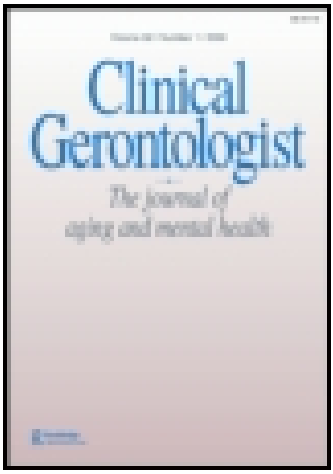

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Reliability and Validity of the "Middlesex Elderly Assessment of Mental State" (MEAMS) Among Hospitalized Elderly in Israel as a Predictor of Functional Potential

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Reliability and Validity of the "Middlesex Elderly Assessment of Mental State" (MEAMS) Among Hospitalized Elderly in Israel as a Predictor of Functional Potential

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ABSTRACT. This study of Hebrew speaking Israelis (n = 77) found that the MEAMS had internal reliability (Cronbach alpha = .75) and parallel form reliability (r = .71). Validity was examined by correlaing the MEAMS to established tests such as the MMSE (r = .64) and Clock Completion Test (r = −.53) and Functional Independent Measure (r = .35). The MEAMS correlated with demographic variables (age r = −.38, education r = .24). *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: <getinfo@haworthpressinc.com> Website: <http://www.HaworthPress.com>]*

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KEYWORDS. MEAMS, elderly rehabilitation, cognitive assessment, cognition

INTRODUCTION

The Middlesex Elderly Assessment of Mental State (MEAMS) is a neuro-psychological screening test. It was created in England by Golding (1989),[1] published by the Thames Valley Test Company and is intended for the use of the medical professions. The test examines cognitive functions necessary for daily functioning and helps in diagnosing either organic or mental disabilities among the hospitalized elderly.[1]

The MEAMS is characterized by its evaluation contexts that are not tested by other short assessment tools, such as the Mini Mental State Examination (MMSE)[2] and the Clock Completion Test (CCT).[3,4] Each of the two versions comprises 12 sub-tests: name learning, naming, comprehension, remembering pictures, arithmetic, spatial construction, fragmental letters, perception, unusual views, usual views, verbal fluency, motor perseveration. The final score is reached by the sum of the sub-tests answered correctly (pass: 1 point, fail: 0 points). Performance norms are as follows: 10-12: good performance, 9-8:borderline range, 7 or below: comprehensive evaluation is required.

Golding (1989)[1] Examined the validity, reliability and the determination of norms for the MEAMS among 120 elderly patients and Husband and Tarbuck (1994)[5] expanded the use of the test to a psycho-geriatric population. Powell, Brokers and Papadopolous (1994)[6] found problems in the reliability of some of the MEAMS' sub tests: visual perception, naming, comprehension, calculation and verbal fluency. The researchers have limited their conclusions in light of their small sample.

The purpose of the present study is to examine the test's reliability and validity among elderly population in an acute geriatric and rehabilitative unit in Israel in order to use it for both clinical and research purposes.

METHODS

Population

The sample comprised 77 elderly people, (mean age 79.4 years, median 81.5), hospitalized in the geriatric ward (rehabilitative and

acute patients) at the Meir Hospital, Kfar Sava, Israel (see Table 1). Forty-nine percent of the patients had undergone orthopedic surgery, 15.6% suffered from neurological diseases or stroke, 35% suffered from internal diseases and/or functional decline. Average hospitalization was 54.4 days (median 65.5).

All the subjects were Hebrew-speakers and had an average of 9 years education. Sixty-two percent of the subjects were independent in the activities of daily living (ADL) prior to their hospitalization. Exclusion criteria were patients with aphasia, visual or auditory impairment.

PROCEDURE

The study's battery was administered to all subjects on admission and discharge and comprised the following research tools:

- A demographic and medical questionnaire was completed by a geriatrician exclusively on admission.
- The CCT,[3,4] MMSE[2] MEAMS (two versions)[1] were administrated by occupational therapists.
- The Functional Independent Measure (FIM)[7] was assessed by a multi-disciplinary team.

STATISTICAL ANALYSIS

Statistical analysis was carried out using SPSS software. The level of significance was $\alpha < 0.05$. The MEAMS test was given to an academic expert in order to determine content validity of the Hebrew version.

Internal reliability was tested by the Cronbach Test and parallel version reliability by the Pearson Correlation Coefficient. Examination of parallel validity was performed by comparing the MEAMS with the MMSE and the CCT tests, and predictive validity by comparing it with the FIM test. These tests were examined using the Pearson Correlation Coefficient. Examination of the discriminating validity of the test was conducted by the Analysis of Variance (Anova) Model and Scheffe test.

RESULTS

Reliability. The study's results show high internal reliability between the sub-tests of both versions: MEAMS A: $\alpha = .7456$, MEAMS

TABLE 1. Characteristic of the Study Subjects

Sample	77	
Sex	Male: 28	Female: 49
Age	Mean = 79.4 S.D. = ± 7.94 Median = 81.5	Range: 67-95
Diagnosis		
Orthopedic	33.8%-hip fracture 15.6%-joint replacement	
Neurological	15.6%	
Functional Decline/Internal Disease	35%	
Ethnic Origin	71% Eastern Europe 13% Asia, Africa 2% Israeli born	
Duration of Hospitalization	Mean = 54.5 Median = 65.5	Range 11-114

B: $\alpha = .7561$, and a significant positive correlation between versions A and B: ($r = .7155$, $p = .005$).

Validity. The test was translated by the researchers and contextually validated by an expert-the head of the occupational therapy department at Tel Aviv University and a geriatric specialist.

Parallel validity. A significant positive correlation was found between MEAMS A and MMSE relating to admission: ($r = .6422$, $p = .000$) and between MEAMS B and MMSE relating to discharge ($r = .4828$, $p = .000$).

Comparison of the MEAMS with the CCT indicates a significant negative correlation between MEAMS A and CCT on admission ($r = -.5285$, $p = .000$) and on discharge ($r = -.4980$, $p = .000$). Correlation was found negative due to the scoring method of the CCT, which gives points for mistakes. A normal clock drawing of the CCT ranges between 0 and 3.

Predictive validity. Comparison of the MEAMS A with the FIM indicates a weak but significant positive correlation relating to admis-

sion (r = .349, p = .000) and discharge (r = .349, p = .000). No significant correlation was found between the MMSE and the FIM relating to admission (r = .166, p = .955) or discharge (r = .093, p = .423).

Discriminating validity. In accordance with the MEAMS norms (A: 12-10, B:9-8, C: 7 or below) the subjects were divided into 3 groups according to their performance level on the MMSE and FIM tests, and significant differences were found between the groups (see Tables 2 and 3).

Effect of demographic data on MEAMS performance. A significant negative correlation was found between age and score on the MEAMS A on admission (r = −.3785, p = .000) and a significant positive

TABLE 2. Differences in FIM Score on Admission and Discharge Between Subjects in Group A and C

Measuring Tool	Mean Group Score (S.D.) A	B	C	F	Df	p-value
FIM Admission	**96.21 (15.238)***	86.333 (16.334)	**82.81 (14.798)***	**5.923**	(2.72)	.0042
FIM Discharge	**114.09 (26.09)***	105.272 (14.781)	**91.97 (13.795)**	**9.447**	(2.70)	.002

Norms A: 12-10, B: 9-8, C: 7 or below.
*Significant differences

TABLE 3. Differences in MMSE Scores on Admission and Discharge Between Subjects in Group A and B and Group A and C

Measuring Tool	Mean Group Score (S.D.) A	B	C	F	Df	P-value
MMSE Admission	90.44 (7.948)*	88.22 (6. 530)*	71.50 (15.466)*	22.916	(2.74)	.0001
MMSE Discharge	90.05 (19.544)*	62.27 (30.522)*	60.63 (24.921)*	12.609	(2.71)	.0001

Norms A: 12-10, B: 9-8, C: 7 or below
*All differences are significant.

correlation between the number of years of education on admission (r = .3499, p = .002) and discharge (r = .232, p = .005). A significant positive correlation was also found between the number of years of education and the MMSE on admission: (r = .236, p = .043)

DISCUSSION

The MEAMS test was found to have high parallel version reliability and high internal reliability. Parallel version reliability indicates that both versions examine an identical world of contents. Internal reliability permits separate use of some of the sub-tests without compromising the reliability of the tool.

This finding contradicts the results of the study conducted by Powell Brookers and Papadopolos (1994)[6] that indicated problems of reliability in several of the sub-tests. Comparison of the results of scores on the MEAMS (both versions) and the MMSE on admission and discharge showed an average-level of positive correlation, a finding which gives the tool parallel validity and underscoring its uniqueness in comparison with the MMSE. The significant correlation found also with the CCT supports and strengthens its parallel validity.

These results points to the sensitivity of the MEAMS in locating difficulties in the components of cognitive functions among hospitalized elderly and during their rehabilitation.

The significant parallel correlation found between the two versions of the MEAMS and the FIM gives the tool predictive validity. Due to the fact that each tool contains a different world of content the validity was found weak. In light of these results, only the MEAMS, and not the MMSE or CCT, is an important predictor of the level of occupational performance during hospitalization and rehabilitation of the elderly. The norms of the MEAMS also give it the ability to differentiate between different performance levels on the FIM and the MMSE.

These findings strengthen the importance of cognitive status as an important rehabilitative criterion that affects occupational performance, rehabilitative potential, duration of hospitalization and discharge disposition.[3,8,9]

The significant negative relationship that was found between age and success on the MEAMS and the significant positive relationship

with years of education is appropriate to that known in the literature. As age increases the frequency of cognitive impairment rises, and the number of years of education affect performance ability on the neuro-psychological tests.[10]

In conclusion, the MEAMS is a short, easy-to-administer cognitive screening test, which examines a variety of cognitive components necessary for daily functioning. The tool was found to have internal reliability and parallel version reliability, contents validity, parallel validity, discriminating validity, predictive validity and norms. This implies that MEAMS provides a sensitive assessment of neurocognitive status and functional potential among the hospitalized geriatric and rehabilitative population in Israel. The tool is affected, like most neuro-psychological tests, by age and years of education and therefore is unsuitable for uneducated population. The MEAMS is also not recommended for patients suffering from aphasia or severe visual and auditory disorders.

In order to extend the clinical and research uses of the tool among a variety of populations, it is recommended to conduct further research while comparing it with both cognitive and functional assessment tools as well.

REFERENCES

1. Golding E. The Middlesex Elderly Assessment of Mental State. England: Thames Valley Test Company, 1989.

2. Folstein, MF, Folstein, SE, McHugh, PR. Mini Mental State Evaluation: A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research, 1975, 12; pp. 189-198.

3. Watson, JI, Arfen, CL, Briggs, SJ. Clock Completion: An objective screening test for dementia. The American Geriatric Society, 1993, 41; pp. 1235-1240.

4. Heinik, J. Clock Drawing Test in Dementia in Alzheimer's disease. Herefuah, 1998, 134; pp. 143-148 (Hebrew).

5. Husband, HJ, Tarbuck, AF. Cognitive Rating Scale: A comparison of the Mini Mental State Examination and the Middlesex Elderly Assessment of Mental State. International Journal of Geriatric Psychiatry, 1994, 9; pp. 797-802.

6. Powell T, Brooker, DJR, Papadopolous, A. Test-Retest of the Middlesex Assessment of Mental State (MEAMS): A preliminary investigation in people with probable dementia. British Journal of Clinical Psychology Society, 1993, 32; pp. 224-226.

7. Granger,CV, Hamilton, BB, Sherwin, FS. Guide for Use of the Uniform Data Set for Medical Rehabilitation. Buffalo, NY: Buffalo General Hospital, 1986.

8. Hills, GA, Bernstein, SR. Assessment of Elders and Caregivers. In Van Deusen, J, Brunt, D. Assessment in Physical and Occupational Therapy, Pennsylvania, Saunders Company, 1997; pp. 401-415

9. Johnston NM, Kirshblum, S, Zorowitz, R, Shillat, SG. Prediction of Outcome following Rehabilitation of Stroke Patients. Neuro-Rehabilitation, 1992, 2. pp. 72-97.

10. Geldmacher TJ, Whitehouse PJ. Evaluation of Dementia. The New England Journal of Medicine, 1996, 335; pp. 330-336.

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