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Corresponding Author
Veeda Mohan Kumar,
Mahavir Institute of Medical Sciences and General Hospital, Vikarabad, India
mohankumarveeda@gmail.com

Author Designation
[1,3]Associate Professor
[2]Assistant Professor

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A Clinical Study on Hepatic Encephalopathy

[1]Ajit Mogalgiddi, [2]Bukya Kalyani and [3]Veeda Mohan Kumar
[1-3]Mahavir Institute of Medical Sciences and General Hospital, Vikarabad, Telengana, India

ABSTRACT
Hepatic encephalopathy (HE) is a complex neuropsychiatric syndrome associated with liver dysfunction. This study aims to evaluate the psychological and neurological aspects of HE in a cohort of 100 patients. A cross-sectional study was conducted with 100 patients diagnosed with hepatic encephalopathy. The Child-Turcotte-Pugh (CTP) score and the West Haven classification system were used to assess the severity and type of HE. Psychological and neurological assessments were carried out to determine the impact of HE on mental and cognitive functions. Of the 100 patients, more than half (59%) had a CTP Score C, indicating severe liver disease. Approximately one-third (32%) had a CTP Score B, while the remaining 9% had a CTP Score A. The distribution of HE types was as follows: 84% had Type C HE, 13% had Type A HE and 3% had Type B HE. According to the West Haven classification, more than one-third of the patients (34%) were classified as Grade III and another third (33%) were classified as Grade IV, indicating advanced stages of encephalopathy. The remaining patients were classified as Grade I (22%) and Grade II (11%). This study highlights the significant psychological and neurological burden of hepatic encephalopathy in patients with advanced liver disease. The majority of the patients exhibited severe HE (West Haven Grade III and IV) and severe liver dysfunction (CTP Score C). These findings underscore the need for comprehensive management strategies addressing both the mental and cognitive aspects of HE to improve patient outcomes.

INTRODUCTION

Hepatic encephalopathy (HE) is a complex neuropsychiatric syndrome that arises as a complication of chronic liver disease, particularly cirrhosis. Characterized by a spectrum of cognitive, psychiatric and motor disturbances, HE significantly impairs patients' quality of life and poses substantial challenges for clinical management[1]. The pathogenesis of HE is multifactorial, involving the accumulation of neurotoxic substances such as ammonia, inflammation and alterations in blood-brain barrier permeability[2].

Psychological and neurological impairments are central to the clinical presentation of HE. Patients frequently experience cognitive deficits, including impairments in attention, memory and executive functions, as well as mood disturbances such as depression and anxiety[3]. Neurologically, HE manifests through a range of symptoms from subtle motor incoordination to profound coma in severe cases[4]. The West Haven classification system is widely used to grade the severity of these symptoms, ranging from minimal HE (Grade I) to coma (Grade IV)[1].

The Child-Turcotte-Pugh (CTP) scoring system is another critical tool used in the clinical assessment of HE, providing an indication of liver disease severity based on parameters such as bilirubin, albumin, prothrombin time, ascites and encephalopathy grade[5]. Patients with higher CTP scores are at an increased risk of developing more severe forms of HE, highlighting the importance of regular monitoring and early intervention.

Despite advancements in understanding the biochemical and pathophysiological underpinnings of HE, the psychological and neurological dimensions remain underexplored. This study aims to bridge this gap by systematically examining the psychological and neurological aspects of HE in a cohort of patients, utilizing the CTP scoring system and the West Haven classification to stratify disease severity and encephalopathy grades, respectively.

The burden of HE on cognitive and emotional functioning is profound, affecting not only the patients but also their caregivers and the healthcare system. Cognitive impairments can hinder daily activities, reduce employment opportunities and diminish overall quality of life[6]. Additionally, mood disturbances associated with HE can exacerbate the social isolation and stigma often experienced by patients with chronic liver disease[7].

By focusing on a comprehensive assessment of cognitive and emotional function, this study seeks to enhance the clinical approach to HE, emphasizing the importance of addressing both psychological and neurological health in the management of this debilitating condition. Understanding these aspects will enable the development of more effective therapeutic strategies and support systems tailored to the needs of HE patients.

MATERIALS AND METHODS

Study Design and Population: This cross-sectional study was conducted to evaluate the psychological and neurological aspects of hepatic encephalopathy (HE) in patients with chronic liver disease. A total of 100 patients aged between 41-60 years were recruited from the hepatology clinic of a tertiary care hospital. Inclusion criteria were a confirmed diagnosis of HE and willingness to participate in the study. Patients with other neurological disorders, significant psychiatric illness, or acute liver failure were excluded.

Assessment Tools and Classification Systems:

Child-Turcotte-Pugh (CTP) Scoring: The severity of liver disease was assessed using the Child-Turcotte-Pugh (CTP) score. This score includes five clinical measures: bilirubin, albumin, prothrombin time (INR), ascites and encephalopathy. Based on these parameters, patients were classified into CTP Score A (5-6 points), B (7-9 points) and C (10-15 points).

West Haven Classification: The severity of HE was graded using the West Haven classification system. This classification stratifies HE into four grades based on the level of consciousness, intellectual function, behavior and neurological findings (Table 1).

Table 1: West Haven classification

West Haven Classification	Description
Grade I	Trivial lack of awareness, euphoria or anxiety, shortened attention span, impaired performance
Grade II	Lethargy, disorientation to time, inappropriate behavior
Grade III	Somnolence to semi-stupor, responsive to stimuli, confusion, gross disorientation
Grade IV	Coma

Types of Hepatic Encephalopathy: The type of HE was classified based on the underlying cause as follows (Table 2):

Table 2: Types of Hepatic Encephalopathy

Type of HE	Description
Type A	HE associated with acute liver failure
Type B	HE associated with portal-systemic bypass or shunting without intrinsic liver disease
Type C	HE associated with cirrhosis and portal hypertension or portal-systemic shunts

Psychological and Neurological Assessment: A comprehensive battery of psychological and neurological tests was administered to all patients. The psychological assessment included standardized questionnaires to evaluate mood (e.g., Beck Depression Inventory) and anxiety (e.g., Hamilton Anxiety Rating Scale). The neurological assessment involved cognitive tests such as the Mini-Mental State

Examination (MMSE) and neuropsychological tests to assess memory, attention and executive functions.

Data Collection and Analysis: Demographic and clinical data were collected from patient records and direct interviews. The severity of HE and liver disease was recorded using the West Haven classification and CTP score, respectively. Psychological and neurological test scores were analyzed to identify patterns and correlations with HE severity.

RESULTS AND DISCUSSIONS

A total of 100 patients were considered for this study. Of these, more than three-fourth (76%) patients were male and only 24% patients were female (Table 3).

Table 3: Gender

Gender	No. of Patients (%)
Male	76 (76)
Female	24 (24)
Total	100 (100)

Almost all the patients considered for this study were older than 20 years. More than half of these patients (54%) belonged to the age group 41-60 years. More than one-third of the total number of patients fell into the age group 20-40 years. Only 8 % of the patients were older than 60 years and only 1 patient aged ≤20 years was present in this study (Table 4).

Table 4: Age Group

Age Group	No. of Patients (%)
≤20 years	1 (1)
20-40 years	37 (37)
41-60 years	54 (54)
> 60 years	8 (8)
Total	100 (100)

More than half of the patients (59%) had CTP Score C. About one-third of the patients (32%) had CTP Score B, while the remaining 9% patients had CTP Score A (Table 5).

Table 5: CTP Score

CTP Score	No. of Patients (%)
CTP A	9 (9)
CTP B	32 (32)
CTP C	59 (59)
Total	100 (100)

Of the 100 patients considered for this study, more than four-fifth (84%) showed Type C Hepatic Encephalopathy, while 13% patients had Type A Hepatic Encephalopathy and a mere 3% patients had Type B Hepatic Encephalopathy (Table 6).

Table 6: Type of Hepatic Encephalopathy

Type of Hepatic Encephalopathy	No. of Patients (%)
Type A	13 (13)
Type B	3 (3)
Type C	84 (84)
Total	100 (100)

More than one-third of the patients (34%) considered for this study belonged to West Haven Classification III, while one-third of the patients (33%) fell into West Haven Classification IV. Of the remaining one-third patients, majority of the patients (22%) belonged to West Haven Classification I and only 11% patients were of West Haven Classification II (Table 7, Fig. 1).

Table 7: West Haven Classification

West Haven Classification	No. of Patients (%)
I	22 (22)
II	11 (11)
III	34 (34)
IV	33 (33)
Total	100 (100)

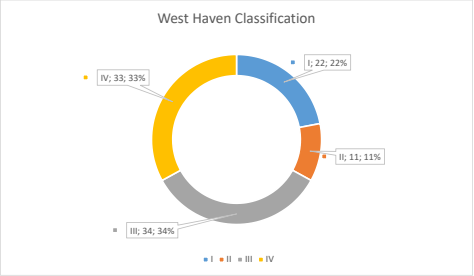

Fig. 1: West Haven classification

Hepatic encephalopathy (HE) is a complex neuropsychiatric syndrome that results from liver dysfunction and is commonly seen in patients with advanced liver disease, such as cirrhosis. The Child-Turcotte-Pugh (CTP) score is a widely used system to evaluate the prognosis of chronic liver disease and the necessity for liver transplantation[8]. The CTP score classifies patients into three categories: A (least severe), B (moderately severe) and C (most severe), based on five clinical measures: encephalopathy, ascites, bilirubin, albumin and prothrombin time. Additionally, the West Haven classification system is used to grade the severity of HE from Grade I (mild symptoms such as lack of awareness) to Grade IV (coma)[9].

In our study, we considered a total of 100 patients with hepatic encephalopathy. Of these, 76% were male and 24% were female, indicating a higher prevalence of HE among males. This gender distribution is consistent with findings from Bustamante *et al.* (1999), who also reported a higher incidence of HE in males[10]. The age distribution in our study showed that more than half (54%) of the patients were between 41-60 years old, more than one-third (37%) were between 20-40 years old and only 8% were older than 60 years, with just one patient aged 20 years or younger. This age distribution aligns with observations by Hartmann IJ *et al.* (2000) and Dhiman RK *et al.* (2010), who noted that HE is more common in middle-aged to older adults, reflecting the progressive nature of liver disease over time[11,12].

Previous studies have highlighted the prevalence and severity of HE in patients with advanced liver disease. Our study showed that 59% of patients had CTP Score C, 32% had CTP Score B and 9% had CTP Score A. This distribution is consistent with Poordad FF (2007), who reported a high proportion of patients with cirrhosis in CTP class C. The high percentage of patients in CTP class C in both studies underscores the advanced liver dysfunction in these patient populations[13]. Similarly, Bustamante *et al.* (1999) found that 40% of their patient cohort was in CTP class C, 40% in class B and 20% in class A, illustrating the varying degrees of disease progression among patients .

In our study, 84% of patients had Type C HE, 13% had Type A HE and 3% had Type B HE. Ferenci *et al.* (2002) found a similar distribution, with Type C HE being the most common form associated with cirrhosis. The alignment of our results with those of Ferenci *et al.* (2002) confirms the predominance of Type C HE in patients with advanced liver disease[1].

Regarding the West Haven classification, our study revealed that 34% of patients were in Grade III, 33% were in Grade IV, 22% were in Grade I and 11% were in Grade II. The severity of HE, as classified by the West Haven system, was also explored by Hartmann IJ *et al.* (2000) and Dhiman RK *et al.* (2010), who found that a substantial number of patients were in the more severe grades (III and IV), indicating significant impairment in cognitive and motor functions due to advanced liver disease.

Our study's findings regarding the CTP scores, types of HE and West Haven grades align closely with those reported in previous studies. The high prevalence of male patients, the concentration of patients in middle-aged and older age groups, the predominance of CTP Score C and the significant proportion of patients with severe HE (West Haven Grades III and IV) are consistent with established patterns in hepatic encephalopathy research. These consistencies underscore the progressive nature of liver disease and the critical need for timely diagnosis and management of HE to improve patient outcomes.

CONCLUSIONS

This clinical study on hepatic encephalopathy (HE) underscores the significant burden of advanced liver disease, with a majority of patients falling into the most severe classifications of CTP score and West Haven grades. The higher prevalence among middle-aged males and the dominance of Type C HE highlight critical demographic trends. These findings reinforce the urgent need for early diagnosis, effective management and targeted interventions to improve patient outcomes. The study also emphasizes the importance of future research to explore innovative treatments and enhance our understanding of HE's underlying mechanisms.

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