AL ZAHRAWI UNIVERSITY COLLEGE

DEPARTMENT OF PHARMACY

Graduation Project

Assessment of chronic liver disease treatment in Iraqi patients

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Abstract

Introduction:
Chronic liver disease CLD is a progressive deterioration of liver functions. This is a continuous process of inflammation, destruction, and regeneration of liver parenchyma leading to fibrosis and cirrhosis. Cirrhosis is a leading cause of mortality and morbidity across the world. It is the 11th leading cause of death and 15th leading cause of morbidity, accounting for 2.2% of deaths and 1.5% of disability-adjusted life years worldwide in 2016.

Materials and Methods:
A retrospective cross-section study carried out between July 2024 and March 2025 enrolled 200 patients from different Iraqi provinces with CLD whose diagnosis depended on specialized physicians according to WHO guidelines. The research form contained six fields. The first related to social information. The second includes types of CLD. The third includes signs and symptoms. The fourth includes laboratory tests (evaluation of starting and 6 months follow-up). The fifth related to treatment. The final section includes the patient outcome.

Results:

In this study, there were a total of 200 patients with CLD distributed regarding their general characteristics. 57.5% of the studied group were above the age of 50 years. 56% were males and the others were females. 50.5% were urban population and 49.5% lived in rural areas. The majority of the studied group had abdominal disturbance (72%) and (66.5%) jaundice, anorexia (63.5%). The studied group have liver cirrhosis (48%), HBV (24%), HCV (27.5%), and liver cancer (3.5%).

Conclusion:

This study gives a full look at CLD in the Middle Euphrates region, focusing on important epidemiological trends. It shows that 52% of the people studied have viral hepatitis, which is a risk factor for CLD. Despite notable advancements in most patients, 64.5% of the studied group were improved, elevated death rates (7% died), especially among rural populations. Regarding gender, about 56% were males and the others were females.

The aim: To evaluate the treatment of the patients with chronic liver disease, types of drugs used, its effectiveness and outcome of patients in Iraq

Key words: chronic liver disease, cirrhosis, hepatitis, viral infection.

1. Background

Chronic liver disorders (CLDs) affect 1.5 billion individuals globally and kill 2 million each year (1). The 2020 Lancet study on the global burden of illness found

that CLD-related disability-adjusted life years have increased by 33.0% over the past 30 years, accounting for 1.8% of the global burden. These findings suggest CLD is a growing public health issue (2). Most CLD patients are ignorant of their disease and exposed to liver damaging factors until they develop symptoms like nausea, vomiting, abdominal distension, jaundice, etc., and need hospitalization. This led to severe hepatitis, decompensated cirrhosis, and acute-on-chronic liver failure (ACLF), which had high short-term mortality (3, 4). HBV and HCV infect 2 billion and 160 million people, respectively (5,6). HCV superinfection in chronic HBV patients was the most common coinfection clinical characteristic in Asia–Pacific (7). Chronically infected people are at significant risk of liver cirrhosis and liver cancer, which kill 1 million people annually (8). In industrialized countries, alcoholic steatohepatitis (ASH) and Non-alcoholic steatohepatitis (NASH) are common. Obese patients had higher NASH-related morbidity and death (9). In diabetic cohorts, non-alcoholic chronic liver disease and hepatocellular cancer were more common (10). Liver cancer causes acute liver failure by spreading damaged liver cells (12). The liver is the main site of xenobiotic metabolism, making it prone to reactive metabolite poisoning. Cytochrome P450 enzymes catalyze most activation processes, and phenobarbital and 3-methylcholanthrene boost toxicity (12). Hepatitis, fatty liver disease, cancer, and alcohol, acetaminophen, and some cancer medicines cause liver problems (13). Since there are so many patients, clinicians must promptly identify those at high risk of death and make clinical judgments to improve their prognosis and preserve medical resources.

Aim of study: To evaluate the treatment of the patients with chronic liver disease, types of drugs used, its effectiveness and outcome of patients in Iraq

2. Materials and Methods:

2.1Patients and method

A retrospective cross-section study carried out between July 2024 and March 2025 enrolled 200 patients from different Iraqi provinces (Babylon, Karbala, and Al Najaf) with chronic liver disease (CLD) whose diagnosis depended on specialized physicians according to WHO guidelines. The research form contained six fields. The first section related to social information such as age, gender, and residence. The second section includes types of CLD, including: Hepatitis A (HAV), Hepatitis B (HBV), Hepatitis C (HCV), alcoholic liver disease, hepatocellular carcinoma, and liver cirrhosis. The third section includes signs and symptoms, including jaundice, anorexia, fatigue, abdominal pain, itchy skin, etc. The fourth part includes laboratory tests (evaluation of starting and 6 months follow-up), such as CBC tests, kidney function tests (creatinine, urea), liver function tests (ALT, AST, ALP, bilirubin), and coagulation markers (APTT, INR). The fifth part includes treatment and adjuvant treatments. The final section includes the patient outcome.

All data were collected, tabulated, and statistically analyzed using SPSS 26.0 for Windows (SPSS Inc., Chicago, IL, USA). Obtaining ethical permission for the research project was done through the Ethical Board at Al Zahrawi College University (REBZ Ref No.10/2/2025), and consent was taken into account upon acceptance to complete the study. Using a 95% confidence level and a 5% margin of error, an online sample size calculator determines how many samples are required to achieve the specified statistical requirements.

2.2 Statistical analysis:

Quantitative data were expressed as the median (interquartile range), and qualitative data were expressed as absolute frequencies (number) and relative frequencies (percentage). We used the Chi-square test to compare percentages of categorical variables. Baseline data versus follow-up data was compared by a Wilcoxon Signed Ranks test. We used the Mann-Whitney test to compare two groups of non-normally

distributed variables after testing for normality with the Kolmogorov-Smirnov test. All tests were two-sided. p-value < 0.05 was considered statistically significant (S), and p-value ≥ 0.05 was considered statistically insignificant (NS).

3. Results

In this study, there were a total of 200 patients with chronic liver disease distributed regarding their general characteristics.

Table (1) reveals that about 57.5% of the studied group were above the age of 50 years, while 28.5% of them were between 30 to 50 years. Regarding gender about 56% were males and the others were females. For residence the study 50.5% were urban population and 49.5% lived in rural areas

Table (1): Distribution of the studied population regarding their general characteristics (n=200)

Item	No	%
Age category		
<18 years	6	3
18-30 years	22	11
30-50 years	57	28.5
>50 years	115	57.5
Gender		
Male	112	56
Female	88	44
Residence		
Urban	101	50.5
Rural	99	49.5

As illustrated in table (2), the majority of the studied group had abdominal disturbance (72%) and (66.5%) jaundice, anorexia (63.5%), fatigue (31%), jaundice (27.5%) and itchy skin (15%). Only 6% of them complained of weight loss.

Table (2): Distribution of different symptoms among the studied population (n=200).

	Studied group (n=200)	
	No	%

Anorexia	127	63.5
Abdominal disturbance	144	72
Itchy skin	30	15
Jaundice	133	66.5
Weight loss	12	6
Fatigue	62	31

As illustrated in Figure (1), most of the studied group have liver cirrhosis (48%), and some of them have HBV (24%) and HCV (27.5%). very low percentage of them have HAV (1.5%), alcoholic liver disease (2%) and liver cancer (3.5%).

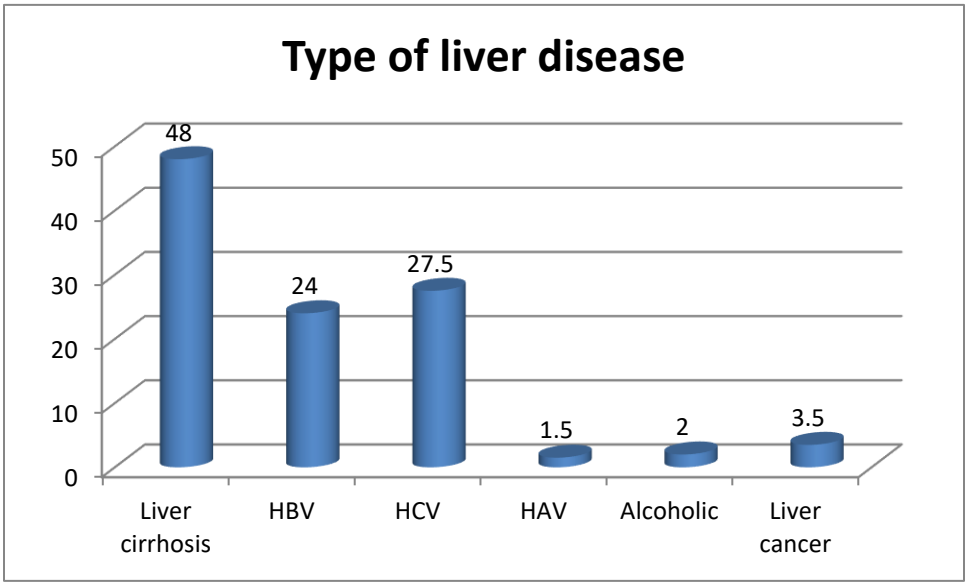

Figure (1): bar chart illustrating percentage distribution of studied group regarding their type of CLD (n=200).

As shown in table (3), the majority of the studied group take albumin (54%), PPI (50.5%), claforan (cefotaxime) (31%), lactulose syrup (29.5), roxef (ceftriaxone) (29.5%) and paracentesis (27.5%). Low percentages took blood (21.5%), octreotide (15.5%). Endoscopic variceal ligation EVL was used in only (9.5%) of cases while Meropenem was used in only (7.5%).

Table (3): Distribution of percentage of taken therapies in the studied population (n=200).

	Studied group (n=200)

	No	%
Albumin	108	54
Paracentesis	55	27.5
PPI	101	50.5
Blood	43	21.5
octreotide	31	15.5
EVL	19	9.5
Lactulose syrup	59	29.5
Meropenem	15	7.5
Roxef	59	29.5
Claforan	62	31

Table (3) reveals that 26% of the studied group take rifaximin and 20% take Lasix(furosemide). some of them take entecavir (21.5%). low percentages of the studied group take flagyl (metronidazole) (6.5%), Aldactone (spironolactone) (6.5%), Inderal (propranolol) (9.5%), Tanvir® (tenofovir) (5.5%) and Harvoni® (ledipasvir/sofosbuvir) (4.5%). 18% of the studied group take Epclusa® (sofosbuvir/velpatasvir).

Table (4): Distribution of percentage of taken therapies in the studied population (n=200).

	Studied group (n=200)	
	No	**%**
Rifaximin	52	26
Flagyl	13	6.5
Aldactone	13	6.5
Lasix	40	20
Inderal	19	9.5
Entecavir	43	21.5
Tenofovir	11	5.5

Harvoni	9	4.5
Epclusa	36	18

Table (5) reveals that 22.5% of the studied group take Zofran (ondansetron) as an adjuvant therapy, 21% take plasil (metoclopramide) and 16% take vit K. very low percentages take ca (5%), k+ (2%), paracetamol (7%) and only 1% take vit D.

Table (5): Distribution of percentage of taken adjuvant therapies in the studied population (n=200).

	Studied group (n=200)	
	No	**%**
Vit K	32	16
Zofran	45	22.5
Plasil	43	21.5
Ca	10	5
K +	4	2
Vit D	2	1
Paracetamol	14	7

Figure (2) reveals that 64.5% of the studied group were improved and only 7% of them died.

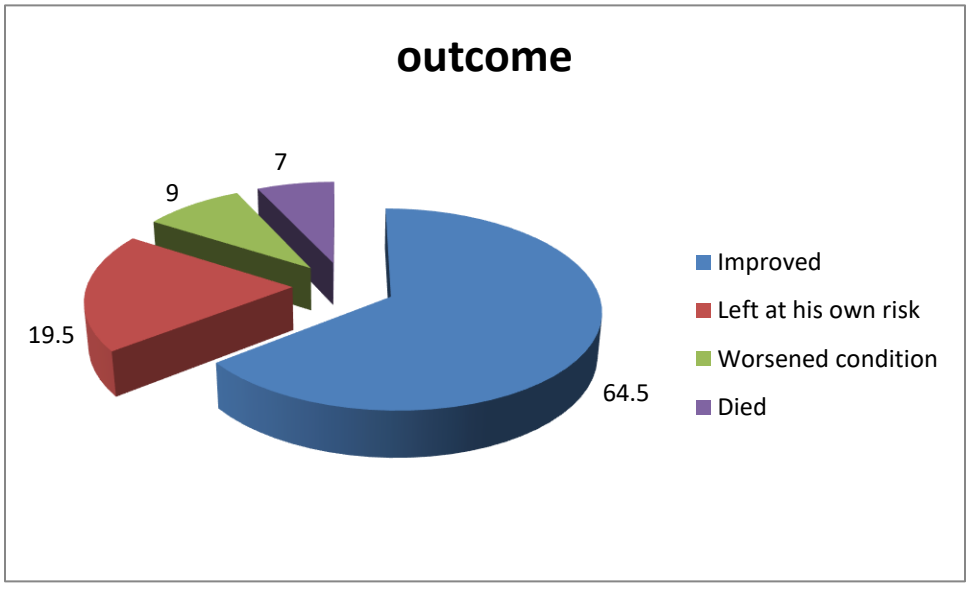

Figure (2): pie chart illustrating percentage distribution of studied group regarding outcome (n=200).

Table (6) reveals that majority of the studied group have viral hepatitis infection (52%) as a risk factor for CLD. About 47.5% of the studied group complained of ascites as a new sign and some of them experienced coagulation disorders (16.5%). Only 7.5% complained of variceal bleeding and 7% experienced hepatic encephalopathy.

Table (6): Distribution of Studied population regarding risk factors and complications (n=200)

Item	No	%
Risk factors		
Viral hepatitis infection	104	52
Autoimmune disease	1	0.5
Complications		
Hepatic encephalopathy	14	7
Coagulation disorders	33	16.5
Ascites	95	47.5
Variceal bleeding	15	7.5

Table (7) reveals that there is statistically significant relationship between baseline lab results and 6 months follow up lab results of HB, RBC, LYM, WBC and CRP.

Table (7): Comparing baseline and 6 months **follow up CBC and CRP lab results in the studied population (n=200).**

Items	Category	Baseline		6 mon Follow up		X^2	P value
		No	%	No	%		
HB	**Normal**	38	19	56	28	-2.98	**0.003***
	Decreased	161	80.5	140	70		
	Increased	1	0.5	4	2		
PLT	**Normal**	55	27.5	70	35	-0.76	0.444
	Decreased	141	70.5	130	65		
	Increased	4	2	0	0		
RBC	**Normal**	71	35.5	59	29.5	-3.97	**<0.001***
	Decreased	128	64	108	54		

	Increased	1	0.5	33	16.5		
LYM	**Normal**	111	55.5	110	55	-8.72	**<0.001***
	Decreased	20	10	86	43		
	Increased	69	34.5	4	2		
WBC	**Normal**	114	57	131	65.5	-4.59	<**0.001***
	Decreased	6	3	25	12.5		
	Increased	80	40	44	22		
CRP	**Normal**	22	11	164	82	-11.68	**<0.001***
	Decreased	0	0	2	1		
	Increased	178	89	34	17		

Wilcoxon signed Rank test ***Significant (p value<0.05)**

Table (8) reveals that there is statically significant relationship between baseline lab results and 6 months follow up lab results of ALT, ALP, Total bilirubin, albumin level, APTT, urea and creatinine levels.

Table (8): Comparing baseline and 6 months follow up liver and kidney function, INR, APTT lab results in the studied population

Items	**Category**	Baseline		6 mon Follow up		**X^2**	**P value**
		No	**%**	**No**	**%**		
AST	**Normal**	52	26	115	57.5	-7.30	**<0.001***
	Decreased	0	0	6	3		
	Increased	148	74	79	39.5		
ALT	**Normal**	63	31.5	115	57.5	-6.407	**<0.001***
	Decreased	1	0.5	8	4		
	Increased	136	68	77	38.5		
ALP	**Normal**	103	51.5	128	64	-4.296	**<0.001***
	Decreased	0	0	4	2		
	Increased	97	48.5	68	34		
T. Bilirubin	**Normal**	8	4	98	49	-8.893	**<0.001***

	Decreased	1	0.5	4	2		
	Increased	191	95.5	98	49		
Albumin level	**Normal**	93	46.5	112	56	-3.606	**<0.001***
	Decreased	0	0	82	41		
	Increased	107	53.5	6	3		
INR	**Normal**	82	41	96	48	-1.500	0.134
	Decreased	2	1	1	0.5		
	Increased	116	58	103	51.5		
APTT	**Normal**	136	68	59	29.5	-6.427	**<0.001***
	Decreased	**0**	**0**	2	1		
	Increased	64	32	139	69.5		
UREA	**Normal**	91	45.5	108	54	-2.690	**0.007**
	Decreased	2	1	5	2.5		
	Increased	107	53.5	87	43.5		
CREATININE	**Normal**	95	47.5	113	56.5	-2.032	**0.042**
	Decreased	2	1	1	0.5		
	Increased	103	51.5	86	43		

Wilcoxon signed Rank test ***Significant (p value<0.05)**

Table (9) illustrated that there is a statistically significant relation between patients' residence and the outcome with 75% of rural population showed no improvement. There is no significant relation between age, gender and outcome.

Table (9): relation between basic characteristics and outcome

Item	**Category**	**Outcome**				**X^2**	**P value**
		Not improved		**Improved**			
		No	**%**	**No**	**%**		
Age	<18	4	66.7	2	33.3	0.582	0.901
	18-30	14	63.6	8	36.4		
	30-50	39	68.4	18	31.6		
	>50	72	62.6	43	37.4		
Gender	Male	70	62.5	42	37.5	0.445	0.505
	Female	59	67	29	33		
Residence	Urban	54	53.5	47	46.5	10.850	**0.001***
	Rural	75	75.8	24	24.2		

X^2 (Chi square test) ***Significant (p value<0.05)**

Table (10) illustrated that there is a statistically significant relationship between abdominal disturbance, jaundice and the outcome with (70.1%) of those with abdominal disturbance and (57.1%) of those with jaundice did not show improvement. There is a statistically insignificant relationship between other symptoms and outcome.

Table (10): relation between symptoms of the disease and outcome

Category	Outcome				X^2	P value
	Not improved		Improved			
	No	%	No	%		
Anorexia	86	67.7	41	32.3	1.572	0.210
Abdominal disturbance	101	70.1	43	29.9	7.142	**0.008***
Itchy skin	16	53.3	14	46.7	1.922	0.166
Jaundice	76	57.1	57	42.9	9.3	**0.002***
Weight loss	10	83.3	2	16.7	1.987	0.160
Fatigue	35	56.5	27	43.5	2.542	0.111

X^2 (Chi square test) *Significant (p value<0.05)

Table (11) reveals that there is a statically significant relationship between liver cirrhosis, liver cancer and HCV and the outcome where 53.1%of patients that have liver cirrhosis are not improved, 78.2% of patients that have HCV are not improved and 28.6% of patients with liver cancer are not improved. There is no significant relationship between HBV, HAV, alcoholic liver disease and the outcom**e.**

Table (11): relation between Types of CLD and outcome

Item	Category	Outcome				X^2	P value
		Not improved		Improved			
		No	%	No	%		
	Liver cirrhosis	51	53.1	45	46.9	10.432	**0.001***

Types of CLD	HBV	35	72.9	13	27.1	1.954	0.162
	HCV	43	78.2	12	21.8	6.202	**0.013***
	HAV	3	100	0	0	1.676	0.195
	Alcoholic	3	75	1	25	0.197	0.658
	Liver cancer	2	28.6	5	71.4	4.089	**0.043***

X^2 (Chi square test) ***Significant (p value<0.05)**

Table (12) reveals that there statically significant relationship between viral Hepatitis disease and the outcome where 76% of patients that have viral hepatitis disease did not improve.

Table (12) relation between risk factors, complications of CLD and outcome

Item	Category	Outcome				X^2	P value
		Not improved		Improved			
		No	%	No	%		
Risk factors	Viral hepatitis infection	79	76	25	24	12.431	**<0.001***
	Autoimmune diseases	1	100	0	0	3.771	0.438
Complications of CLD	Hepatic encephalopathy	6	42.9	8	57.1	3.080	0.079
	Coagulation disorders	23	69.7	10	30.3	0.466	0.495
	Ascites	56	58.9	39	41.1	2.437	0.119
	Variceal bleeding	12	80	3	20	4.629	0.201

X^2 (Chi square test) ***Significant (p value<0.05)**

Table (13) reveals that there is statistically significant relation between outcome and PPI, lactulose syrup and claforan use as 42.6% of patients used PPI, 47.5%of patients used lactulose syrup and 53.2% of those who use claforan showed improvement.

Table (13) relation between taken treatments and outcome

Category	outcome				X^2	P value
	Not improved		improved			
	No	%	No	%		
Albumin	65	60.2	43	39.8	1.909	0.167
Paracentesis	32	58.2	23	41.8	1.323	0.250
PPI	58	57.4	43	42.6	4.460	**0.035***
Blood	23	53.5	20	46.5	2.901	0.089
Octreotide	21	67.7	10	32.3	0.168	0.682
EVL	10	52.6	9	47.4	1.292	0.256
Lactulose syrup	31	52.5	28	47.5	5.226	**0.022***
Meropenem	6	40	9	60	4.251	**0.039***
Roxef	39	66.1	20	33.9	0.094	0.759
Claforan	29	46.8	33	53.2	12.33	**<0.001***

Table (14) reveals that there is statically significant relationship between the outcome and entecavir, Harvoni and epclusa use, where 76.7% of patients who use entecavir and 88.9% of those who use epclusa unfortunately showed no improvement while 66.7% of those who used Harvoni showed improvement.

Table (14) relation between taken treatments and outcome

Category	Outcome				X^2	P value
	Not improved		Improved			
	No	%	No	%		
Rifaximin	27	51.9	25	48.1	4.854	0.028
Flagyl	10	76.9	3	23.1	0.937	0.333
Aldactone	9	69.2	4	30.8	0.136	0.712
Lasix	24	60	16	40	0.442	0.506

Inderal	10	52.6	9	47.4	1.292	0.256
Entecavir	33	76.7	10	23.3	3.586	**0.048***
Tenofovir	7	63.6	4	36.4	0.004	0.951
Harvoni	3	33.3	6	66.7	3.998	**0.046***
Epclusa	32	88.9	4	11.1	11.405	**0.001***

Table (15) shows there is no significant relationship between these drugs and outcome

Table (15) relation between treatment and outcome

Category	**Outcome**				**X^2**	**P value**
	Not improved		**Improved**			
	No	**%**	**No**	**%**		
Vit K	22	68.8	10	31.3	0.301	0.584
Zofran	29	64.4	16	35.6	<0.001	0.993
Plasil	32	74.4	11	25.6	2.353	0.125
paracetamol	8	57.1	6	42.9	0.356	0.551

Table (16) illustrated that there is a statistically significant relation between patients' residence and death with 24.2% of rural population died and 46.55% of urban population died. There is no significant relation between age, gender and death.

Table (16): relation between basic characteristics and survival

Item	**Category**	**survival**				**X^2**	**P value**
		died		**survived**			
		No	**%**	**No**	**%**		
Age	<18	0	0	6	100	2.885	0.410
	18-30	1	4.5	21	95.5		
	30-50	2	3.5	55	96.5		
	>50	11	9.6	104	90.4		
Gender	Male	7	6.3	105	93.8	0.220	0.639
	Female	7	8	81	92		
Residence	Urban	47	46.5	54	53.5	10.850	**0.001***
	Rural	24	24.2	75	75.8		

X^2 (Chi square test) ***Significant (p value<0.05)**

Table (17) reveals that there is a statistically significant relation between fatigue and survival.

Table (17): relation between symptoms and survival

Category	survival				X^2	P value
	died		survived			
	No	%	No	%		
Anorexia	6	4.7	121	95.3	2.768	0.096
Abdominal disturbance	11	7.6	133	92.4	0.322	0.570
Itchy skin	1	3.3	29	96.7	0.729	0.393
Jaundice	10	7.5	123	92.5	0.278	0.598
Weight loss	1	8.3	11	91.7	0.035	0.852
Fatigue	8	12.9	54	87.1	4.810	**0.028***

X^2 (Chi square test) ***Significant (p value<0.05)**

Table (18) reveals that there statistically significant relationship between viral Hepatitis disease and survival where 1.9% of patients that have viral hepatitis disease did not survive.

Table (18) relation between risk factors, complications of CLD and survival

Item	Category	survival				X^2	P value
		died		survived			
		No	%	No	%		
Risk factors	Viral hepatitis infection	2	1.9	102	98.1	8.579	**0.003***
	Autoimmune diseases	0	0	1	100	0.893	0.926
Complications of CLD	Hepatic encephalopathy	1	7.1	13	92.9	0.001	0.983
	Coagulation disorders	2	6.1	31	93.9	0.054	0.817
	Ascites	1	10.5	85	89.5	3.456	0.063
	Variceal bleeding	0	0	15	100	1.489	0.685

X^2 (Chi square test) ***Significant (p value<0.05**

Table (19) shows that there is statistically significant relationship between survival and both rifaximin and entecavir use as 84.6% of patients who used rifaximin and 100% of those who used entecavir survived.

Table (19) relation between taken treatments and survival

Category	survival				X^2	P value
	died		survived			
	No	%	No	%		
Rifaximin	8	15.4	44	84.6	7.589	**0.006***
Flagyl	1	7.7	12	92.3	0.010	0.919
Aldactone	1	7.7	12	92.3	0.010	0.919
lazix	5	12.5	35	87.5	2.323	0.127
Inderal	3	15.8	16	84.2	2.491	0.114
Entecavir	0	0	43	100	4.123	**0.042***
Tenofovir	0	0	11	100	0.876	0.349
Harvoni	0	0	9	100	0.709	0.400
Epclusa	0	0	36	100	3.304	0.069

X^2 (Chi square test) ***Significant (p value<0.05)**

Table 20 reveals that there is a statically significant relationship between liver cirrhosis, liver cancer and HBV and survival. There is no significant relationship between HCV, HAV, alcoholic liver disease and survival.

Table (20): relation between Types of CLD and survival

Item	Category	survival				X^2	P value
		died		survival			
		No	%	No	%		
Types of CLD	Liver cirrhosis	11	11.5	85	88.5	5.637	**0.018***
	HBV	0	0	48	100	4.754	**0.029***
	HCV	2	3.6	53	96.4	1.318	0.251
	HAV	0	0	3	100	0.229	0.632
	Alcoholic	0	0	4	100	0.307	0.579

	Liver cancer	2	28.6	5	71.4	5.185	**0.023***

X^2 (Chi square test) ***Significant (p value<0.05)**

4. Discussion

Chronic liver disease is a progressive deterioration of liver functions. Cirrhosis is a leading cause of mortality and morbidity across the world. Cirrhosis and viral hepatitis are the most common conditions (14), which is in line with our findings in Figure 1, which show that 48% of the people we studied have liver cirrhosis, 24% have HBV, and 27.5% have HCV. Although the prevalence of viral infections in cirrhosis varied from one country to another, the contribution of HCV was generally higher in countries from the European and American regions, and the combined contribution of the two viruses in patients with cirrhosis was usually less than 50%. By contrast, in countries from African and Asian regions, HBV was more common (although with some exceptions), and the combined prevalence of both viruses among patients with cirrhosis usually exceeded 50% (15). The majority of CLD patients in our study were over 50 years old (Table 1), and most of them were men. This is in line with research from around the world that shows the risk of liver disease rises with age because of longer exposure to hepatotoxic factors like viral infections, heavy alcohol use, and metabolic disorders (16).

The nearly equal distribution between urban and rural populations suggests a widespread burden of CLD across different demographics. However, rural patients exhibited significantly poorer outcomes, highlighting disparities in healthcare access, early diagnosis, and treatment adherence. Similar findings were reported by Arroyo et al. (2019), who emphasized that rural populations often have worse CLD prognoses due to delayed medical intervention and limited specialist care (17).

The most common symptoms reported in the study were abdominal disturbances (72%), jaundice (66.5%), and anorexia (63.5%). These findings align with the literature, which describes these symptoms as hallmarks of hepatic dysfunction, often resulting from hepatocellular injury, biliary obstruction, or portal hypertension (18). According to 31% of patients, fatigue was the only symptom significantly linked to death, which shows how important it is as a clinical indicator of disease severity (Table 17). This finding is in line with what Arroyo et al. 2019 said, which is that fatigue in CLD patients is often linked to systemic inflammation and hepatic decompensation (17). Our study (Figure 1) also found that cirrhosis was the most common liver disease (48%), followed by hepatitis C virus (HCV) infection (27.5%) and hepatitis B virus (HBV) infection (24%), and these findings closely match global estimates, where cirrhosis is responsible for 40–55% of CLD cases, and HCV and HBV collectively account for nearly half of all chronic liver conditions (19). Alcoholic liver disease was relatively rare (2%) in our results, which is expected in Iraq due to lower alcohol consumption compared to Western populations, or perhaps the patients do not tell the truth because of the nature of Iraqi society, which considers the phenomenon of drinking alcohol unacceptable. Pharmacological management played a crucial role in patient outcomes. The study found that albumin, proton pump inhibitors (PPIs), and cefotaxime (Claforan) were the most common treatments (Tables 3 and 4). Albumin is often given to people with cirrhosis who have ascites because it helps keep the oncotic pressure steady and lowers the amount of fluid that builds up (20). However, the study found that albumin did not significantly improve outcomes ($P = 0.167$). This is in line with what the European Association for the Study of the Liver said in 2018, which also questioned albumin's long-term survival benefits (21), especially in the later stages of cirrhosis or when it has gotten worse, since a liver transplant is still the best option. At the end stage of CLD, lactulose syrup and rifaximin have been associated with improved patient symptoms but not outcomes, thereby reinforcing their role in managing the

symptoms of hepatic encephalopathy. However, liver transplantation remains the definitive solution. Lactulose reduces systemic ammonia levels by promoting its excretion, a well-documented mechanism in hepatology (22). Similarly, rifaximin was shown to lower hospitalization rates by 30-40%, a result consistent with Mustika et al.'s 2020 findings on its efficacy in reducing hepatic complications (16).

There is also a lot of evidence to support the idea that rifaximin should be used in addition to standard lactulose therapy as a second line of defense (23). To find out how well rifaximin works, several long-term, open-label clinical trials and clinical practice studies have shown that it lowers the rate of hepatic encephalopathy-related hospitalizations and the number of times overt hepatic encephalopathy events happen when added to lactulose therapy (24, 25). Our study in Table 13 reveals that there is a statistically significant relationship between outcomes and protein pump inhibitors (PPI). As in the general population, PPIs are also among the most commonly prescribed classes of drugs among patients with cirrhosis (26). However, only a few specific situations, such as the immediate post-variceal banding period, recommend PPIs for short-term use (27).

The study also noted mixed responses to antiviral therapies. Patients frequently received prescriptions for entecavir and tenofovir, but their effectiveness varied. Our study in Table 14 reveals that maximum improvement occurs with the Harvoni antiviral drug in viral hepatitis and not with others. Additionally, this means that antiviral therapy might not be enough for people with advanced cirrhosis. Instead, antifibrotic and immunomodulatory agents should be looked into together (28). The treatments analyzed in the study played a role in controlling symptoms associated with chronic liver disease. 9.5% of the studied population took Inderal (Propranolol) and received beta blockers as part of their treatment. People primarily use beta blockers to reduce portal hypertension, a condition characterized by increased

pressure in the portal vein system. By decreasing portal pressure, beta blockers help prevent or manage complications such as variceal bleeding (29). Lasix and Aldactone, both diuretics, are beneficial in managing fluid retention and ascites, helping to reduce swelling and discomfort. Vitamin K supports blood clotting and helps reduce bleeding tendencies in patients with liver dysfunction. Zofran and Plasil are effective in controlling nausea and vomiting, improving patients' ability to eat and maintain nutrition. Although the statistical analysis did not confirm significant improvement for most of these treatments, their symptom-controlling benefits remain essential in managing chronic liver disease. Our study in Table 12 reported that viral hepatitis was the leading risk factor for CLD (52%), a statistic consistent with global estimates, where viral hepatitis accounts for 45–55% of liver-related morbidity (17). The most common complications included ascites (47.5%), coagulation disorders (16.5%), hepatic encephalopathy (7%), and variceal bleeding (7.5%). These findings are comparable to those reported in international studies, where ascites occurs in approximately 50% of cirrhotic patients, and hepatic encephalopathy affects 5–10% (8). Regarding survival, 64.5% of patients showed improvement, while 7% died. Mortality was significantly higher among rural patients (24.2%) than urban patients (46.5% survival), highlighting the impact of healthcare accessibility on treatment outcomes (Table 16). Mustika et al. (2020) confirmed that rural patients often experience worse CLD outcomes due to delayed diagnosis and limited treatment options (16).

5. Conclusions

This study gives a full look at CLD in the Middle Euphrates region, focusing on important epidemiological trends. It shows that 52% of the people studied have viral hepatitis, which is a risk factor for CLD, poor treatment outcomes, and unequal access to healthcare. Despite notable advancements in most patients, 64.5% of the

studied group were improved, elevated death rates (7% died), especially among rural populations, continue to be a concern. Mitigating these hurdles via early detection, enhanced treatment, and increased healthcare access is crucial for alleviating the burden of chronic liver disease in Iraq. Addressing CLD necessitates early diagnosis, specific treatment, and fair access to healthcare. Implementing these techniques can enhance survival rates and quality of life for CLD patients in the Middle Euphrates region, aligning outcomes with global best practices. Regarding gender, about 56% were males and the others were females.

6. Recommendation

Viral infection, the highest risk factor, necessitates vaccination against viral hepatitis, particularly types B and C. Enhanced Screening and Early Diagnosis: Expanding hepatitis screening programs could facilitate early detection and treatment and prevent disease progression. Routine liver function monitoring should be implemented for at-risk populations, particularly those over 50 years of age. The study underscores the need for tailored antiviral regimens and the integration of emerging antifibrotic agents into standard treatment protocols. Future research should explore novel therapeutic strategies for patients with decompensated cirrhosis. Rural healthcare infrastructure must be improved to ensure timely diagnosis and treatment for CLD patients. Telemedicine services and mobile health clinics could help bridge the gap in specialist availability. Given the metabolic impact of CLD, integrating dietary counseling into treatment plans could enhance patient outcomes. Public health initiatives should focus on educating patients about liver-supportive diets and lifestyle modifications. Future studies should investigate genetic and environmental factors contributing to CLD progression in the Middle Euphrates region.

7. Conflict of interest

There is no conflict of interest in this research.

8. Ethical approval

Obtaining ethical permission for the research project was done through the Ethical Board at Al Zahrawi College University (REBZ Ref No.10/2/2025), and consent was taken into account upon acceptance to complete the study.

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