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Research Article

**EVALUATION OF SUB-CLINICAL HEPATIC ENCEPHALOPATHY BY  
PSYCHOMETRIC TESTS****Dr. Abdul Haque Khan<sup>1\*</sup>, Dr. Muhammad Adnan Bawany<sup>2</sup>, Dr. Mukhtiar Hussain Jaffery<sup>1</sup>, Dr. Aida Nasar<sup>2</sup>, Dr. Hamid Nawaz Ali Memon<sup>3</sup>, Dr. Abdul Subhan Talpur<sup>4</sup>, and Dr. Muhammad Ayyaz<sup>5</sup> and Dr. Zulfiqar Ali Qutrio Baloch<sup>5</sup>**<sup>1</sup>Department of Medicine, Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro<sup>2</sup>Isra University Hospital Hyderabad, Sindh, Pakistan<sup>3</sup>Zulekha Hospital Dubai United Arab Emirates<sup>4</sup>Liaquat University Hospital Hydderabad / Jamshoro<sup>5</sup>Brandon Regional Hospital Brandon, Florida, U.S.A**Abstract:****Objective:** To evaluate the sub-clinical hepatic encephalopathy by psychometric tests.**Patients and Methods:** The cross sectional study of six months was conducted at the tertiary care hospital Hyderabad. The inclusion criteria were the patients of  $\geq 12$  years of age, either gender, diagnosed to have cirrhosis of liver by history, clinical examination, laboratory findings, ultrasonography and liver biopsy and spare from the medications the impaired the cognitive function. A detailed clinical history, physical examination including neuropsychological tests [NCT and DST] and the baselines and specific relevant investigations were advised and the data was collected on predesigned proforma. The frequency and percentages was calculated while the numerical statistics were used to compute mean  $\pm$ SD.**Results:** Thirty patients with histologically proven cirrhosis were recruited and studied for subclinical hepatic encephalopathy during six months study period. The mean age  $\pm$  SD for whole population was  $43.98 \pm 7.83$  years with male gender predominance (66.6%) while the mean  $\pm$  SD for DST and NCT was  $241.82 \pm 5.83$  and  $152.98 \pm 7.75$ . The common etiologies identified were Hepatitis B (40%), hepatitis C (33.3%) and hepatitis B and C (16.6%) while DST and NCT were shown to be abnormal in 17 (56.6%) and 18 (60%) individuals with chronic liver disease respectively.**Conclusion:** The sub clinical hepatic encephalopathy on the basis of NCT and DST could better predict a subsequent episode of overt hepatic encephalopathy in chronic liver disease.**Keywords:** Sub clinical hepatic encephalopathy, psychometric tests and Hepatic encephalopathy.**Corresponding author:****Dr. Abdul Haque Khan,**

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**INTRODUCTION:**

Hepatic encephalopathy (HE) a lethal complication of end stage hepatic disease and considered as neuropsychological syndrome occurs in patients with either severe hepatic failure, chronic liver disease or as a consequence of surgical portal systemic shunts and traditionally it is graded into four (4) clinical grades [1-3]. Despite clinical grading of hepatic encephalopathy a subclinical state is explained in which individuals with liver cirrhosis regardless about etiology presents number of neuropsychological errors but yet have a normal neurological & mental status on global neurological physical examination [4-6]. Several physicians advise by using a combination of 2 to 3 psychometric tests as diagnostic tool of subclinical hepatic encephalopathy (SHE). Several others neurophysiological tests as visual evoked potential and electro encephalography (EEG) sometimes also used [7, 8]. However controversies persist whether these neurophysiological tools are appropriate for clinical psychometric tests [9, 10]. The sub clinical hepatic encephalopathy prevalence varies from 40% to 85% depends on type of tests and sample size used. Thus, in view routine periodic assessment of subclinical hepatic encephalopathy is recommended in individuals with chronic liver disease and the present study was an attempt to observe the frequency of subclinical hepatic encephalopathy by clinical psychometric tests in patients with liver cirrhosis.

**PATIENTS AND METHODS:**

The cross sectional study of six months was conducted at the tertiary care hospital Hyderabad. The inclusion criteria were the patients of  $\geq 12$  years of age, either gender, diagnosed to have cirrhosis of liver by history, clinical examination, laboratory findings, ultrasonography and liver biopsy and spare from the medications the impaired the cognitive function while the exclusion criteria of the study were patient having overt HE, preexisting psychiatric & neurological disorders causing cognitive dysfunction, difficulty in performing psychometric tests as having visual errors and the patients already on antipsychotic / antidepressant therapy. The participants had administration for neuropsychological test and the non probability

purposive sampling technique was used to recruit the patients while the informed consent was taken for participation after explaining the purpose of the study to each individual and the patient assured prior to consent that non participation don't affect the treatment strategy. A detailed clinical history, physical examination including neuropsychological tests [NCT and DST] and the baselines and specific relevant investigations were advised and the data was collected on predesigned proforma. The number connection test (NCT) and digit symbol test (DST) were used as psychometric tests. The patients were advised to participate by providing the pencil and instruct to begin by draw a line at number one in continuous order until the marked end of circle is obtained. The time was noted during entire test while during the procedure if the subject had mistake then advise to continue the process by making point out for mistake. The score is expressed in terms of the time in seconds required for the test. The test was found to be highly sensitive to brain impairment with diffuse involvement. Digit symbol test consists of a paper upon numbers one to nine randomly placed in 04 lines of 25 squares each. The initial 10 squares were considered as for practice purpose. The time duration to finish the test considered as score obtained and the errors were also observed, the duration of the test takes maximum approximately seven minutes. In NCT-A, the individuals joined the numbers in sequence as fast as possible while in NCT-B, the individuals joined alternatively the numbers & letters as early as possible. The DST was measured in points while NCT and DST were measured as seconds. The data was saved in SPSS to analyze by evaluating the frequencies, percentages and mean  $\pm$  standard deviations.

**RESULTS:**

Thirty patients with histologically proven cirrhosis were recruited and studied for subclinical hepatic encephalopathy during six months study period. The mean age  $\pm$  SD for whole population was  $43.98 \pm 7.83$  years with male gender predominance (66.6%) while the mean  $\pm$  SD for DST and NCT was  $241.82 \pm 5.83$  and  $152.98 \pm 7.75$ . The demographical, clinical profiles and status of psychometric tests of the patients with subclinical hepatic encephalopathy are shown in Table 1-2.

**TABLE 01: THE DEMOGRAPHICAL AND CLINICAL PROFILE OF THE PATIENTS**

<b>AGE (years)</b>	<b>FREQUENCY (N=30)</b>	<b>PERCENTAGE (%)</b>
12-19	02	6.6
20-29	03	10
30-39	07	23.3
40-49	08	26.6
50-59	08	26.6
60+	02	6.6
<b>GENDER</b>		
Female	10	33.3
Male	20	66.6
<b>RESIDENCE</b>		
Urban	09	30
Rural	21	70
<b>Cause of chronic liver disease</b>		
Hepatitis B	12	40
Hepatitis C	10	33.3
Hepatitis B and C	05	16.6
NAFLD/ NASH	02	6.6
Hepatoma	01	3.3
<b>Child-Pugh class</b>		
A	08	26.6
B	17	56.6
C	05	16.6

**TABLE 02: THE STATUS OF PSYCHOMETRIC TESTS IN PATIENTS WITH SUB-CLINICAL HEPATIC ENCEPHALOPATHY**

<b>Digit symbol test (DST)</b>	<b>Frequency (N=30)</b>	<b>Percentage (%)</b>
Normal	13	43.3
Abnormal	17	56.6
<b>Number connection test (NCT)</b>		
Normal	12	40
Abnormal	18	60

**DISCUSSION:**

In current study we had performed psychometric tests study to evaluate the relationship among the detection of sub clinical hepatic encephalopathy (SHE) and the development of episodes of hepatic encephalopathy [11]. The diagnosis of SHE is important in the context of quality of life or traffic accidents. Still less well known is either SHE is a predictor for overt mental changes. If such relation exists than the association could warrant a search for early evaluation and possible management of individuals with SHE [12]. In present study we evaluate the frequency of SHE in patients of liver cirrhosis patients by using NCT and SDT. The mean age  $\pm$  SD for whole population in present study was  $43.98 \pm 7.83$  with male gender predominance. The mean age

in the study of 179 patients by Groeneweg M, et al [13] was  $50.00 \pm 2.52$  years with 113 males and 66 females, while the range of patients in a study by Nader was 35-70 years with a mean of 51 years respectively [14]. In present study the etiology for liver cirrhosis were chronic viral hepatitis B, C, hepatoma and NAFLD / NASH while the cause for liver cirrhosis was viral hepatitis in seventy five patients, alcoholism in forty individuals & other etiologies in seventy one subjects in the study by Groeneweg M [13]. In an another study by Nadar 24 hepatitis C, 14 alcoholic CLD, 2 hepatitis B and two patient had both viral hepatitis B and C was studied [14]. In the study by Quero JC, et al [15] 50% of the studied population had abnormal neuropsychiatric tests.

In current series the total abnormal rate of NCT and DST in chronic liver disease was 60% and 56.6 respectively and supported as a sensitive and specific tool to detect SHE and it is consistent with the former literature reported that NCT and DST able to detect SHE with sensitivity of 76% and a specificity of 96% respectively [16]. In present study we choice DST and NCT as both tools are sensitive and have a easy use and accessibility at bed side especially during a routine visit of patients with liver cirrhosis [17]. Early evaluation and management of SHE seem extremely necessary in Pakistan due to huge population and high incidence of chronic liver diseases in this country [18]. The raised prevalence of SHE in cirrhotic subjects should concentrate us to have attention on these important observations frequently encountered in our daily medical practice [19].

### CONCLUSION:

The existence of impaired neuropsychological findings in patients with liver cirrhosis patients is confirmed by our results through psychometric tests (NCT and DST). The sub clinical hepatic encephalopathy on the basis of NCT and DST could better predict a subsequent episode of overt hepatic encephalopathy & recommended as substitute of intelligence quotient (IQ) test for SHE in patients with liver cirrhosis.

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