

Clinico-epidemiological spectrum of chronic liver disease patients at a tertiary care center in Ajman, UAE – a descriptive 5 year data analysis

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ABSTRACT

Aim: To describe the clinico-epidemiological profile, metabolic risk factors, and treatment outcomes of patients with chronic liver disease (CLD) at a tertiary care center in Ajman, UAE.

Materials and Methods: 149 individuals with confirmed CLD were included in a descriptive five-year retrospective study. Descriptive statistics (frequencies and percentages) were utilized for analyzing demographic data, lifestyle variables, metabolic comorbidities, and clinical outcomes.

Results: The male-to-female ratio in the cohort was 3.7:1, with a significant male preponderance (78.5%; n=117). In particular, most patients (91.3%) were under 60, with those under 40 making up the biggest group (46.3%; n=69). The Eastern Mediterranean Region was the place of origin for more than half of the participants (55.7%). In terms of lifestyle risk factors, 32.9% of respondents smoked, and 24.2% reported drinking alcohol (14.1% now, 10.1% previously). Although only 8.1% were classified as obese (BMI ≥ 30 kg/m²), 84.6% had abnormal BMI (overweight or obese). Fatty liver (41.6%), diabetes mellitus (38.9%), dyslipidaemia (37.6%), and hypertension (36.2%) were among the significant metabolic comorbidities. Nearly half (49.0%) of patients had incomplete or poor clinical outcomes to medications, whereas 51.0% had "good" results.

Conclusions: This tertiary-care cohort found a predominance of economically productive males who were affected by CLD, who also exhibited a high prevalence of metabolic risk factors. Origins of obesity and diabetes have highlighted the regional influence of metabolic (MAD) liver disease. To optimise the outcome of patients who have these diseases, there is an urgent need for early screening and comprehensive management of metabolic risk factors.

KEY WORDS: BMI, metabolic syndrome, lifestyle factors, cardiovascular risk, liver function, diabetes, public health, Middle East

INTRODUCTION

Chronic liver disease (CLD) has risen as a dreadful public health challenge globally. It is characterised by progressive destruction of liver parenchyma that leads to fibrosis, cirrhosis, and potentially hepatocellular carcinoma [1,2]. Typically, viewed as a condition that mainly affects the elderly, recent epidemiological shifts show a rising incidence among younger adults, largely

driven by the changing lifestyle patterns [3,4]. Globally, CLD was estimated to affect approximately 1.5 billion people in 2017, with metabolic-associated conditions accounting for nearly 60% of these cases [5,6]. The burden remains overwhelming, as of 2021, cirrhosis and other chronic liver pathologies contributed to over 1.4 million deaths and 46.4 million disability adjusted life years worldwide [7].

In the Middle East and North Africa (MENA) region, the clinical spectrum of CLD is going through a rapid transition. While the success of vaccination campaigns and antiviral therapies has led to a decline in viral hepatitis, there has been a significant surge in Metabolically Dysregulated Associated Steatotic Liver Disease (MASLD) [8]. In the MENA region, MASLD prevalence is estimated to be around 39.4% in the general adult population, rising to a concerning 68.7% among patients with type 2 diabetes [9,10]. In the last decade, the incidence of MASLD in this region increased by nearly 14%, with high fasting plasma glucose identified as the major contributing factor [11].

The United Arab Emirates (UAE) reflects these regional trends as well, where metabolic risk factors have become the main cause of CLD [12]. In the UAE, CLD is increasingly associated with the rising cases of obesity and type 2 Diabetes Mellitus [13]. This shift is critical as liver diseases are often asymptomatic in their early stages, complicating early detection and leading to worse clinical prognoses. For younger adults, this early onset leads to long-term metabolic complications, impaired quality of life, and a substantial socio-economic burden [14]. Clinical outcomes in CLD are often influenced by a complex interplay of comorbidities such as Hypertension, Hypercholesterolemia, and Diabetes Mellitus, which can accelerate disease progression [15]. Therefore, identifying specific predictors within the UAE is essential for promoting and achieving healthy ageing [16].

Research indicates that while age and gender are significant non-modifiable factors, men often show a higher risk and faster fibrosis progression [17, 18]. The modifiable lifestyle factors, too, like tobacco use, alcohol consumption, and dietary habits, play a vital role in the clinical epidemiological profile of these patients. These factors, along with abnormal body mass index (BMI), have proven to be predictors of CLD [19]. Understanding how these factors correlate with objective clinical markers such as Liver function tests (LFTs) is critical for early detection [20]. As these diseases undergo silent progression, characterising these variables within a tertiary care setting is vital for developing targeted screening and lifestyle-based preventive initiatives.

Despite the rising health concern, there remains a notable lack of awareness regarding liver disease risk, especially among the younger population. This study aims to provide a comprehensive five-year descriptive analysis of the clinical epidemiological spectrum of CLD at a tertiary care centre in Ajman, UAE. By examining demographic, lifestyle, and clinical variables, this research seeks to identify the key factors that can inform effective public health strategies to reduce the burden

of liver disease and support the goal of healthy ageing within the UAE.

AIM

The primary aim of this study was to describe the clinico-epidemiological spectrum of chronic liver disease (CLD) among adult patients managed at a tertiary care center in Ajman, United Arab Emirates, over five years. Specifically, the study sought to characterize the demographic profile, lifestyle risk factors, metabolic comorbidities, anthropometric patterns, vaccination status, and clinical outcomes of patients diagnosed with CLD in order to provide a comprehensive overview of disease patterns within this population.

MATERIALS AND METHODS

STUDY DESIGN, SETTING, AND SAMPLING

A retrospective cross-sectional study was conducted to review the cases of chronic liver diseases reported to an Academic Healthcare Institution in Ajman, UAE. The electronic medical records of patients diagnosed with chronic liver disease from January 2020 to July 2025 were retrieved to assess the clinical and epidemiological spectrum. Cases were identified using ICD-10 codes, and records with missing key demographic or clinical information were excluded.

DATA COLLECTION AND VALIDATION

Information was retrieved from the hospital's electronic medical records using a structured data collection form developed from the standard clinical documentation practices adopted in the hospital. Extracted variables comprised sociodemographic characteristics, clinical features of Chronic liver diseases, medical conditions, prognosis, and lifestyle factors. To ensure data quality, a systematic validation and cleaning process was applied, including the identification and removal of duplicate entries using unique patient identifiers and the exclusion of records with missing key information. In cases where multiple records existed for the same patient, the most complete and diagnostically confirmed record was retained.

DIAGNOSTIC CRITERIA AND CLINICAL DOCUMENTATION

The diagnosis of chronic liver disease was based on documentation by the treating physician, supported by clinical evaluation and relevant investigations recorded in the electronic medical records. Diagnostic consistency

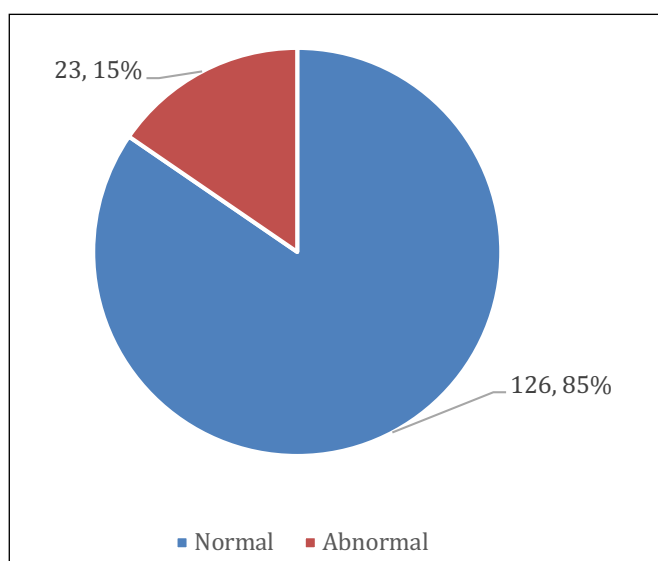


Fig. 1. Distribution of participants according to their anthropometric characteristics

Source: Own materials

cy was maintained through the hospital’s standardized clinical documentation protocols.

ETHICAL APPROVAL

The study received approval from the Institutional Review Board of the Medical University (IRB Ref. no. IRB-COM-STD-119-Dec-2025), and permission to access

records was granted by the University Hospital, Ajman. As the study used anonymized retrospective data, informed consent was waived. All procedures adhered to the ethical principles of the Declaration of Helsinki, ensuring participant confidentiality and anonymity.

DATA MANAGEMENT AND STATISTICAL ANALYSIS

After data cleaning, a total of 149 records of patients with chronic liver diseases were included in the final dataset. The dataset was verified in Microsoft Excel® and subsequently analyzed using IBM SPSS Statistics version 30. Descriptive statistics were used to summarize the study variables, with categorical data presented as frequencies and percentages.

RESULTS

During five years, a total of 149 patients with chronic liver disease (CLD) were identified for the study, which describes the characteristics of patients at a tertiary care hospital in Ajman, United Arab Emirates. Complete demographic, clinical, and risk factor data were collected from all included cases.

In terms of age (Table 1), 69 patients (46.3%) were under 40 years, 67 patients (45.0%) were between 40 and 60 years, and only 13 patients (8.7%) were over 60 years. In fact, more

Table 1. Distribution of participants according to sociodemographic characteristics

Variable	Category	Frequency [n]	Percent [%]
Age Group	Below 40 years	69	46.3
	40 years to 60 years	67	45.0
	Above 60	13	8.7
Gender	Male	117	78.5
	Female	32	21.5
Marital Status	Single	29	19.5
	Married	120	80.5
Nationality / WHO Region	EMR (Eastern Mediterranean Region)	83	55.7
	SEAR (South-East Asia Region)	53	35.6
	Others	13	8.7

Source: Own materials

Table 2. Distribution of participants according to their personal habits

Variable	Category	Frequency [n]	Percent [%]
Alcohol Use	Never	113	75.8
	Former Use	15	10.1
	Current Use	21	14.1
Smoking	Yes	49	32.9
	No	100	67.1

Source: Own materials

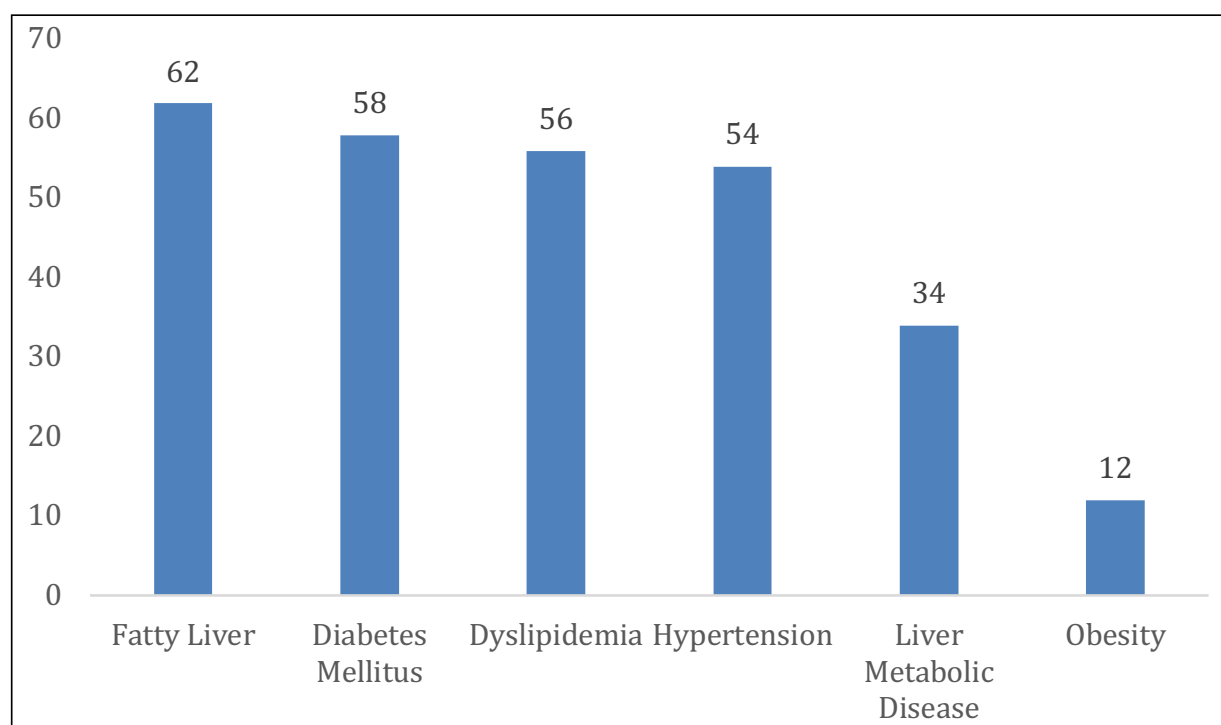


Fig. 2. Distribution of participants according to history of metabolic comorbidities

Source: Own materials

Table 3. Distribution of participants according to history of past surgeries and vaccination status

Variable	Category	Frequency [n]	Percent [%]
Surgical History	Yes	56	37.6
	No	93	62.4
Vaccination Status	Vaccinated – up to date	103	69.1
	Vaccinated – not up to date / incomplete	36	24.2
	Not vaccinated at all	6	4
	Not sure / don't know	4	2.7

Source: Own materials

Table 4. Distribution of participants according to clinical outcomes to medication

Variable	Category	Frequency [n]	Percent [%]
Treatment Outcome	Good	76	51.0
	Partial	31	20.8
	Poor	42	28.2

Source: Own materials

than 90% of the cohort (91.3%) was below 60 years of age, implying that CLD mostly impacted people who were economically productive. The male predominance in the study population was quite striking; there were 117 males (78.5%) and 32 females (21.5%), making the male-to-female ratio approximately 3.7:1.

Most of the patients were married (120; 80.5%), and the rest (29; 19.5%) were single. When the patients were classified according to the regional classification of the World Health Organization, 83 patients (55.7%) were from the Eastern Mediterranean Region, 53 patients

(35.6%) were from the South, East Asia Region, and 13 patients (8.7%) were from other regions.

In terms of lifestyle-related risk factors (Table 2), out of 36 cases (24.2%) where alcohol consumption was present, 21 (14.1%) were still using alcohol, 15 (10.1%) were previously using alcohol, and 113 cases (75.8%) were no alcohol consumers. out of the total cases, 41 patients (32.9%) were smokers, while the remaining 100 (67.1%) were non-smokers.

Anthropometric assessment (Fig. 1) showed that only 12 patients (8.1%) were considered obese by the binary obesity variable; however, by BMI classification, 126

patients (84.6%) were in the abnormal BMI category, with only 23 patients (15.4%) having a normal BMI. Hence, the group under study was characterized by a high level of abnormal body mass.

Most of the study participants were metabolically unhealthy. Concurrent with other metabolic disorders, 58 (38.9%) of the patients had diabetes, 54 (36.2%) had hypertension, and 56 (37.6%) had dyslipidemia. Fatty liver was found in 62 patients (41.6%) and 87 (58.4%) without fatty liver changes, while 34 (22.8%) were classified as NAFLD based on liver metabolic disease (Fig, 2).

A history of previous surgery was reported by 56 (37.6%) out of the total 149 patients, and 93 (62.4%) had no record of these surgeries. The vaccination status of hepatitis B was different among the groups. Based on the definition of the four categories in the methodology, there were 103 patients (69.1%) who were vaccinated up to date, 36 patients (24.2%) had not received their complete immunization series, 6 patients (4.0%) who were not vaccinated at all, and 4 patients (2.7%) who were unsure of vaccination status (Table 3).

Clinical outcomes for patients who received treatment (Table 4) were divided into three groups: good, partial, and poor. Among the study participants, 76 patients (51.0%) had a good outcome, 31 patients (20.8%) had a partial outcome, and 42 patients (28.2%) had a poor outcome. Almost half of the study participants (49.0%) had partial or poor clinical outcomes during the study period.

DISCUSSION

The present five-year descriptive study done in the UAE provides important insight into the evolving clinico-epidemiological spectrum of Chronic Liver Disease within the Gulf population. The key findings that emerged include insights into the gender predominances, regional distribution, age factors, and metabolic comorbidities.

The pronounced male predominance (78.5%) observed in the present study is consistent with the global epidemiological data. Several studies have emphasized persistent sex disparities in CLD incidence and outcomes, attributed to behavioral, hormonal, and metabolic differences [21]. The Global Burden of Disease analysis also demonstrated a higher age-standardized mortality and DALY rates from CLD among males compared to females [22].

The high proportion of patients under the age of 60 years is particularly striking. Although chronic liver disease tends to predominantly impact the older age groups, new information indicates that there is a rising burden among younger, economically productive populations due to metabolic disease and viral hepatitis

patterns [23, 24].

According to a 2024 analysis in the MENA region, there is a reported rising CLD prevalence among young individuals due to obesity and other metabolic conditions [25]. Since more than 90% of our population was under the age of 60, the socioeconomic impact is quite significant, as CLD among the working age group can have a substantial effect on the healthcare systems and productivity [24, 26].

A significant percentage reported no alcohol use (75.8%), while 24.2% had current or prior exposure to alcohol. This low prevalence in Gulf countries can be attributed to the region's cultural and religious norms. However, the incidence of chronic liver disease has risen significantly, with alcohol use emerging as a notable contributor [27]. Therefore, the fact that there is still a significant proportion of alcohol consumers in our study is still an important consideration and remains clinically relevant.

The smoking prevalence of 32.9% in this study aligns with the clinical evidence indicating that cigarette smoking negatively impacts the incidence and severity of CLD at multiple levels: promoting hepatocarcinogenesis, hepatic fibrogenic stimulus, exacerbating metabolic fatty liver disease, and overall, negatively impacting liver-related outcomes [28, 29]. Southeast Asian regions are significantly reporting the risk of smoking as the leading cause of NAFLD [30].

A key finding of this study is the high metabolic risk profile of the population, with a significant population having an abnormal BMI (84.6%), diabetes mellitus (38.9%), hypertension (36.2%), and dyslipidemia (37.6%). These findings strongly support the global transition towards metabolic dysfunction associated with steatotic liver disease (MASLD) as a leading CLD etiology. This is further evidenced by MASLD becoming the most widespread CLD globally, affecting over 30% adults and increasingly recognized as a significant contributor to liver cirrhosis and failure [31, 32].

The pandemic levels of obesity and T2DM in the Gulf region, together with an aging population, suggest that NAFLD/NASH-associated advanced liver disease and mortality will increase in these countries [33]. Metabolic factors lead to hepatocyte injury and stress, contributing to mitochondrial dysfunction in MASLD. This leads to hepatocellular oxidative injury, inflammation, and accelerated fibrosis progression with worse prognosis [34]. The results of this study showed that most of the population was vaccinated against the hepatitis B virus. Hepatitis B vaccination programs have dramatically reduced the incidence of new chronic HBV infections globally, especially where infant immunization has been implemented [35, 36]. In GCC countries, including the

UAE, vaccination programs have significantly reduced HBV incidence.

However, in countries where adult vaccination coverage and catch-up campaigns are sub-optimal, like sub-Saharan Africa and East Asia, the burden of HBV infection remains, with approximately 296 million people affected by it [37]. Nearly half (49%) of the patients had partial or poor outcomes. This large proportion of adverse clinical courses is consistent with several global observational studies that have shown the persistence of morbidity in CLD despite the advances in therapy and supportive care [38]. Metabolic risk factors, which were highly prevalent in our population, have been well recognized as predictors of rapid fibrosis progression, decompensation, and liver-related mortality [34, 39]. Delayed presentation and advanced disease at the time of diagnosis may also underlie the high proportions of suboptimal outcomes.

These findings emphasize the need for proactive liver disease screening, structured follow-up, and integrated management plans. This study was conducted at a single tertiary care centre in the UAE, which may limit external validity as patient characteristics and disease patterns may vary across several healthcare settings within the country.

CONCLUSIONS

A thorough picture of the clinico-epidemiological range of chronic liver disease (CLD) in the area is given by this five-year descriptive study of patients with CLD who were seen at a tertiary care facility in Ajman, United Arab Emirates. The results show that middle-aged persons are mostly affected by CLD, and that men are more likely to be affected by patients with cirrhosis and associated consequences presented at advanced stages of the disease, indicating delayed diagnosis and inadequate early screening, according to the clinical profile.

The continuous epidemiological shift in the United Arab Emirates and the larger Gulf area is reflected in the etiological pattern. While viral hepatitis, especially

hepatitis B and C, remains a significant but relatively declining cause, probably due to better vaccination and antiviral treatment strategies, metabolic dysfunction-associated steatotic liver disease (MASLD) and alcohol-related liver disease emerged as the leading contributors. The strong metabolic foundations of CLD in this group are highlighted by the coexistence of metabolic comorbidities such as obesity, type 2 diabetes mellitus, dyslipidaemia, and hypertension.

The prevalence of metabolic and lifestyle-related variables in the development of disease is further supported by biochemical and radiological data. Elevated liver enzymes, aberrant lipid profiles, and imaging indications of fatty infiltration of fibrosis were present in a significant percentage of individuals. The need to use an integrated, multidisciplinary approach to liver health is highlighted by the clustering of metabolic risk factors among CLD patients.

Overall, the study highlights that most of the risk variables identified, such as obesity, sedentary lifestyle, poor eating patterns, and alcohol intake, are controllable, even though other demographic characteristics, such as age and gender, cannot be changed. In Ajman, the growing role of metabolic aetiologies indicates a change in the causes of liver disease from communicable to non-communicable, requiring focused public health initiatives.

According to the study, frequent liver function testing and non-invasive fibrosis assessment should be used to improve early diagnosis of chronic liver disease, especially in high-risk populations like those with metabolic risk factors. In addition to alcohol harm reduction techniques, liver health should be incorporated into non-communicable disease programs with a focus on weight control, glycaemic management, and cholesterol regulation. To lower the disease burden and enhance outcomes, multidisciplinary care, community awareness campaigns, hepatitis B immunisation, hepatitis C screening, and the creation of a regional liver disease registry are crucial.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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RECEIVED: 02.01.2026

ACCEPTED: 28.02.2026

