

Twenty-two Items and Fifteen Items Screening Tests from LNNB-I for Screening Neuropsychological Deficits

Masroor Jahan¹, S. Haque Nizamlo², Alka Nizamlo³ and Abdul Khalique⁴

ABSTRACT :

Since all epileptic patients do not have significant neuropsychological deficits, a screening tool will be helpful to identify epileptic patients who need detail neuropsychological assessment. In the present study an attempt was made to identify screening tool from LNNB-I. Twenty two items screening tool was identified on the basis of previous study conducted on 120 epileptic patients and 30 normal controls (Jahan et al., 2000) using stepwise discriminant analysis. Items requiring reading and writing abilities were excluded and 15 items screening tool was identified that can be used for illiterate patients also. Overall classification rate of 22 items screening test for epileptic and normal subjects was 86.7% with sensitivity of 85% and specificity of 93.3%. overall classification rate of 15 items screening test for epileptic patients and normal subjects is 83% with sensitivity of 80.8% and specificity of 93.3%. Cut-off point was 13 for 22 items screening test, and 8 for 15 items screening test.

Keywords : Screening cognitive deficits, Screening epileptic patients, Screening tool from LNNB, Neuropsychological screening test.

INTRODUCTION:

LNNB Form-I is a comprehensive battery for neuropsychological assessment consisting of 269 items. It has items assessing basic sensory-motor functions to conceptual abilities. Standardization studies of LNNB are mainly conducted on brain-damaged subjects or on subjects having severe cognitive impairment. However, in epileptic patients, deficits are usually subtle, and basic sensory-motor-speech functions are intact, hence, on many items epileptic patients perform similar to normal persons. Moreover, overall performance of 35% epileptic patients remains like normal persons (For detail see Jahan et al., 2000), hence, they do not require detail neuropsychological assessment. To avoid the lengthy process of assessment for patients who don't have significant neuropsychological deficit, a screening test is required to predict whether administration of LNNB was likely to yield useful information.

Golden (1987) developed screening test for adult and children from LNNB-II. The goal was to design instrument that would take less than 20

minutes to administer and score. It was not intended to classify patients as organic or non-organic, but rather to predict the degree of severity of overall LNNB performance. Stepwise multiple regression was done to identify items for screening test. The adult sample included 160 normal subjects, 125 patients of psychiatric disorder (87 schizophrenic patients, 25 depressive patients, and 13 with other psychiatric disorders), and 241 patients of brain dysfunction (head injury, trauma, stroke, epilepsy, metabolic disorders, degenerative disorder, and tumors). Screening tool consisted of 15 items. Correlation of these 15 items with overall total scores from the entire battery was .948. Cross validation sample yielded a correlation value .943. A cut-off score of 7 correctly classified 88.6% subjects as normal, and 94.8% subjects as abnormal. Cross validation study identified 90% subjects correctly. This screening test consists of items from LNNB-II that has computerized scoring and interpretation system. In clinical set-up LNNB-I is more commonly used battery because it is manually scored and computerized scoring facility is also available. Hence, screening test derived from

1. Assistant Prof. of Clinical Psychology, Ranchi Institute of Neuro-Psychiatry and Allied Sciences, Ranchi. (Reprint Request)
2. Director and Prof. of Psychiatry, Central Institute of Psychiatry, Ranchi.
3. Associate Prof. of Clinical Psychology, Deepshikha Institute of Child Development and Mental Health, Ranchi.
4. Reader, PG Department of Psychology, Ranchi University, Ranchi.

LNNB-I is needed to screen patients for probable neuropsychological deficits. The need for screening test is more for disorders/diseases where neuropsychological deficits may or may not be present; e.g., epilepsy, psychiatric disorders etc.). In the present study the data of previous study (Jahan et al., 2000; study was conducted on epileptic patients) is reanalyzed to identify items for screening test.

METHODOLOGY

Sample: The sample consisted of 120 epileptic patients and 30 normal subjects (for detail see Jahan et al., 2000). Diagnosis of epilepsy was done according to Commission on Classification and Terminology of International League Against Epilepsy (1989). Twenty-three patients had primary generalized epilepsy, 93 had secondary generalized epilepsy and 4 had focal epilepsy. Mean age of patient group was 24.20 ± 8.12 and normal subjects group was 25.37 ± 8.30 . All subjects were right handed and literate.

TOOLS

Handedness was screened by Hand Preference Battery (Annett, 1970). To exclude probable psychiatric cases, General Health Questionnaire-5 (Shamsunder et al., 1986) was used. Socio-demographic and clinical details were collected using a Socio-Demographic and Clinical Data Sheet. Proforma contained socio-demographic characteristics, birth and developmental history, past history, and family history for patients and normal subjects, and clinical variables related to seizure, ictal and postictal features of seizure, investigation reports, medication and impression about patients' diagnosis for patients' record.

The Luria-Nebraska Neuropsychological Battery Form 1 (LNNB) (Golden et al., 1985) was administered to all subjects. It consists of 269 items. Based on the basic functions involved these items are arranged under eleven clinical scales (C1-C11) and five summary scales (S1-S5). Construct and concurrent validity of the LNNB is well documented. Reliability studies showed internal

consistency ranging from .78 to .94, split-half from .89 to .988, test-retest from .69 to .96 and inter-rater reliability from .75 to .97 (Golden et al., 1985). Few items were translated into patients' mother tongue without changing the content whenever needed (translated items have been used in earlier studies also, for detail see Jahan et al., 2000).

PROCEDURE

After screening according to inclusion and exclusion criteria subjects were selected for study. A detail history was taken from patient and informants (preferably those who have witnessed the attack) and socio-demographic and clinical data sheet was filled. Information was cross-confirmed from the case-record file. Reports of other investigations like routine EEG, CT Scan etc. were recorded after the interpretation of the LNNB. The LNNB was administered to all subjects individually. To control fatigue effect testing was completed in 2-5 sessions in one day or over a period of 2 consecutive days.

Statistical Analysis: Data was analyzed using mean, SD and conanical discriminant analysis by SPSS V 7.5.

RESULT

Data of previous study (Jahan et al., 2000) was reanalyzed using conanical discriminant analysis. To identify differentiating items, stepwise discriminant analysis was done for all clinical scales of LNNB-I. Analysis suggested that out of 269 items of LNNB Form-I, 22 items differentiated epileptic and normal subjects (Table 1). Overall classification rate of 22-items screening test for epileptic and normal subjects is 86.7% with sensitivity of 85% and specificity of 93.3% (Eigenvalue = .672; Wilk's Lambda = .598; $df = 22$; $p < .001$). Mean score of normal subjects for 22-items screening test was 7.83 and SD was 5.092. Mean and SD suggests a range of 0 to 13 score for average performance, 14 to 18 score for borderline performance, and score of 19 and above for impaired performance. Cut-off score for 22-items screening test is 13.

SCREENING TESTS FROM LNNB - I

Table 1 : Showing items of twenty-two items screening tool (* fifteen items screening tool) from LNNB-I.

Item No.	Functions assessed
2*	Simple movement of right hand
13*	Hand coordination in double plane
21*	Smooth coordination of hand movement
62*	Rhythmic tapping through modeling
74*	Graphaesthesia for geometrical figure
85*	Stereognosis
87*	Visual naming
95	Drawing clock time
122*	Understanding of compound grammatical structure
125*	Understanding of compound grammatical structure
128*	Understanding of logical relation
169*	Narrative speech: fluency
171	Appreciation of grammatical structure
173	Appreciation of grammatical structure
186	Writing: grammar and spelling
199	Reading text: accuracy
200	Reading text: fluency
218	Understanding arithmetical operation: sign
228*	Memory for sensory trace: tapping
235*	Logical memory
240*	Comprehension of thematic text
248*	Comprehension of word

* Items of fifteen items screening too from LNNB-I

Few items require reading and writing ability, hence are inapplicable for illiterate patients, hence, these items were excluded from the screening test, and screening test applicable for illiterate patients also consisted of 15 items (Table 1). Overall classification rate of 15-items screening test for epileptic and normal subjects is 83.3% with sensitivity of 80.8% and specificity of 93.3% (Eigenvalue = .563; Wilk's Lambda = .640; df = 15; $p < .001$). Mean score of normal subjects for 15-items screening test was 4.53 and SD was 3.501. Mean and SD suggests a range of 0 to 8 score for average performance, 9 to 11 score for borderline performance, and score of 12 and above for impaired performance. Cut-off score for 15-items screening test is 8.

DISCUSSION

On the basis of stepwise discriminant analysis two screening tests (22-items and 15-items screening test) were derived from LNNB-I. These screening tools are to identify patients who may have neuropsychological deficits, i.e., to predict a need for detail neuropsychological assessment.

This should not be used to diagnose brain damage. Patients who score above cut-off point should be assessed in detail for diagnostic purpose or neuropsychological rehabilitation planning.

If a patient scores 14 (cut-off point 13) on 22-items screening test, or 9 (cut-off point 8) on 15-items screening test, administration of screening test should be discontinued and full battery should be administered or patient should be referred for detail assessment.

Functions assessed by screening tool covers almost all clinical scales, hence is representative of overall functions assessed by the full battery. These items assess functions that are reported impaired in epileptic patients in many previous studies. Anomia (Mungas et al., 1985), grammatical deficits and poor arithmetical skills (Ellis et al., 1991), and impaired verbal fluency (Corcoran & Upton, 1993) etc. are most commonly reported cognitive deficits. Since the present screening tool consists of these functions, it is able to identify epileptic patients with probable cognitive deficits.

Fifteen items screening tool from LNNB-I does not include items requiring reading and writing ability. Hence, its additional advantage is that it can be used for illiterate patients also.

REFERENCES

- Annett, M. (1970). A classification of hand preference by association analysis. *British Journal of Psychology*, 61, 303-321.
- Corcoran, R., & Upton, D. (1993). A role for the hippocampus in cord sorting. *Cortex*, 29, 293-304.
- Commission on Classification and Terminology of the International League against Epilepsy. (1989). Proposal for revised classification of epilepsies and epileptic syndromes. *Epilepsia*, 30, 389-399.
- Ellis, A.W., Hiram, J.C., Cardno, A., & Kay, J. (1991). Processing of words and faces by patients with left and right temporal lobe epilepsy. *Behavioural Neurology*, 4, 121-128.
- Golden, C.J., Purisch, A.D., & Hammeke, T.A. (1985). *Luria-Nebraska Neuropsychological Battery: Forms I & II (Manual)*. Los Angeles: Western Psychological Services.

- Golden C. J. (1987). *Screening Test for Luria-Nebraska Neuropsychological Battery: adult and Children's Froms: Manual*. Western Psychological Services: California.
- Jahan, M., Nizamie, S.H., & Nizamie, A. (2000). Neuropsychological deficits in epileptic patients. *Indian Journal of Clinical Psychology*, 27, 230-238.
- Mungas, D., Ehler, S., Walton, N., & McCuichen, C. B. (1985). Verbal learning defferences in epileptic patients with left and right temporal lobe foci. *Epilepsia*, 26, 340-345.
- Shamsunder, C., Sriram, T.G., Muraliraj, S.G., & Shanmugham, V. (1986). Validity of a short 5-item version of the General Health Questionnaire. *Indian Journal of Psychiatry*, 28, 217-219.

INDIAN JOURNAL OF CLINICAL PSYCHOLOGY (2005), VOL. 32 : NO. 2

FORM IV

Statement about ownership and other particulars about Indian Journal of Clinical Psychology :

1. Place of Publication : Ranchi
2. Periodicity of Publication : Half-Yearly
3. Printer's Name : Kailash Paper Conversions Pvt. Ltd.
4. Editor's and Publisher's Name : Professor Amool R. Singh
- Nationality : Indian
- Address : Ranchi Institute of Neuro-Psychiatry & Allied Sciences (RINPAS),
Kanke, Ranchi - 834 006 (India)
Ph. : 91-0651-2233687 (R), 91-0651-2451121 (O)
e-mail : editorijcp@yahoo.com
5. Name and Address of individuals & who own the newspaper & partners of share holders holding more than one percent of the total capital : Indian Association of Clinical Psychologists.

I, Prof. Amool R. Singh, hereby declare that the particulars given above are true to the best of my knowledge and belief.

SPECIAL SECTION

This section consists of few unreviewed papers originally presented in the NACIACP held in Coimbatore during January 2005 (as sent by Conference Director).

Editor