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Magnitude and Trends of Chronic Liver Disease: A Retrospective Hospital Based Study in Eastern Amhara Region, Northeast Ethiopia

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Introduction

There are many different types of liver diseases and conditions that affect liver function. These can be acute liver failure, which results in a rapid loss of liver function usually within days or weeks, and chronic liver disease, which is characterized by a gradual deterioration of liver functions which could progress to cirrhosis or to hepatocellular carcinoma (HCC) [1]. Cirrhosis caused an estimated 1.32 million deaths in 2017, with 80 to 90% of patients progressing to HCC which is the fifth most common cancer in the world and the second leading cause of cancer death in men, trailing only lung cancer [2]. Various etiologies of chronic liver diseases have been reported, with the most common being Alcoholic Liver Disease, Non-alcoholic Fatty Liver Disease (NAFLD) or nonalcoholic steatohepatitis (NASH), also known as metabolic dysfunction- associated fatty liver disease (MAFLD), and chronic hepatitis B and C infections. Drugs, genetic causes, autoimmune diseases, and unexplained causes are also stated [2].

Alcohol-related liver disease accounts for 9.5% of CLD worldwide, with rates varying by region, with Europe having the highest rates [3]. Metabolic dysfunction-associated fatty liver disease is also the most common type of chronic liver disease, affecting more than 1 billion people worldwide, with prevalence ranging from 6% to 35%, with the highest rates in developed countries [4]. However, MAFLD is frequently asymptomatic or patients may experience non-specific symptoms and it is underestimated in developing countries due to screening and diagnosis practices [1, 5]. Viral hepatitis is the second leading etiology of CLD in developing countries with hepatitis B and C being among the most common. It is estimated that 10% of acute HBV infections and 80% of acute HCV cases progress to chronic disease [6]. Globally, more than 257 million people were living with chronic HBV in 2021, with 20% expected to die prematurely from liver failure or hepatocellular carcinoma. It was estimated that only 11% of infected people were aware of their infection, with only 17% receiving treatment which could be much higher in developing countries [7].

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Every year, approximately 2 million CLD deaths occur as a result of cirrhosis, viral hepatitis, and HCC complications and the prevalence of cirrhosis ranged 4.5% to 9.5% [8]. According to a global study of liver disease, mortality from cirrhosis increased by 47.15%, with the temporal trend varying depending on the etiology [9].

The global trend showed epidemiology shift of CLD, an increasing metabolic and alcoholic liver disease, and a decreasing hepatitis viruses[10]. According to findings decreasing trend of overall CLD death rate in all age groups was driven by the decrease in the proportion of people with HBV but the death rate for HCV and NAFLD was increased[11]. However, pattern varies by country, and viral hepatitis remains the leading cause of CLD in in sub-Saharan Africa. Countries also take different approaches to prevention and treatment, as well as access to health care [12, 13].

In Ethiopia, CLD was the 7th leading cause of death in 2019 and according to studies the three most common etiologies were Hepatitis B virus, alcohol, and hepatitis C virus with a prevalence of 40%, 17% and 15% respectively which showed variation by gender and age [14-16]. A significant proportion of NAFLD was also reported which is likely underreported given the rising prevalence of non-communicable diseases, such as type 2 diabetes and obesity as studies revealed high proportion of NAFLD among type 2 diabetic patients in different parts of the country [17, 18]. Furthermore, data about CLD, demographic and socio-economic factors in the study area is scarce [19, 20]. Therefore, this study aimed to describe the types and trend of CLD in the eastern Amhara region of North east Ethiopia

Methods

Study design and Settings

A retrospective hospital-based study was conducted in Dessie comprehensive specialized hospital, Amhara region, Ethiopia from January, 2018 to December, 2022 to estimate the magnitude, by etiologies and temporal trend of chronic liver disease. The hospital is serving as referral site for an estimated 10 million people.

Inclusion and exclusion criteria

Data was collected from patients with liver disease and those visiting the hospital from 2018 to 2022 was included and others were excluded.

Data collection

Data collector nurses were trained from the hospital and pretested data abstraction checklist was used to abstract data from the medical records.

Ethical Approval

Ethical approval was obtained from the Amhara Public Health Institute Dessie Branch ethics review committee (ID: APHI_DB/RTTD/17/2015) and permission to conduct the study was granted from relevant authorities

Data Analysis

Data was entered into Epi Info v7 and exported to STATA 14 for analysis. Frequencies, Proportions and summary statistics were used to describe the subjects in relation to the studied variables; the results are presented with tables.

Table 1. Socio-demographic characteristics of CLD among patients in Dessie comprehensive specialized hospital, Amhara region, North east Ethiopia, from January, 2018 to December, 2022

Characteristics	Frequency	Percent
Gender		
Male	59	66.3
Female	30	33.7
Residence		
Rural	66	74.2
Urban	23	25.8
Age group		
<18 years	5	5.6
18 – 24 years	8	9
25 – 34 Years	30	33.7
35 – 44 Years	15	16.9
45 – 54 years	12	13.5
>55 years	19	21.3
Total	89	100

Results

A total of 89 medical records of liver patients were observed of which the majority 59 (66.3%) were males and 66 (74.2%) rural residents. The median age was 35 years ranged 4 to 85 (SD± 15.7) and about half (48.3%) were below 35 years age (Table 1).

The most common clinical presentation was ascites which accounted 68.5% followed by jaundice (19.1%). The mean duration of clinical sign was 6.5 months with minimum of 1 a maximum of 36 months. Hypertension was seen as frequently observed comorbidity at proportion of 11.2% followed by diabetes and tuberculosis at 4.5%. Twenty seven study participants (30.3%) were anemic and 21 (23.6%) had history of taking drug for long time (Table 2).

Chronic hepatitis B infection was the most frequent etiology of CLD at 32.6% followed by Alcoholic liver disease and Nonalcoholic fatty liver disease at 21.3% and 18% respectively. In sixteen (18%) study subjects, unexplained cause of CLD was seen with 21 (23.6%) subjects with long time drug intake was identified most frequently for hypertension (11.2%), and diabetes (4.5%). Majority of CLD cases are males 59 (66.3%) and the most frequent etiology in males is chronic hepatitis B infection and alcoholic liver disease whereas, non-alcoholic liver disease and hepatitis B virus cause are the main etiology in females. As indicated in table 3, alcoholic and nonalcoholic liver disease is largely prevalent among age group above 55 years old and chronic hepatitis B infection is high in the age group 19-24 years. About three-fourth of CLD is prevalent among rural residents and all chronic Hepatitis B infection, Alcoholic liver disease, Non-alcoholic liver disease and unexplained causes of CLD are most frequent among rural than urban.

Table 2. Clinical Patterns of chronic liver disease patients in Dessie comprehensive specialized hospitals, Amhara region, North east Ethiopia, from January, 2018 to December, 2022

Characteristics	**Frequency**	**Percent**
Clinical presentation		
Ascites	61	68.5
Jaundice	17	19.1
Bloody vomit	9	10.1
Mental sign	1	1.1
Other	1	1.1
CLD Type		
Alcoholic Liver Disease	19	21.3
Nonalcoholic Faty Liver Disease	16	18
Chronic Hepatitis B infection	29	32.6
Chronic Hepatitis C infection	3	3.4
Hepatosplinic schistosomiasis	6	6.7
Unexplained	16	18
Comorbidity		
No	68	76.4
Diabetes	4	4.5
Hypertension	10	11.2
Tuberculosis	4	4.5
Diabetes and Hypertension	1	1.1
Other	1	2.2
Anemia		
Yes	27	30.3
No	62	69.7
Long time taken drug		
Yes	21	23.6
No	68	76.4

Table 3. Distribution of chronic liver disease etiology in Dessie comprehensive specialized hospitals of Amhara region, Northeast Ethiopia, from January, 2018 to December, 2022

Characteristics	ALD	NALD	HBV	HCV	Schistosomiasis	Unexplained	Total (%)
Gender							
Male	14	6	22	3	4	10	59 (66.3%)
Female	5	10	7	0	2	6	30 (33.7%)
Age in years							
Below 18	0	0	2	0	1	2	5 (5.6%)
19-24	0	0	7	0	1	0	8 (9.0%)
25-34	2	4	10	2	3	9	30 (33.7%)
35-44	4	5	3	1	1	1	15 (16.9%)
45-54	4	1	5	0	0	2	12 (13.5%)
55 and above	9	6	2	0	0	2	19 (21.3%)
Residence							
Urban	4	4	10	0	0	5	23 (25.8%)
Rural	15	12	19	3	6	11	66 (74.2%)
Total	19	16	29	3	6	16	89 (100%)

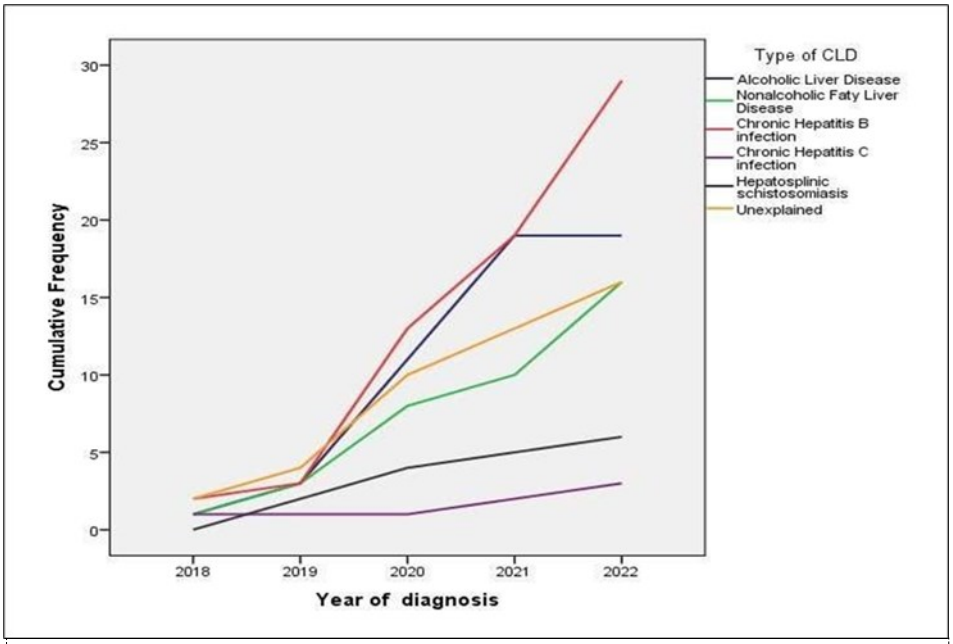

Figure 1. Five year trend of CLD types

In our study, aspartate transaminase (AST) and alanine transaminase (ALT) enzyme measurement was detected in 69 study subjects and increased level was observed for AST in 32 (46.3%) and for ALT in 19 subjects (27.5%) and for both in 17 (24.6%) based on ALT and AST reference limit of 0-42U/L and 0-37 U/L currently used in the country respectively. High level of AST than ALT which is mostly related to cirrhosis was observed in 49 (71.0%) study participants.

As shown in the graph below, the five year trend of CLD types in the study area exhibit variation in proportion and rate of increment (Fig.1). It is noticed that all types of CLD increase from 2018 to 2021 and chronic hepatitis B is the most contributing cause with highest rate of increment while hepatitis C virus infection and hepatosplenic schistosomiasis were among the least. In 2021 and onwards, alcoholic liver disease remain stable contrary to nonalcoholic liver disease which show upward trend.

Discussion

Chronic liver disease is believed to be distributed in different population groups and geographic area and this retrospective hospital based study was done to determine the five year magnitude and trends of chronic liver disease and describes the different types of CLD. In our finding, it was noted that CLD was most frequently distributed among males, age group below 35 years and rural residents. A study from Addis Ababa, Ethiopia also reported high prevalence of CLD in males than females. However, it contrasts to the Addis Ababa finding that showed the most commonly affected age group of 31 to 50 years [21]. This could be due to the fact that there might be epidemiologic difference between rural and urban setting in terms of factors causing liver disease. Secondly, in our study rural residents are included in the study and alcoholic liver disease is the second most frequent cause of CLD highly prevalent among age group above 55 years old whereas, in the Addis Ababa study alcoholic liver disease was the leading factor which is attributable to old age.

The most frequent etiology of CLD in the present study was chronic hepatitis B infection (32.6%), Alcoholic liver disease (21.35) and Nonalcoholic fatty liver disease (18%). This finding reveals hepatitis B infection remains the leading cause of CLD in Ethiopia similar to previous reports in Sub-Sahara Africa at 34%. Likewise, alcohol is the second cause of CLD which contributed slightly higher than previous 18% of CLD in Sub Sahara Africa. On the other hand, the proportion of NAFLD in this study is higher than the previous report of 12% in Ethiopia[17] and 13.5% in African countries. However, the global proportion of NAFLD is about 25% and due to change in lifestyle and increasing comorbidities particularly diabetes and obesity the finding is still underestimated [22]. In addition, unexplained causes of CLD was reported in a significantly higher proportion (18%) of study subjects. Although it is lower than previous finding of 45% in the country[17], it might be related to unexplained factors such as long time taken drugs, Khat chewing or rare genetic conditions which are missed due to poor diagnosis.

This study found that, NAFLD and hepatitis B are the most common causes of chronic liver disease in females at 33.3% (10 out of 30) and 23.3% (7 out of 30) respectively unlike in males where hepatitis B and alcohol are the most common etiologies of CLD at 37.3% (22 out of 59) and 10.1% (6 out of 59) respectively. This shows sign of epidemiology change to NAFLD in the adult population similar to the global trend [23]. Furthermore, chronic hepatitis B infection is the causative factor of almost all 87.5% (7 out of 8) chronic liver disease in the age group 19-24 years which might indicate the presence of past high rate of mother to child transmission before the launch of national childhood hepatitis vaccination

programs [24] or increased risk of sexual acquisition in the younger population as various reported similar findings which require additional preventive measures [25].

Ascites is the main signs of liver cirrhosis resulted from portal hypertension and it is the most frequently seen clinical presentation in the present study at 68.5% which higher than previous report of 46.2% from Gondar, Ethiopia [16]. But as compared to findings from developed countries where ascites, accounting about 80% of case, it is much lower that might be due prevalence variation across different geographic regions [26]. However, the mean health facility visit of 6.5 months after clinical sign was observed in our study which is indicative of delay in early screening and treatment until advanced stage of the disease is reached that influence its management and outcome.

Aminotransferase enzymes, aspartate aminotransferase (AST) and alanine aminotransferase (ALT), are commonly associated with liver disease as both enzymes are highly concentrated in the liver. However, as AST is also spread to the heart, skeletal muscle, kidneys, brain and red blood cells, an increase in ALT is more specific for liver damage including sign of nonalcoholic fatty liver disease [27]. Various studies also showed AST to ALT ratio of greater than 1 suggests cirrhosis [28]. Nonetheless, AST and ALT can vary according to age, sex, comorbidity conditions, or medication intake and chronic hepatitis and cirrhotic patients may have aminotransferase levels within the reference range. In our finding, increased level of AST and ALT is observed in 46.3% and 27.5% respectively with increment of both enzymes in 24.6% and 49 (71.0%) study participants had AST to ALT ratio of greater than one which reveals about two third of chronic liver patients in the study area were in the advanced cirrhotic stage which is higher than reports from Africa [29].

Increasing five year trend of all forms of CLD is also observed in this study with hepatitis infection remaining the highest and still showed increasing trend. On top of this nonalcoholic fatty liver disease and unexplained causes of chronic liver disease are linearly increasing which reveals the importance of addressing metabolic disorders and improving the diagnosis of liver disease.

Conclusions

In conclusion, this study showed the most frequent etiology of CLD in the study area is hepatitis B infection, Alcohol and Nonalcoholic fatty liver disease. The proportion of NAFLD and unexplained causes of CLD are higher than the previous reports and increasing five year trend of all forms of CLD is also observed. In this finding chronic liver disease is most frequently distributed among males, age group below 35 years and rural residents. Non-alcoholic fatty liver disease and hepatitis B are the most common causes of chronic liver disease in females whereas, hepatitis B infection is the major causative factor chronic liver disease in the age group 19-24 years and current interventions should consider this population groups. About two third of chronic liver patients in the study area were in the advanced cirrhotic stage indicated by ascites and AST to ALT ratio of greater than one which reveals delay in diagnosis suggesting the need of early screening.

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Declaration on interest

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