.0188
AST	Class A	134	48.04	8.599	0.743
	Class B	114	79.37	36.674	3.435
ALT	Class A	134	44.45	9.218	0.796
	Class B	114	57.37	21.953	2.056
ALP	Class A	134	244.73	42.165	3.643
	Class B	114	251.42	41.852	3.920
Total Platelet Count	Class A	134	1.206	0.2240	0.0194
	Class B	114	1.032	0.1222	0.0114
Splenic Vein Diameter	Class A	134	13.99	0.746	0.064
	Class B	114	15.37	0.934	0.087

Patients were enrolled from the Department of Gastroenterology, SCB Medical College, Cuttack and Department of Gastroenterology and Hepatobiliary Sciences, IMS and SUM Hospital, Bhubaneswar, from the departments of Gastroenterology and hepatology as well as from the other medical college. As determined required, a combination of diagnostic modalities was used to evaluate the diagnosis of CLD. Different biochemical parameters and other diagnostic modalities were filled in a designed proforma. Two hundred forty-eight (248) individuals diagnosed with CLD at the time of presentation had their data examined and were enrolled in the study. There was a definite male majority among the 248 patients; not a single female was enrolled in the study population. These 248 patients ranged in age from 30-90 years, with 39 individuals (42.39%) in the 50- to 60-year-old age group showing a characteristic peak. Most patients, or 74, were between 40 and 70 (Table 1).

Child Turcotte Pugh (CTP) score: Depending on the sum of these five variables, patients are divided into three classes; A (score of 5-6), B (score of 7-9), and C (score of 10-15). A maximum of 54% of patients were from Class A under Child purgh score, whereas 46% were from Class B (Table 2).

According to De Franchisetal [13], oesophageal varices were rated as non-existent in grades 1, 2, and 3.

Grade 1: Less than a third of the lumen was occupied by oesophageal varices, which flattened when the air was inhaled.

Grade 2: Less than a third was taken up by oesophageal varices, which did not flatten with air insufflation.

Grade 3: At least a third of the lumen was taken up by oesophageal varices in grade 3, and they did not flatten when the air was inhaled.

When observed, oesophageal varix griding, 53% were under the Grade 1 Category, followed by a fraction of 17% in grade 2, and a fraction of 15% was in grade 3, the routine category.

Table (2) indicates Child Pugh's score and survival rate after one year and two years, respectively; a fraction of 54% is in Class A, the 1-year survival rate was 100%, and the two-year survival rate was 90%.

The number of cases with Child Pugh's score A grade I was 96, grade II was 0, and grade III was 0, and the normal UGI bleeds with varices were 38 patients. Interestingly, the UGI bleeds with varices among the CPS B grade I was 36, grade II 42, and grade III was 36; however, none of the patients under CPC B had normal UGI bleeding with varices (Table 3). The independent sample t-test revealed all the mean values for age, blood ammonia, bilirubin, and other parameters in two groups, i.e., CPS class A and B (Table 4)

Discussions

The main objective of the current investigation was to identify the clinical, etiological, and access-related characteristics of chronic liver disorders in eastern India. These are pertinent for developing policies and addressing difficulties with the health system's readiness, such as the distribution of resources for liver diseases in the Eastern Indian population. At least one-third of CLDs in India present at an astonishingly advanced stage of decompensated cirrhosis; there were notable regional differences in the country's predominant aetiologies, though there are socioeconomic disparities that characterize access to care facilities, among other important findings of this study. In 2019–2021, the hepatitis B vaccination was added to the immunization Program at IMS & SUM Hospital, Bhubaneswar. As a result, liver disease policy should prioritize screening and raising public knowledge of liver illnesses as critical strategic measures. To change this

situation, it may be necessary to improve professional education, risk factor detection, and public knowledge of the liver disease.

To change this situation, improving professi onal education, risk factor detection, and pu blic knowledge of the liver disease may be necessary.

Because of industrialization, alcoholism has become even more prevalent in our study population, increasing ALD-related morbidity and mortality in recent years. Even in India, which has a multiracial Asian population. According to the previous study, Indians have the highest rate of alcoholic cirrhosis (>50%) [14]

We demonstrate the study based on data that chronic liver diseases present late and early in two Indian hospitals. On the other hand, the relationship between the Child-Pugh score and oesophageal varices is inconsistent. Some studies have found no link between oesophageal varices and the Child-Pugh score [15-17]. As a result, parameters such as platelet count and white cell count have been used to predict the presence of significant oesophageal varices and thus increase endoscopy yield [18-20]

Present study group was consistent with previous studies in terms of age distribution, as the majority of patients (146 patients (60%) were over 40, and none were under 30. Many studies [21-25]. The severity of inflammation was associated with faster fibrosis progression when liver biopsies were obtained from patients at least 2 to 3 years apart. Because severe liver inflammation is associated with increased serum ALT levels, people with elevated serum ALT levels are more likely to have cirrhosis than those with persistently normal serum ALT levels [26-28]. We cannot comment on this because no liver biopsy was performed in our study group of cirrhotic patients. Considering this, screening and raising awareness about liver diseases are critical strategic interventions in liver disease policy and should be prioritized in the Indian context. Improving liver disease awareness, detecting risk factors, and improving professional education are all essential interventions in this scenario.

Conclusions

To limit further abuses such as alcohol consumption and chewing tobacco, an initiative must be launched to reduce alcohol consumption and chewing habits at various levels through awareness campaigns, strict control, and legislation. Controlling blood glucose and reducing obesity, most likely through increased physical activity and dietary changes, may be necessary for preventing CLD in our rural community.

Strengths and limitations of the study

1. The study has limitations, although it revealed significant findings that could contribute to the scientific community's understanding of CLD.
2. There are some limitations to our study. The first is prejudice in selection.
3. Even though the controls were drawn from the population, a higher ratio of powers to cases would have more accurately illustrated the risk factor distribution among controls.
4. Information bias comes in second. The goal of history is to document risk variables that existed before the development of CLD.

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Ethical Approval: Ethical clearance was applied for and obtained from the ethics committee SCB Medical College and Hospital, Cuttack. All procedures adhered to

the approved protocols; the Helsinki Declaration conducted the study.

Informed Consent: Informed consent was obtained from all subjects that were included in the study.

Author Contributions: All authors contributed substantially to the study and approved the manuscript.

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