Assessment of Drug Utilization Patterns of Supportive Therapy in Pediatric Patients with Acute Viral Hepatitis at a Tertiary Care Hospital

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Abstracts

Background: Acute viral hepatitis (AVH) remains a significant public health concern in pediatric populations, particularly in developing countries where inadequate sanitation and limited healthcare access facilitate the spread of hepatotropic viruses. Supportive therapy constitutes the mainstay of management; however, data on prescribing patterns in children are limited in Bangladesh.

Objective: To assess the drug utilization patterns of supportive therapy in pediatric patients with acute viral hepatitis admitted to Community Based Medical College Hospital, Bangladesh.

Methods: This descriptive observational study included 155 children aged <15 years with confirmed AVH, admitted between January 2024 to December 2024. The study was carried out through a collaborative effort between the Departments of Pediatrics and Pharmacology. Demographic data, viral etiology, clinical presentation, drug utilization for supportive therapy, length of hospital stay, and clinical outcomes were recorded. Supportive medications were categorized as oral rehydration solution (ORS), intravenous fluids, antiemetics, antipyretics, vitamin supplements, hepatoprotective agents, and antibiotics. Data were analysed using SPSS v26, and the association between antibiotic use and clinical outcomes was assessed using Chi-square or Fisher's exact test, with $p < 0.05$ considered statistically significant.

Results: The mean age of participants was 7.8 ± 3.4 years, with a male-to-female ratio of 1.35:1. Hepatitis A virus (HAV) was the most prevalent etiology 65.8%, followed by hepatitis E virus (HEV) 21.9%, while HBV and HCV were less common. Oral rehydration solution was administered to 80.0% of patients, antiemetics to 62.6%, antipyretics to 56.8%, intravenous fluids to 50.3%, vitamin supplements to 46.5%, hepatoprotective drugs to 34.8%, and antibiotics to 18.7%. The mean hospital stay was 6.4 ± 2.7 days. Clinical outcomes were favourable, with 72.3% fully recovered, 23.2% improved, and 4.5% experiencing complications. Antibiotic use was significantly associated with adverse outcomes ($p = 0.041$).

Conclusion: Hepatitis A virus is the predominant cause of pediatric AVH in Bangladesh, and supportive therapy remains the cornerstone of management. While overall prognosis is favourable, inappropriate antibiotic use was linked to adverse outcomes, emphasizing the need for rational prescribing. These findings highlight the importance of guideline-driven supportive care and provide insights into pediatric drug utilization patterns in resource-limited settings.

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Introduction

Acute viral hepatitis (AVH) continues to be a major public health concern worldwide, particularly in developing countries where inadequate sanitation, contaminated water, and limited access to healthcare facilitate the spread of hepatotropic viruses.[1] The disease is primarily caused by hepatitis A, B, C, D, and E viruses, which infect hepatocytes and result in hepatic inflammation and varying degrees of liver dysfunction.[2] Among pediatric populations, hepatitis A virus (HAV) and hepatitis E virus (HEV) are the predominant causes of acute viral hepatitis, especially in low- and middle-income countries where hygienic conditions are often suboptimal.[3] Globally, viral hepatitis contributes substantially to morbidity and mortality. The World Health Organization estimates that millions of new infections occur each year, with a significant proportion affecting children in developing regions.[4] Although most cases in pediatric patients are self-limiting, severe complications such as acute liver failure, prolonged cholestasis, and coagulopathy can occur in a minority of cases.[5] Early diagnosis, careful monitoring, and appropriate supportive care are therefore essential to prevent adverse outcomes and reduce the burden of disease. In South Asian countries, including Bangladesh, hepatitis A remains highly endemic and frequently affects children and adolescents.[6] Transmission commonly occurs via the fecal-oral route through contaminated food, water, or inadequate personal hygiene.[7] Clinically, children present with fever, malaise, anorexia, nausea, vomiting, abdominal discomfort, and jaundice, while laboratory evaluation often reveals elevated serum aminotransferases, hyperbilirubinemia, and abnormal liver function tests.[8] Management of acute viral hepatitis in children is predominantly supportive, as most viral infections resolve spontaneously without requiring specific antiviral therapy.[9] Supportive care emphasizes adequate hydration, nutritional support, monitoring for complications, and avoidance of hepatotoxic medications.[10] Commonly prescribed supportive medications include antiemetics, proton pump inhibitors, vitamin supplements, hepatoprotective agents, and intravenous fluids. Prescribing practices, however, may vary considerably among clinicians and healthcare institutions.[11] Drug utilization research serves as a valuable tool for evaluating prescribing patterns, promoting rational drug use, and identifying deviations from standard treatment guidelines.[12] Rational pharmacotherapy is particularly critical in pediatric populations, as children are more susceptible to adverse drug reactions and dosage-related complications.[13] Despite the high prevalence of pediatric acute viral hepatitis, limited data exist regarding the utilization patterns of supportive medications in developing countries.[14] Systematic evaluation of drug prescribing practices in real-world clinical settings can provide insights into current practices, identify gaps in rational drug use, and guide policy and practice improvements.[15] Therefore, this study aims to assess the drug utilization patterns of supportive therapy among pediatric patients with acute viral hepatitis admitted to Community Based Medical College Hospital, Bangladesh. The findings are expected to inform rational prescribing, optimize patient management, and contribute

to evidence-based pediatric care.

Methods

This descriptive observational study was conducted at Community Based Medical College Hospital, Bangladesh from January 2024 to December 2024. The study was carried out through a collaborative effort between the Departments of Pediatrics and Pharmacology. The study included 155 pediatric patients diagnosed with acute viral hepatitis (AVH) based on clinical and laboratory findings. Children aged below 15 years with confirmed AVH were included, while patients with chronic liver disease or other comorbidities affecting hepatic function were excluded. Demographic data, clinical presentation, laboratory results, types of viral hepatitis, drug utilization for supportive therapy, length of hospital stay, and clinical outcomes were recorded. Supportive medications were categorized into oral rehydration solution (ORS), intravenous (IV) fluids, antiemetics, antipyretics, vitamin supplements, hepatoprotective agents, and antibiotics. Data were entered into SPSS (version 26) and analyzed descriptively using frequencies, percentages, mean, and standard deviation. The association between antibiotic use and clinical outcome was assessed using the Chi-square test, with a p-value <0.05 considered statistically significant.

Results

A total of 155 pediatric patients with acute viral hepatitis were included in the study. The age distribution showed that 42 children 27.1% were under 5 years, 68 children 43.9% were between 5 and 10 years, and 45 children 29.0% were over 10 years, with a mean age of 7.8 ± 3.4 years. Regarding gender distribution, 89 patients 57.4% were male and 66 patients 42.6% were female, resulting in a male-to-female ratio of 1.35:1. Analysis of the types of viral hepatitis revealed that hepatitis A virus (HAV) was the most prevalent, affecting 102 patients 65.8%, followed by hepatitis E virus (HEV) in 34 patients 21.9%. Hepatitis B virus (HBV) and hepatitis C virus (HCV) were less common, affecting 12 patients 7.7% and 7 patients 4.5%, respectively. The drug utilization pattern of supportive therapy demonstrated that oral rehydration solution (ORS) was the most frequently administered therapy, prescribed to 124 patients 80.0%. Intravenous (IV) fluids were given to 78 patients 50.3%, antiemetics to 97 patients 62.6%, antipyretics to 88 patients 56.8%, vitamin supplements to 72 patients 46.5%, hepatoprotective drugs to 54 patients 34.8%, and antibiotics to 29 patients 18.7%. Regarding length of hospital stay, 71 patients 45.8% were discharged within 5 days, 59 patients 38.1% stayed for 6 to 10 days, and 25 patients 16.1% were hospitalized for more than 10 days, with a mean duration of 6.4 ± 2.7 days. The clinical outcomes of the study population indicated that 112 patients 72.3% fully recovered, 36 patients 23.2% showed improvement, and 7 patients 4.5% experienced complications. An assessment of the association between antibiotic use and clinical outcomes revealed that among patients receiving antibiotics, 18 recovered, 8 improved, and 3 developed complications. Among patients who did not receive antibiotics, 94 recovered, 28 improved, and 4 developed complications. The association was statistically significant (Chi-square test, $p = 0.041$).

Table I: Age Distribution of the Study Population (n = 155)

Age Group	Frequency	Percentage
<5 years	42	27.1
5–10 years	68	43.9
>10 years	45	29.0
Total	155	Total
Mean Age	7.8 ± 3.4 years	

Table II: Gender Distribution

Gender	Frequency	Percentage
Male	89	57.4
Female	66	42.6
Total	155	100
Male: Female Ratio	1.35: 1	—

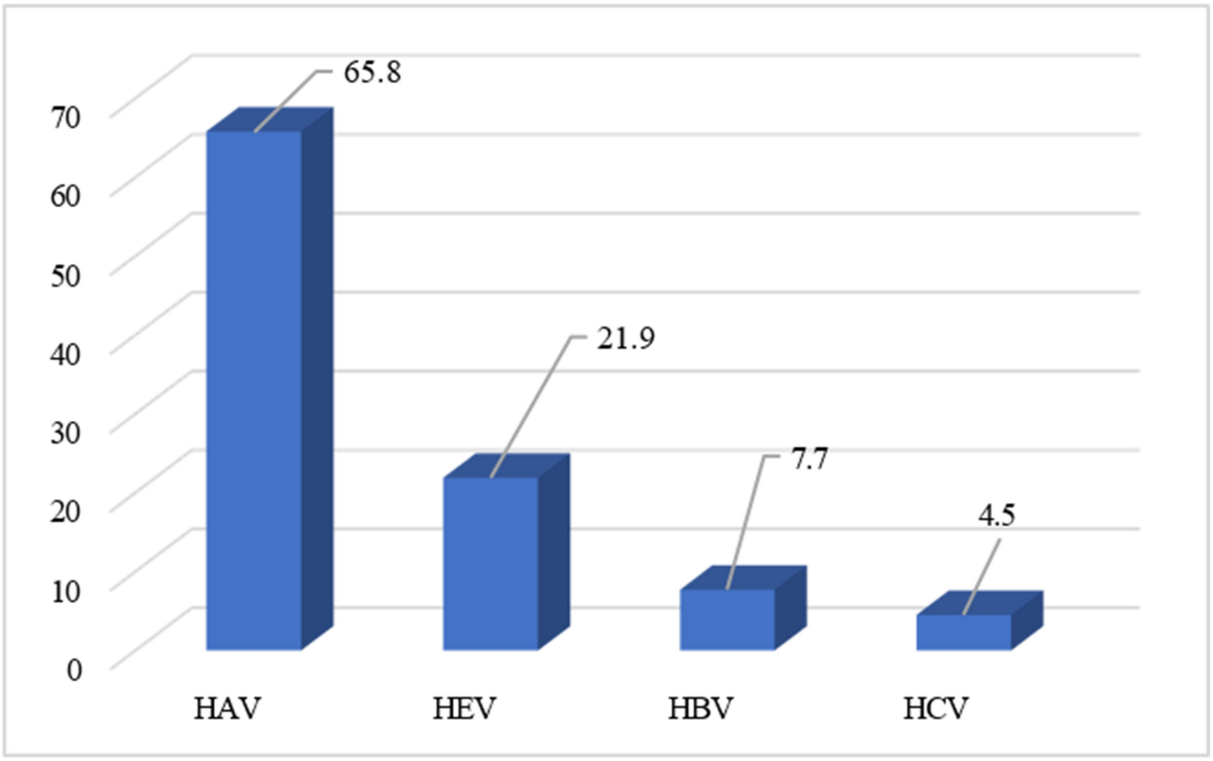

Figure 1. Column Chart Showed Distribution of Viral Hepatitis Types

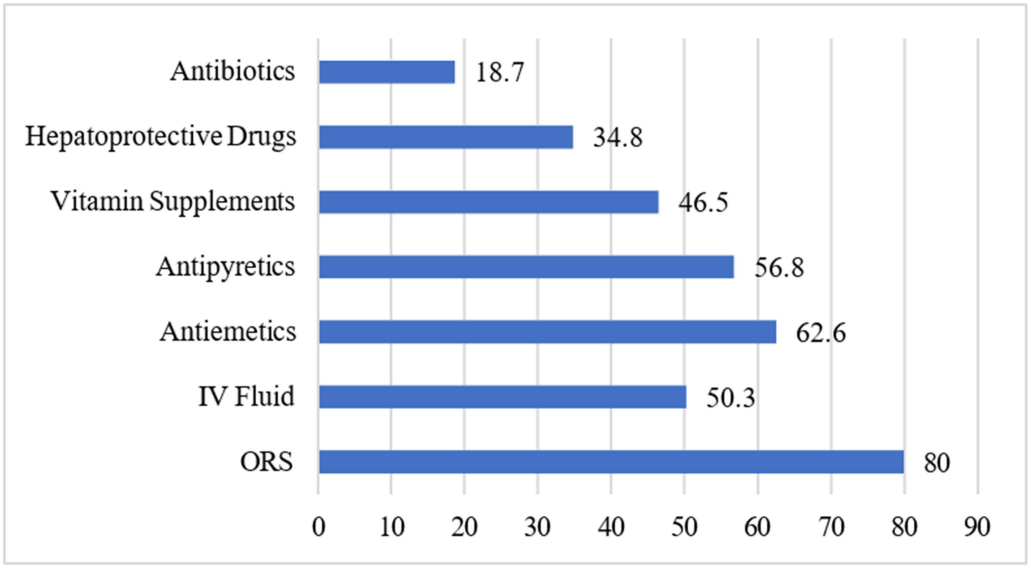

Figure 2. The Bar Chart Showed the Drug Utilization Pattern of Supportive Therapy

Table III: Length of Hospital Stay

Hospital Stay	Frequency	Percentage
≤5 days	71	45.8
6–10 days	59	38.1
>10 days	25	16.1
Total	155	100
Mean hospital stays	6.4 ± 2.7 days	

Table IV: Clinical Outcome of Patients

Outcome	Frequency	Percentage
Recovered	112	72.3
Improved	36	23.2
Complications	7	4.5
Total	155	100

Table V: Association between Antibiotic Use and Outcome

Outcome	Antibiotic Used	Antibiotic Not Used	p-value
Recovered	18	94	
Improved	8	28	0.041
Complications	3	4	

(Chi-square test)

Discussions

In this study, we found that hepatitis A virus (HAV) was the predominant etiology of acute viral hepatitis in pediatric patients, followed by hepatitis E virus (HEV), with HBV and HCV being less common. This distribution aligns with previous pediatric studies in South Asia reporting HAV as the leading cause of acute viral hepatitis in children (e.g., in Nepal and Bangladesh), underscoring the high endemicity of HAV in low- and middle-income countries.[14,15] Our result of supportive therapy being widely used also reflects existing guidelines that emphasize supportive care (hydration, antiemetics, antipyretics, and dietary management) as the cornerstone of treatment in uncomplicated pediatric AVH.[16] Supportive fluid therapy and ORS were the most frequently utilized interventions in our cohort, consistent with global management guidelines recommending adequate hydration and electrolyte balance as first-line treatment for pediatric viral hepatitis patients.[17] The frequent use of antiemetics and antipyretics in our study also mirrors reported clinical practices, as these drugs are commonly administered to ameliorate symptomatic distress in children with nausea and fever during acute hepatitis.[17] However, despite the predominance of self-limiting disease in pediatric AVH, nearly one-fifth of our patients received antibiotics, which may reflect concerns related to secondary bacterial co-infection or inappropriately empirical prescribing in settings with limited diagnostic resources. Our findings on antibiotic use are notable because antibiotics are not routinely indicated in viral hepatitis unless there is clear evidence of bacterial infection. Moreover, antibiotics have been associated with drug-induced hepatotoxicity and may potentially worsen outcomes in patients with underlying liver inflammation.[18] The significant association observed between antibiotic use and adverse outcomes in our study highlights this concern and suggests the need for judicious antibiotic prescribing in pediatric hepatitis cases where bacterial infection is not confirmed. The mean duration of hospitalization and the proportion of patients experiencing complications in our cohort are comparable to other pediatric AVH studies, though direct comparisons are limited due to variation in study populations and healthcare settings.[15] Additionally, existing literature suggests that complications such as prolonged cholestasis, ascites, or acute liver failure can occur in pediatric AVH, particularly in those with atypical manifestations or late presentation.[14, 15] Our study did not specifically stratify complication types, but the overall low complication rate supports the generally favourable prognosis of AVH in children when managed appropriately. Despite the contributions of this study, several gaps remain in the literature. First, there are few comprehensive drug utilization studies focused on supportive therapy patterns in pediatric acute viral hepatitis; most existing pediatric drug utilization research examines general prescription patterns or antibiotic use across multiple conditions rather than disease-specific supportive treatment.[19] Second, there is limited high-quality evidence defining optimal supportive medication regimens for pediatric hepatitis, including clear indications for hepatoprotective drugs and criteria for antibiotic initiation. Third, the potential impact of different supportive

interventions on clinical outcomes, such as recovery time, complication rates, and hospital stay, remains under-explored. Future larger, multicenter studies are therefore warranted to better characterize national prescribing patterns, assess rational drug use against evidence-based guidelines, and evaluate the clinical benefits of specific supportive therapies in pediatric AVH.

Our results reinforce the role of supportive therapy as the mainstay of management in pediatric acute viral hepatitis and highlight areas for improvement in rational prescribing, particularly concerning antibiotic use. This study adds to the limited literature on drug utilization patterns in pediatric liver disease and underscores the need for guideline-driven prescribing practices to optimize outcomes in this vulnerable population.

Conclusion

This study demonstrates that hepatitis A virus (HAV) is the predominant cause of acute viral hepatitis in pediatric patients in Bangladesh, followed by hepatitis E virus (HEV), while HBV and HCV are less common. Supportive therapy, including oral rehydration solution (ORS), intravenous fluids, antiemetics, antipyretics, and vitamin supplementation, remains the cornerstone of management, consistent with global treatment guidelines. The findings emphasize the low complication rate and favorable prognosis of pediatric acute viral hepatitis when managed appropriately. Notably, a subset of patients received antibiotics despite viral etiology, and antibiotic use was significantly associated with adverse outcomes, highlighting the need for rational prescribing practices. These results underscore the importance of adhering to evidence-based guidelines for supportive care and judicious use of medications to optimize clinical outcomes in pediatric patients.

Limitations

Several limitations of this study should be acknowledged. First, the study was conducted at a single center, which may limit the generalizability of the findings to other regions or healthcare settings. Second, detailed stratification of complications by type and severity was not performed, restricting deeper analysis of factors influencing adverse outcomes. Third, the study did not evaluate the impact of individual supportive interventions on recovery time or hospital stay, limiting conclusions regarding the efficacy of specific drug categories. Additionally, reasons for antibiotic prescription were not systematically documented, making it difficult to assess the appropriateness of their use. Finally, the study's observational design precludes establishing causality between drug utilization patterns and clinical outcomes. Future multicenter studies with larger sample sizes, comprehensive documentation of complications, and detailed evaluation of drug efficacy are warranted to strengthen evidence on rational drug use and optimal supportive therapy in pediatric acute viral hepatitis.

Recommendation

Mandatory folic acid food fortification should be implemented urgently nationwide. Establishing a comprehensive birth defects registry and strengthening prenatal screening programs with accessible ultrasound facilities are essential for early detection and improved perinatal outcomes.

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