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RESEARCH ARTICLE

PATTERN OF LIVER DISEASE ADMISSIONS AT A TERTIARY GOVERNMENT HOSPITAL IN SANA'A, YEMEN

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Abstract

Back ground and objectives: Liver disease causes major public health problems international, especially in poor countries, and it is associated with poor long-term clinical outcomes and results in the deaths of millions worldwide annually. The aim of this study is to ascertain the virtual frequencies of liver disease and to assess etiological factors among patients admitted to Al-Thawra tertiary Hospital in Sana'a City, Yemen.
Methods: This was a descriptive retrospective analysis study of gastrointestinal patients admitted from January 1, 2021 to December 31, 2021 to the medical wards of Al-Thawra Hospital. This is a tertiary hospital located in the Yemeni capital, Sana'a City. Data were extracted from patient case folders for the period of under review. Data validated with Microsoft Excel version 13 and exported to SPSS version 23.0 for windows; for statistical analysis. Data were evaluated for demographic and other clinical characteristics as definite variables.
Results: Of the 516 gastroenterology patients admitted to the gastroenterology service in medical wards during a one-year period, liver disease accounted for 30% of all gastroenterology in the same period. There were 155 patients diagnosed with liver disease. There were 86 (55.5%) males and 69 (44.5%) females, with a male to female ratio of 1.2:1. The mean overall age of patients and the age range were 46.14±16.5 and 8-85 years, respectively. The peak incidence of age occurred during the fifth and sixth decades of life at 38.1%. The most common liver disease was; autoimmune hepatitis 43 (27.7%), followed by nonalcoholic fatty liver disease 35 (22.6%), viral hepatitis 32 (20.6%) and schistosomiasis 10 (6.5%).
Conclusion: Current findings show that autoimmune hepatitis was the most common cause among gastrointestinal diseases in Sana'a city, Yemen; the male to female ratio was roughly the same. In light of this, health education and public awareness about hepatitis virus screening tests and schistosomiasis screening and treatment is the primary preventive strategy to be considered.
Keywords: Autoimmune hepatitis, liver diseases, schistosomiasis, toxic hepatitis, viral hepatitis, Yemen.

INTRODUCTION

Liver disease produces significant public health problems with poor long-term clinical outcomes, comprising premature deaths from cirrhosis, liver failure, and hepatocellular carcinoma worldwide [1]. Information of the liver disease pattern is useful, not only in shaping health policies, research and prioritizing health interventions, on the contrary may also help in planning the organization and activities of gastroenterology units to provide better and effectual patient care. Mostly; affected persons are asymptomatic for an extended period of time, which makes it extremely difficult to establish accurate information on prevalence and incidence in the common population. The liver disease pattern varies across geographic locations. Worldwide, eight hundred and forty-four millions persons suffer from chronic

liver disease (CLD) as well as a mortality rate of 2 million annually[2,3]. The leading causes of disease and death for liver disease worldwide, consisting of hepatitis B virus (HBV) and hepatitis C virus (HCV) infection, nonalcoholic fatty liver disease (NAFLD), alcoholic liver disease (ALD), liver failure (LF) and connected with cirrhosis, and hepatocellular carcinoma (HCC)[1,3]. Fatty liver disease (hepatic steatosis) is a reversible condition in which large vacuoles of triglycerides accumulate in liver cells and is a group of diseases associated with obesity and metabolic syndrome[1,3]. In addition, HCC is recognized as the fourth most common cause of cancer-related death worldwide. More than 80% of HCC cases occur in low- and medium-resourced countries, particularly in Middle East countries as Yemen, Sub-Saharan Africa and East Asia; where social and medical care funds are often limited[4]. Hepatitis B infection involves at least two billion people worldwide; of these, 350-400 million are chronic hepatitis B virus carriers[1]. The involvement of non-alcoholic fatty liver disease as a significant etiology of liver diseases should also be considered; if obesity is used as a substitute marker. Early malnutrition and stunted growth are associated with a raised risk of metabolic syndrome, and this is exacerbated by increased urbanization in adult life and the association change from the traditional high-fiber diet to the Western diet rich in calories, animal protein and sugars and saturated fat. There is furthermore an increase in the accessibility to fast foods and soft drinks along with a decrease in physical activity[5].

There is a dearth of data on the causes and pattern of liver disease in Yemen and most of the published studies and reports provide information on the epidemiology of viral hepatitis[6-22], but not on liver disease in general. Thus, this study will provide information there is need in the treatment of liver disease and its consequences. Also, this study will highlight an important opportunity to improve overall health given that most causes of liver disease are preventable. Therefore, the aim of this study is to ascertain the hypothetical frequencies of liver diseases and to assess the etiological factors among patients admitted to Al-Thawra tertiary Hospital in Sana'a City, Yemen.

SUBJECTS AND METHODS

This was a descriptive retrospective study including patients admitted from January 1, 2021 to December 31, 2021) in the internal ward of Al-Thawra tertiary Hospital in Sana'a City, Yemen. Case files of patients were retrieved and data extracted. Data included; demographic data, for instance (age, sex, residence, occupation, etc.), clinical manifestations, diagnoses and disease outcomes. All diagnoses were based on the final diagnoses made by the supervising consultants at the hospital. The diagnosis of an individual's liver disease was based on multiple factors including laboratory findings, physical examination, and patient history. Imaging was also generally obtained to assess the liver. Liver biopsy has also been used to confirm the diagnosis of schistosomiasis and other diseases; however, it is not generally preformed for all patients. Data validated with Microsoft Excel version 13 and exported to SPSS version 23.0 for windows; for statistical analysis. Statistics were explored for demographic and other clinical characteristics as categorical variables. The mean and standard deviation were established for quantitative variables such as age. The data were obtainable as a frequency distribution and plots were generated for the partial categorical variables, while the mean and standard deviation were for a quantitative variable.

Ethical consideration: Ethical approval for this study, No: 354 dated December 21, 2020 was obtained Ethical approval was acquired from the ethics committee of the Faculty of Medicine and Health Sciences, Sana'a University prior to data collection. An official letter was obtained from the Faculty of Medicine and Health Sciences, Sana'a University, to be submitted to the administration of Al-Thawra Hospital to facilitate the conduct of this research work.

RESULTS

Of the 516 gastroenterology patients admitted to the gastroenterology service in medical wards during a one-year period, liver disease accounted for 30% of all gastroenterology in the same period. There were 155 patients diagnosed with liver disease. There were 86 (55.5%) males and 69 (44.5%) females, with a male to female ratio of 1.2:1.

Table 1: Socio-demographic characteristics of GIT patients admitted into the medical wards in Al-Thawra tertiary Hospital (n=516).

Variables	n (%)	Variables	n (%)
Age		**Marital Status**	
<25	45 (8.7)	Married	417 (80.8)
25-34	87 (16.9)	Unmarried	99 (19.2)
35-44	119 (23.1)	**Education**	
45-54	81 (15.7)	Illiterate	243 (47.1)
>=55	184 (35.7)	Primary school	130 (25.2)
Sex		Secondary school	86 (16.7)
Male	295 (57.2)	Collage	35 (6.8)
Female	221 (42.8)	University and above	22 (4.3)
Residence		Total	516 (100)
Urban	371 (71.9)		
Rural	145 (28.1)		

The mean overall age of patients and the age range were 46.14±16.5 and 8-85 years. The peak incidence of age occurred during the fifth and sixth decades of life at 38.1%. The most common liver disease was; autoimmune hepatitis 43(27.7%), followed by nonalcoholic fatty liver disease 35 (22.6%), viral hepatitis 32 (20.6%) and schistosomiasis 17 (11%). Toxic hepatitis accounted for 4.5% including herbal toxic hepatitis 3.9%, and alcohol consumption 4.5%, while vascular and neoplastic hepatitis were 3 (1.9%) and 2 (1.3%), respectively. Figure 1 illustrates complications among diagnosed liver patients.

Table 2: Socio-demographic characteristics of liver diseases patients admitted into the medical wards in Al-Thawra tertiary Hospital.

Variables	n (%)	Variables	n (%)
Age		**Marital Status**	
<25	9 (5.8)	Married	136 (87.7)
25-34	27 (17.4)	Unmarried	19 (12.3)
35-44	35 (22.6)	**Education**	
45-54	25 (16.1)	Illiterate	74 (47.7)
>=55	59 (38.1)	Primary school	39 (25.2)
Sex		Secondary school	26 (16.8)
Male	86 (55.5)	Collage	11 (7.1)
Female	69 (44.5)	University and above	5 (3.2)
Residence		Total	155 (100)
Urban	110 (71)		
Rural	45 (29)		

The most common complications were anemia (56.1%), ascites (56.8%), thrombosis (41.3%), and upper gastrointestinal disease (42.6%). On the other hand, lower GI disease occurred in only 23.9%, 20% of patients had acute renal failure, 5.2% had acute hepatic failure, 3.9% had GB syndrome, and 12.9% had pleural effusion. The outcomes of patients were 37.4% cured and discharged from hospital, 31.6% had chronic failure, 12.3% had cirrhosis, 11.2% had chronic hepatitis, 5.2% had hepatocellular carcinoma, and the mortality rate was only 1.9% (Figure 2).

Table 3: The etiological causes of liver diseases for patients admitted into the medical wards in Al-Thawra tertiary Hospital (n=155).

Etiological causes	n (%)
Autoimmune hepatitis	43 (27.7)
Non-alcoholic fatty liver disease	35 (22.6)
Infective viral hepatitis (HBV, HCV)	32 (20.6)
Schistosomasis	10 (6.5)
Toxic hepatitis	7 (4.5)
Herbals toxic hepatitis	6 (3.9)
Chemical toxic	1 (0.64)
alcoholic liver disease	7 (4.5)
Biliary diseases /obstructions	6 (3.9)
Inherited/Metabolites	3 (1.9)
Vascular	3 (1.9)
Neoplastic	2 (1.3)
Total	155 (100)

DISCUSSION

Cirrhosis is the most important cause of mortality and morbidity universal. It is the eleventh most important reason of death and the fifteenth most important reasons of morbidity, accountable for 2.2% of deaths and 1.5% of disability-adjusted life years global in 2016[23]. One of the objectives of the current study is to determine the causes as well as the demographic characteristics of liver patients at Al-Thawra Hospital in Sana'a. The majority of patients were males (55.5%), while females constituted 44.5% of the total (Table 2). Male dominance in the current study is similar to that reported by Yakubu1 and Maiyaki[24], where the incidence of cirrhosis is 80.5% (1/4) more among males than females. The difference is due to increased exposure to risk factors for liver disease such as hepatitis B, alcohol and cigarette smoking. In addition, hormonal factors such as low levels of estrogen in males and high levels in women (a powerful antioxidant) tend to protect women, and estrogen suppresses hepatic fibrosis by reducing stellate cells[25]. Most of our patients were adults and less than 5.4% of our total patients were children under 15 years of age, and the disease center was at > 55 years (38.1%) (Table 2). This finding is similar to the epidemiology of hepatitis where adults predominate in all causes except for hepatitis A virus infection where infection is prevalent in children[23]. The mainly common causes of liver disease in the current study were AIH (27.7%), followed by non-alcoholic fatty liver disease (NAFLD) (22.6%), and viral hepatitis (20.6%) (Table 3). The current results differ from those reported by Sepanlou *et al.*,[26] Asrani, *et al.*,[27] in the global burden of liver disease where the most common causes of disease are NAFLD (59%), followed by HBV (29%), HCV (9%),

and alcoholic liver disease (ALD) (2%) and autoimmune hepatitis, accounting for only 1% of cases. Recent studies in Yemen near the site of the current study revealed the prevalence of hepatitis B virus from 1 to 20%, and hepatitis C ranges from 2 to 5% [8,12,16,18]. Worldwide, there are 257 million persons living with chronic hepatitis B. With no appropriate managing, just about 20% die early due to liver failure or hepatocellular carcinoma[28]. It is predictable that just 11% of sufferers know of their infection, and 17% of them only receive treatment[28]. Sexual transmission, vertical transmission, and hospital transmission (use of contaminated blood products, or medical equipment) are the major routes of spread[7-10,12-23,28].

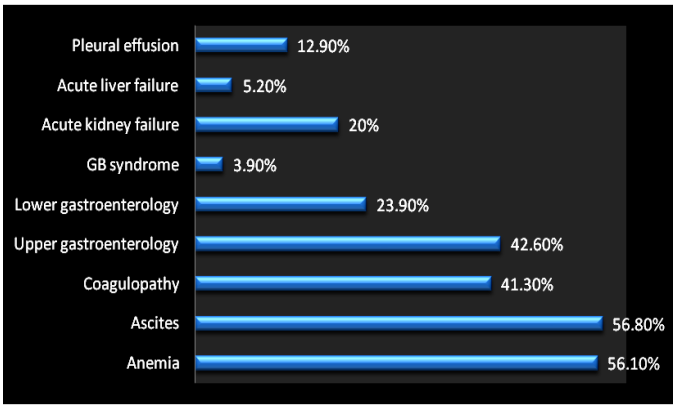

Figure 1: Identifying the complications among liver patients.

Childhood acquisition presents the main risk factor of chronic Hepatitis B virus infection: 80% to 90% of infections gained in the firstly year of life and 50% to 60% of hepatitis B virus infections previous to the age of 6 years result in chronic HBV variation, <5% of infections change to chronic hepatitis B infection when acquired during adulthood[28]. Universal vaccination of children is key to reducing the burden of hepatitis B. The World Health Organization (WHO) officially recommended the inclusion of the hepatitis B vaccine in universal immunization programs for children in 1992. Ever since, the campaigns of vaccination have already had an effect since rates of chronic hepatitis B infection in childhood have fallen from 4.7% in the pre-period of vaccination to 1.3% in 2015[28]. The Americas obtained hepatitis B vaccine coverage of 90% among children under one year of age - the minimum set by the World Health Organization in 2015[27-30].

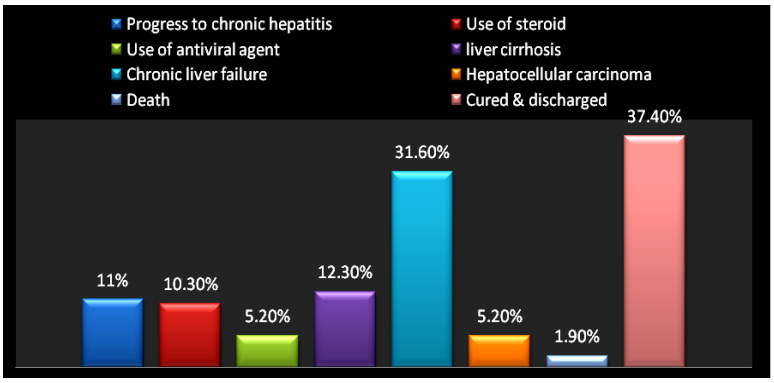

Figure 2: Identifying the outcomes among liver patients.

Immunization rates in other regions including Yemen are still lagging, where HBV coverage for children is no more than 50%. Barriers in these areas include vaccine availability and delays in healthcare delivery as the majority of deliveries in these areas occur outside the hospital[13,28-30]. The prevalence of hepatitis C was stable with declines in some areas from 2000 to 2015, mainly due to improved screening of blood products[7,8,9]. Several modern trends are alarming to the increasing burden of hepatitis C. First, in the world there are more infections (for example, 1.75 million in 2016) diagnosed annually than with successful treatment[28]. Second, use again of non-sterile medical equipment and absence of blood screening programs are enduring problems in many regions, such as Yemen[9,18], Pakistan, India and parts of Southeast Asia[28]. Lastly there has been a recovery in IVDU in the middle of young adults, predominantly in United States, Russia, and China[28].

In the current study, herbal toxic hepatitis was 3.9% of the total liver disease, (Table 3). Herbal preparations and nutritional supplements are a further significant cause of hepatitis. These are the majority ordinary causes of drug-induced hepatitis in Korea[31]. The United-States-based Drug Induced Liver Injury Network has connected more than 16% of hepatotoxicity cases to herbal and dietary supplements[32]. There is no consumer database to keep track

of all known prescription and nonprescription compounds associated with liver injury in Yemen, so researchers in Yemen must create a liver toxic archive of Yemeni herbs. Exposure to other hepatotoxins can occur accidentally or intentionally through ingestion, inhalation, and skin absorption. Synthetic toxic carbon tetrachloride and the wild mushroom Amanita phalloides are other known hepatotoxicities[33].

In the current study, alcoholic liver disease (ALD) accounted for 4.5% of the total liver disease, (Table 3). When alcohol is considered a major cause and a cofactor, alcohol is responsible for 30% to 50% of cirrhosis-related deaths globally[28,34]. Accurate estimates of ALD in Yemen and globally are difficult to establish because the diagnosis is based on people self-report of alcohol consumption, in contrast to viral hepatitis, which can be determined based on objective tests. As an alternative, annual per capita alcohol consumption, which is in a straight line related to the burden of ALD at the population level, is utilized as an indicator of disease trends and all of this information is not available or present in Yemen.

In the current study, the rate of nonalcoholic fatty liver disease (NAFLD) was the second cause (22.6%) (Table 3). This rate is similar to the global prevalence where the prevalence of non-alcoholic fatty liver disease is 24%, which is more than 30% in the Middle East and South America[6]. Up to 59% of NAFLD cases are of the nonalcoholic steato-hepatitis (NASH) phenotype, a major subtype of the disease with a risk of fibrosis progressing to cirrhosis. Even though there are no direct signs of nonalcoholic steatohepatitis, type 2 diabetes and obesity are potent clinical risk factors for the development of fibrosis, and their trends at the population level provide approaching into disease trends[35]. Obesity rates have raised in all counties of the world since 1975. However, despite obesity prevalence rates of less than 5%, China and India account for a very large proportion of global obesity due to their large populations. Russia, Mexico and Egypt also have the highest absolute numbers of obese adults[33], but in Yemen no official data is available but in general the observed obesity rates have increased in Yemen in the past twenty years. There was a significant rate of schistosomiasis as a cause of liver disease in the current study (Table 3). The eggs of *S. mansoni* (the intestinal schistosomiasis endemic in Yemen) migrate to the liver resulting in fibrosis in 4 to 8% of persons with chronic infection, especially those with severe long-term infection. This condition can be divided into two distinct stages: inflammatory hepatic schistose-miasis (an early inflammatory reaction) and chronic hepatic schistose-miasis. The most widespread species that cause this form are *S. japonicum*, *S. mansoni*, and *S. mekongi*. In addition, hepatitis viral infection is common in schistosomiasis endemic areas with hepatitis B or hepatitis C, and hepatitis C infection is associated with faster liver decline and worse outcomes. Hepatofibrotic schistosomiasis caused by *S. mansoni* frequently develops in about 5-15 years, while it may take less time for *S. japonicum*[36].

CONCLUSIONS AND RECOMMENDATIONS

The current findings show that autoimmune hepatitis was the most common cause among gastrointestinal diseases in Sana'a city, Yemen; In light of this, health education and public awareness about hepatitis virus screening tests and schistosomiasis screening and treatment is the primary preventive strategy to be considered. Health education and public awareness about hazard of herbal toxicity and self-medication should also be considered. Non-alcoholic fatty liver disease (NAFLD) and alcoholic liver disease (ALD) are likely to increase in Yemen. So screening for chronic liver disease (CLD) in the general population and NAFLD in high-risk groups is key to targeting prevention and treatment strategies. For Yemen, country-specific strategies will need to be tailored to local trends and risk factors. Therefore, more studies need to be done to identify risk factors.

Liver disease and the consequent cirrhosis of the liver are considered a public health problem in Yemen because it is a major cause of mortality and morbidity. Hepatitis B virus (HBV) burden and mortality is high in Yemen but is expected to decrease due to universal childhood vaccination programs that have expanded since 2010 but will take long time to see the full impact.

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AUTHOR'S CONTRIBUTION

Mutahar DJA: writing original draft, methodology. **Al-Khamesy KSA:** research design, data collection. **Al-Moyed KAA:** statistical analysis, conceptualization. **Al-Shamahy HA:** critical review, supervision. **Al-Shehari MH:** methodology, investigation. Final manuscript was read and approved by all authors.

DATA AVAILABILITY

The data and material are available from the corresponding author on reasonable request.

CONFLICT OF INTEREST

None to declare.

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