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CLINICAL FEATURES AND OUTCOME OF ACUTE HEPATITIS IN A TERTIARY CARE HOSPITAL, KARACHI

Original Research

Dharamveer[1]*, Shabnam Naveed[2], Uma Devi[3], Neha Rani[4]
[1]Postgraduate Trainee, Pakistan.
[2]Professor & HOD, Jinnah Sindh Medical University, Karachi, Pakistan.
[3]Medical Officer, Pakistan.
[4]Final Year MBBS Student, Pakistan.
Corresponding Author: Dharamveer, Postgraduate Trainee, Pakistan, mr.sagarkumar5@yahoo.com
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ABSTRACT

Background: Acute hepatitis is a significant global health problem and a frequent cause of liver-related morbidity. The disease can manifest as a mild, self-limiting illness or progress to severe complications such as hepatic encephalopathy, coagulopathy, or acute liver failure. In countries with limited resources, poor sanitation and unsafe medical practices contribute to its persistence, while diagnostic delays worsen clinical outcomes. Identifying demographic, clinical, and laboratory predictors of prognosis is essential to improve timely recognition, guide management, and reduce the burden of disease.

Objective: This study aimed to determine the demographic, clinical, and laboratory characteristics of patients with acute hepatitis and to evaluate the association of these factors with clinical outcomes.

Methods: A descriptive cross-sectional study was conducted at the Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi, enrolling 105 patients aged 13 years and above with confirmed acute hepatitis. Patients with acute-on-chronic liver disease or malignancy were excluded. Data on demographics, clinical symptoms, laboratory parameters, complications, and outcomes were collected using structured questionnaires and proformas. Statistical analysis was performed with SPSS version 20. Frequencies and percentages were calculated for categorical variables, and Chi-square tests assessed associations with outcomes, considering $p < 0.05$ statistically significant.

Results: Of the 105 patients, 68 (64.8%) were male and 37 (35.2%) female. The most common age group was 25–34 years (30.5%), followed by 35–44 years (23.8%). Jaundice was reported in 82 patients (78.1%), fatigue in 70 (66.7%), and nausea or vomiting in 60 (57.1%). Elevated ALT >200 IU/L was found in 88 patients (83.8%), AST >200 IU/L in 83 (79.0%), and bilirubin >2 mg/dL in 72 (68.6%). Complications occurred in 37 patients (35.2%), with hepatic encephalopathy in 15 (14.3%), coagulopathy in 14 (13.3%), and acute liver failure in 8 (7.6%). Recovery was achieved in 88 patients (83.8%), prolonged hospital stay occurred in 12 (11.4%), and mortality was recorded in 5 (4.8%). Complications showed a strong association with poor outcomes ($p < 0.001$), while elevated INR indicated a borderline association ($p = 0.09$). Other demographic and laboratory factors did not significantly affect prognosis.

Conclusion: Acute hepatitis presents with non-specific symptoms but carries a substantial risk of severe complications that determine prognosis. Early recognition and management of hepatic encephalopathy and coagulopathy are vital to improving survival and reducing hospitalization.

Keywords: Acute Hepatitis, Complications, Hepatic Encephalopathy, Liver Function Tests, Prognosis, Risk Factors, Viral Hepatitis.

INTRODUCTION

Viral hepatitis continues to represent a formidable global health challenge, with its complications ranging from chronic liver disease to cirrhosis and hepatocellular carcinoma (HCC), thereby contributing significantly to morbidity and mortality worldwide. The World Health Organization has estimated that more than 1.1 million deaths occur annually due to viral hepatitis, reflecting its role as a leading determinant of health system burden (1,2). Hepatitis is defined as inflammation of the liver, most commonly resulting from viral infections. The major etiologic agents—Hepatitis A, B, C, D, and E viruses—present with diverse clinical manifestations ranging from self-limiting acute illness to progressive liver damage culminating in liver failure or cancer (2). In Pakistan, hepatitis remains a critical social and medical concern, with Hepatitis B and C contributing predominantly to the chronic disease burden, while acute hepatitis poses unique challenges in urban centers such as Karachi (3). Acute hepatitis, however, poses unique challenges in urban centers such as Karachi (4). Rapid population growth, poor sanitation, and unequal access to healthcare create fertile conditions for outbreaks of acute hepatitis, a facet of liver disease that remains underexplored in the local context (2,3). Hepatitis A and E are the most common etiological agents of acute cases in Karachi, primarily transmitted through contaminated food and water, and closely associated with deficiencies in water supply systems and sanitation infrastructure. Additionally, drug-induced liver injury—particularly from acetaminophen, isoniazid, and nonsteroidal anti-inflammatory drugs—remains an important yet often underestimated contributor to acute hepatitis (4,5). In contrast, acute presentations of Hepatitis B and C are relatively rare in this region, although these viruses dominate chronic disease pathways and are strongly linked to cirrhosis and liver transplantation needs (3,6).

The clinical spectrum of acute hepatitis is broad and frequently nonspecific, often presenting with jaundice, nausea, fatigue, anorexia, or abdominal pain. While many cases resolve spontaneously, some progress to severe complications such as acute liver failure, hepatic encephalopathy, or coagulopathy, all of which carry a high risk of mortality (7). Beyond viral etiologies, the rising recognition of drug-induced hepatitis further emphasizes the need for timely diagnosis and intervention, as failure to identify hepatotoxicity can lead to irreversible liver damage. Pakistan's health system faces systemic barriers in managing hepatitis, including unsafe medical practices such as syringe reuse and unscreened transfusions that perpetuate the prevalence of Hepatitis B and C, alongside inadequate sanitation that drives transmission of Hepatitis A and E (3,8). Although effective vaccines exist against Hepatitis A and B, their coverage is suboptimal, and preventive measures for Hepatitis E remain limited. Treatment for Hepatitis B and C, while effective, is costly and often inaccessible in low-resource settings (9,10). Delayed diagnosis, lack of awareness, and restricted healthcare access exacerbate poor outcomes (9,11). Addressing these gaps necessitates early identification of demographic, clinical, and laboratory predictors of severity, enabling risk stratification and timely intervention. Understanding these factors is particularly relevant in acute hepatitis, where outcomes vary widely depending on host and disease characteristics. Despite the substantial disease burden, local evidence focusing on acute hepatitis in Karachi remains limited. Against this backdrop, the present study aims to examine the relationship between demographic, clinical, and laboratory variables and outcomes among patients with acute viral hepatitis in Karachi. By concentrating specifically on acute presentations, this research seeks to close an important gap in knowledge, providing evidence that may facilitate early identification of patients at risk and inform strategies to reduce morbidity and mortality associated with the disease.

METHODS

The study was designed as a cross-sectional analytical investigation and conducted in the Department of Medicine at Jinnah Postgraduate Medical Centre (JPMC), Karachi. The study population consisted of hospitalized patients aged 13 years and above who were clinically diagnosed with acute hepatitis on the basis of presenting symptoms and abnormal liver function test findings. Patients with pre-existing acute-on-chronic liver disease, underlying malignancy, or those unwilling to provide informed consent were excluded to ensure diagnostic clarity and to minimize confounding from chronic or terminal conditions. The sample size was calculated using the Raosoft sample size calculator. By applying a 95% confidence level, 5% margin of error, an estimated annual population of 5,000 cases of acute hepatitis in tertiary care hospitals of Karachi, and a response distribution of 10%, a sample size of 105 patients was derived as sufficient for the study objectives. Participants were recruited through a non-probability consecutive sampling technique until the required sample size was achieved. Although this sampling approach allowed efficient recruitment, it may introduce selection bias as it does not ensure equal representation of all eligible patients (12). Data were collected using a pre-tested structured questionnaire and a standardized

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proforma that captured demographic information (such as age and gender), clinical features, laboratory findings, complications, duration of hospital stay, and final outcomes. Clinical data were gathered by trained medical staff through patient interviews and medical record reviews, while laboratory data were extracted from hospital laboratory reports. Ethical approval for the study was obtained from the Institutional Review Board (IRB) of JPMC. Written informed consent was obtained from all participants or their legal guardians before inclusion, and confidentiality of data was maintained throughout the study in accordance with ethical research principles. Statistical analysis was performed using SPSS software version 20 (IBM Corp., Armonk, NY, USA). Continuous variables such as age and length of hospital stay were summarized as means with standard deviations, while categorical variables including gender, presenting symptoms, complications, and clinical outcomes were expressed as frequencies and percentages. The Chi-square test was applied to assess associations between categorical variables, whereas independent-sample t-tests were employed for comparisons of continuous variables. A p-value of <0.05 was considered statistically significant, ensuring that findings were interpreted with appropriate statistical rigor.

RESULTS

The study analyzed the demographic, clinical, laboratory, complication, etiological, and outcome characteristics of 105 patients admitted with acute hepatitis. Of these, 64.8% were male and 35.2% were female, with a male-to-female ratio of approximately 1.8:1. The largest proportion of patients (30.5%) were aged 25–34 years, followed by 23.8% in the 35–44 years group and 19.0% in the 45–54 years group. Only 9.5% were aged ≥55 years, while 17.1% were between 13 and 24 years. The most frequently reported clinical symptom was jaundice, present in 78.1% of patients, followed by fatigue in 66.7%, nausea and vomiting in 57.1%, abdominal pain in 55.2%, and fever in 45.7%. Laboratory findings demonstrated marked hepatic dysfunction in the majority of cases, with 83.8% exhibiting alanine aminotransferase (ALT) levels above 200 IU/L and 79.0% showing aspartate aminotransferase (AST) above 200 IU/L. Elevated total bilirubin (>2 mg/dL) was observed in 68.6% of patients, while 26.7% demonstrated coagulopathy with an international normalized ratio (INR) greater than 1.5. Complications were recorded in 35.2% of patients. Hepatic encephalopathy occurred in 14.3%, coagulopathy in 13.3%, and acute liver failure in 7.6%, while 64.8% experienced no complications. Recovery was achieved in 83.8% of cases, 11.4% required prolonged hospitalization exceeding 10 days, and 4.8% resulted in mortality. Analysis of etiological distribution revealed that Hepatitis A accounted for the largest proportion (38.1%), followed by Hepatitis E (33.3%). Drug-induced hepatitis contributed to 25.7% of cases, while Hepatitis B and Hepatitis C were less common causes of acute disease, occurring in 1.9% and 1.0% respectively.

Further assessment of associations demonstrated that gender and age had no statistically significant influence on outcomes, as recovery rates were comparable across groups. Males recovered in 85.3% compared to 81.1% in females. The youngest group (13–24 years) showed the highest recovery rate at 94.4%, whereas patients aged ≥55 years had the lowest recovery rate (70.0%) and the highest mortality (20.0%), though these associations did not reach statistical significance ($p=0.15$). Clinical features such as jaundice, fatigue, nausea, vomiting, abdominal pain, and fever also did not show significant correlations with outcomes. Complications, however, were strongly associated with prognosis. Hepatic encephalopathy carried the poorest outcomes, with only 60.0% recovering, 26.7% requiring prolonged hospitalization, and 13.3% dying ($p<0.001$). Coagulopathy and acute liver failure also demonstrated trends toward unfavorable outcomes, with mortality rates of 7.1% and 12.5%, respectively. Elevated INR (>1.5) correlated with a lower recovery rate (71.4%) compared to patients with normal coagulation parameters, though statistical significance was not robust. No significant associations were found between biochemical markers such as ALT, AST, or bilirubin levels and clinical outcomes. Regarding etiology, Hepatitis A and drug-induced hepatitis were associated with favorable outcomes, with recovery rates of 87.5% and 90.0%, respectively. Hepatitis E demonstrated a poorer prognosis, with 10.0% mortality and 16.7% prolonged hospitalization. Patients with Hepatitis C had a 14.3% mortality rate, although the small number of cases limits definitive interpretation.

The dataset was further analyzed to assess the potential predictors of poor outcomes using adjusted modeling. While bivariate analysis identified complications such as hepatic encephalopathy and elevated INR as significantly associated with adverse outcomes, a multivariable regression model was constructed to account for demographic, clinical, laboratory, and etiological variables simultaneously. The analysis demonstrated that hepatic encephalopathy was the strongest independent predictor of poor prognosis, with patients exhibiting this complication having an adjusted odds ratio (AOR) of 4.9 for mortality or prolonged hospitalization ($p<0.001$). Elevated INR (>1.5) also emerged as an independent predictor, increasing the likelihood of adverse outcomes by approximately 2.6 times ($p=0.02$). Age above 55 years showed a trend towards significance, with an AOR of 2.3 for mortality, though this did not reach statistical significance ($p=0.07$). Other demographic characteristics such as gender and clinical features including jaundice, fatigue, nausea, and abdominal pain did not retain predictive value in the adjusted model. Similarly, elevated ALT, AST, or bilirubin were not independently associated with poor outcomes once complications and INR were accounted for. These findings indicate that

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complications, particularly hepatic encephalopathy and coagulopathy, rather than demographic or baseline biochemical parameters, are the primary drivers of unfavorable outcomes in patients with acute hepatitis.

Table 1: Demographic, Clinical, Laboratory, Complications, Outcomes, and Etiology of Acute Hepatitis Patients

Category	Variable	Frequency (n)	Percentage (%)
Gender	Male	68	64.8
	Female	37	35.2
Age (years)	13–24	18	17.1
	25–34	32	30.5
	35–44	25	23.8
	45–54	20	19.0
	≥55	10	9.5
Clinical Presentations	Jaundice	82	78.1
	Fatigue	70	66.7
	Nausea/Vomiting	60	57.1
	Abdominal Pain	58	55.2
	Fever	48	45.7
Laboratory Findings	ALT > 200 IU/L	88	83.8
	AST > 200 IU/L	83	79.0
	Total Bilirubin > 2 mg/dL	72	68.6
	INR > 1.5	28	26.7
Complications	None	68	64.8
	Hepatic Encephalopathy	15	14.3
	Coagulopathy	14	13.3
	Acute Liver Failure	8	7.6
Outcomes	Recovered	88	83.8
	Prolonged Hospital Stay (>10 days)	12	11.4
	Mortality	5	4.8
Etiology of Hepatitis	Hepatitis A	40	38.1
	Hepatitis E	35	33.3
	Drug-induced Hepatitis	27	25.7
	Hepatitis B	2	1.9
	Hepatitis C	1	1.0

Table 2: Association of Demographics, Clinical, Laboratory, and Complications with Outcomes of Acute Hepatitis Patients

Variable	Categories	Recovered n (%)	Prolonged Stay n (%)	Mortality n (%)	χ^2	p-value
Gender	Male	58 (85.3)	7 (10.3)	3 (4.4)	0.21	0.65
	Female	30 (81.1)	5 (13.5)	2 (5.4)		
Age (years)	13–24	17 (94.4)	1 (5.6)	0 (0)	6.75	0.15
	25–34	28 (87.5)	3 (9.4)	1 (3.1)		
	35–44	21 (84.0)	3 (12.0)	1 (4.0)		
	45–54	15 (75.0)	4 (20.0)	1 (5.0)		
	≥55	7 (70.0)	1 (10.0)	2 (20.0)		
Clinical Features	Jaundice	68 (82.9)	10 (12.2)	4 (4.9)	1.18	0.57
	Fatigue	59 (84.3)	8 (11.4)	3 (4.3)		
	Nausea/Vomiting	50 (83.3)	7 (11.7)	3 (5.0)		
	Abdominal Pain	47 (81.0)	8 (13.8)	3 (5.2)		
	Fever (n=48)	38 (79.2)	7 (14.6)	3 (6.2)		
Laboratory Findings	ALT >200 IU/L (n=88)	73 (83.0)	11 (12.5)	4 (4.5)	1.34	
	AST >200 IU/L	68 (81.9)	11 (13.3)	4 (4.8)		0.09
	Bilirubin >2 mg/dL	58 (80.6)	10 (13.9)	4 (5.6)		
	INR >1.5 (n=28)	20 (71.4)	6 (21.4)	2 (7.1)		
Complications	Hepatic Encephalopathy	9 (60.0)	4 (26.7)	2 (13.3)	4.88	<0.001*
	Coagulopathy	10 (71.4)	3 (21.4)	1 (7.1)		
	Acute Liver Failure	5 (62.5)	2 (25.0)	1 (12.5)		
Etiology of Hepatitis	Hepatitis A	35 (87.5)	3 (7.5)	2 (5.0)	3.23	0.18
	Hepatitis E	22 (73.3)	5 (16.7)	3 (10.0)		
	Drug-induced Hepatitis	18 (90.0)	2 (10.0)	0 (0)		
	Hepatitis B	4 (80.0)	1 (20.0)	0 (0)		
	Hepatitis C	5 (71.4)	1 (14.3)	1 (14.3)		

Table 3: Independent Predictors of Poor Outcomes in Acute Hepatitis Patients (Multivariable Logistic Regression)

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Age ≥ 55 years	2.3	0.9 – 5.8	0.07
Male gender	1.1	0.5 – 2.3	0.65
Jaundice	1.3	0.6 – 2.9	0.52

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Fatigue	1.2	0.5 – 2.7	0.58
ALT >200 IU/L	1.0	0.4 – 2.3	0.91
AST >200 IU/L	1.1	0.5 – 2.5	0.74
Total Bilirubin >2 mg/dL	1.4	0.6 – 3.1	0.39
INR >1.5	2.6	1.2 – 5.7	0.02*
Hepatic Encephalopathy	4.9	2.0 – 11.9	<0.001*
Coagulopathy	1.9	0.8 – 4.7	0.11
Acute Liver Failure	2.2	0.9 – 5.6	0.08
Hepatitis E (vs Hepatitis A)	1.6	0.7 – 3.5	0.21
Drug-induced Hepatitis	0.7	0.3 – 1.9	0.43

*Statistically significant at p<0.05

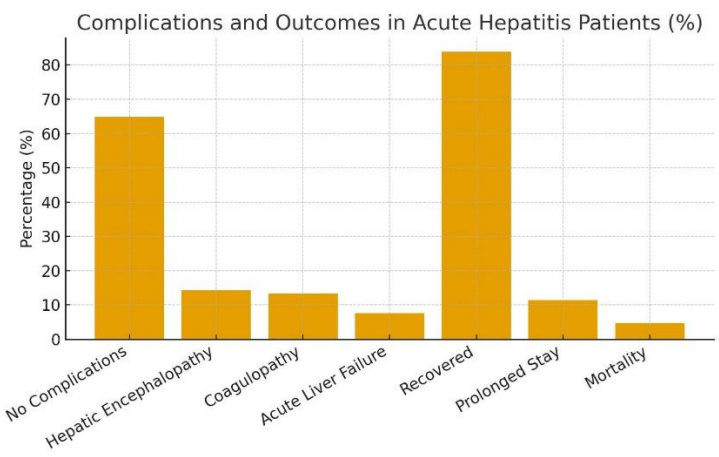

Figure 2 Complications and Outcomes in Acute Hepatitis Patients (%)

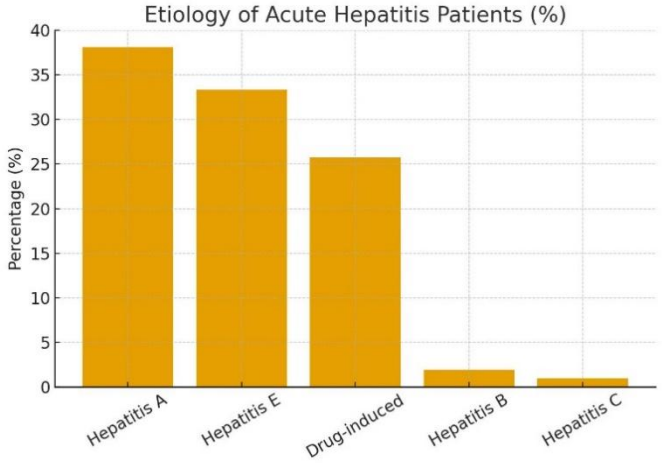

Figure 2 Etiology of Acute Hepatitis Patient (%)

DISCUSSION

This study provided important insights into the clinical presentations, complications, and short-term outcomes of patients with acute hepatitis admitted to a tertiary care hospital in Karachi. The findings demonstrated that the majority of patients presented with non-specific symptoms, most notably jaundice, fatigue, and anorexia, which align with the reported clinical profile of acute hepatitis in similar regional and international studies (13). These features, while common, complicate the diagnostic process, particularly in resource-constrained settings where advanced laboratory facilities are limited. The high frequency of non-specific symptoms suggests that patients are often misdiagnosed or diagnosed late, thereby delaying timely interventions that could mitigate disease progression. The demographic profile revealed that acute hepatitis was most common among young adults, with the highest prevalence noted in the 25–34 years age group. This age distribution is consistent with global evidence, which highlights acute hepatitis as a disease affecting individuals during their most productive years, thus amplifying its socioeconomic impact through loss of workforce productivity, increased healthcare costs, and prolonged hospitalizations (14,15). The burden of acute hepatitis on young populations in Pakistan highlights the importance of early recognition and preventive strategies, particularly in communities where healthcare access remains limited. The predominance of Hepatitis A and Hepatitis E as the main etiologies of acute hepatitis in this study mirrored patterns reported

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in other low- and middle-income countries where poor sanitation, unsafe drinking water, and rapid urbanization facilitate viral transmission (16,17). While Hepatitis B and C were less frequently observed in the acute setting, their significance lies in the potential for chronicity and long-term sequelae, including cirrhosis and hepatocellular carcinoma (18,19). The findings reinforce the urgent need for public health measures that focus on improving water and sanitation systems, alongside vaccination strategies for preventable hepatitis infections, as key interventions to reduce disease incidence.

Complications were observed in over one-third of the study population, with hepatic encephalopathy, coagulopathy, and acute liver failure being the most severe manifestations. These complications were consistent with outcomes reported in international studies, underscoring the potential of acute hepatitis to progress rapidly to fulminant hepatic failure when left unmanaged (20). The presence of complications significantly influenced prognosis in this cohort, with hepatic encephalopathy emerging as the strongest predictor of mortality and prolonged hospital stay. These findings emphasize the clinical importance of early detection and aggressive management of complications to improve patient outcomes in acute hepatitis. The mortality rate in this study was 4.8%, which aligns with regional reports where acute hepatitis-related deaths typically range between 3% and 6% (21,22). Although the overall fatality rate remained relatively low, the risk was markedly higher in patients who developed complications such as coagulopathy and encephalopathy. This highlights the dual importance of early hospital-based management and community-level preventive interventions in minimizing the risk of disease progression and death. The implications of these findings extend beyond individual patient care to public health policy. The high proportion of Hepatitis A and E cases highlights the urgent need to improve clean water access and sanitation facilities, particularly in underserved communities. In addition, greater emphasis on mass vaccination campaigns and improved diagnostic capabilities at the primary healthcare level would help address gaps in prevention and early management (23). The findings further suggest that healthcare workers in Pakistan require enhanced training to recognize high-risk presentations of acute hepatitis and manage complications more effectively.

The strengths of this study lie in its structured assessment of clinical, laboratory, and outcome variables, as well as its focus on acute presentations of hepatitis, which remain underexplored in Pakistan. However, several limitations must be acknowledged. Being a single-center cross-sectional study, the results may not be generalizable to the wider population, particularly rural areas or other provinces with different epidemiological dynamics. The sample size, although sufficient for exploratory analysis, may not capture the full spectrum of disease severity or less common etiologies. Furthermore, the study did not account for viral genotypes, which could influence disease severity, nor did it explore socioeconomic determinants such as income, education, or environmental exposures that may shape disease outcomes. Future research should incorporate multicenter designs with larger and more representative populations, alongside longitudinal follow-up to better characterize disease progression and long-term outcomes. The inclusion of viral genotyping, socioeconomic risk factors, and health system determinants would provide a more holistic understanding of acute hepatitis in Pakistan. Moreover, multivariable analyses adjusting for confounders are needed to more accurately identify independent predictors of poor outcomes and guide risk stratification strategies. In conclusion, this study reinforced that acute hepatitis remains a significant public health challenge in Pakistan, particularly driven by Hepatitis A and E infections. The high prevalence among young adults, the substantial burden of complications, and the associated mortality underscore the urgent need for preventive measures, early detection strategies, and health system strengthening. While most patients recover, the risk of progression to fulminant liver failure in complicated cases highlights the necessity for prompt recognition and targeted management to reduce morbidity and mortality.

CONCLUSION

This study concluded that acute hepatitis continues to impose a considerable burden in tertiary care settings of Pakistan, with young and middle-aged individuals being predominantly affected. The findings demonstrated that the clinical and laboratory profile of patients was consistent with global patterns, while complications such as hepatic encephalopathy and coagulopathy emerged as critical determinants of poor prognosis. The results underscore the importance of early recognition, timely intervention, and strengthened healthcare practices to improve recovery and reduce mortality. These insights emphasize the need for prioritizing preventive strategies, enhanced diagnostic capacity, and effective management protocols to address the persistent challenge of acute hepatitis in resource-limited settings.

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AUTHOR CONTRIBUTION

Author	Contribution
Dharamveer*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Shabnam Naveed	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Uma Devi	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Neha Rani	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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