**Validation of the Egyptian Harmonized Cognitive Assessment Protocol (HCAP)**

**Introduction:**

This project aims to provide an overview of the systematic process for validating the Egyptian version of HCAP, ensuring its reliability, validity, and cultural appropriateness for the Egyptian population. The project incorporates information regarding subject recruitment, training, data collection, clinical assessment, cognitive test selection, data cleaning, descriptive statistics, and data analysis.

**Completed steps:**

**Step 1: Subject Recruitment and Data Collection:**

- Subjects were recruited from three distinct sites: Ain Shams Geriatric Hospital in Cairo, Outpatient Clinics in Mansoura University Teaching Hospital in Mansoura, and outpatient clinics in Beni Suef University Teaching Hospital in Beni Suef.

- A total of 197 individuals participated, with a remarkable 100% participation rate achieved.

- Only 10 interviews were conducted with no informant interviews and were not included in the study.

- Data collection included both participant and informant questionnaires, with the former averaging 45 minutes and the latter approximately 25 minutes, conducted either face-to-face or by phone.

**Step 2: Training and Standardization:**

- A comprehensive 3-day training program was provided to all field teams, covering essential aspects such as project orientation, strategies for securing participant consent, interview techniques, guidelines for administering neuropsychological tests, procedures for informant interviews, and data management.

- Standardized procedures ensured uniformity in test administration and data collection.

**Step 3: Data Monitoring and Communication:**

- Continuous communication was maintained between the field management team and site coordinators throughout data collection.

- This communication allowed for close oversight of progress and timely resolution of any challenges faced by interviewers.

- Collected data was reported to the HCAP research coordinator, who performed weekly monitoring, including data distribution analysis.

- Feedback was used to refine and revise the assessment items for upcoming waves.

**Step 4: Clinical Assessment and Diagnosis:**

- Clinical assessments by psychiatrists and neurologists were conducted to diagnose cognitive impairments.

- The distribution of cognitive conditions was as follows: 55% normal, 25% Mild Cognitive Impairment (MCI), 15% early dementia, and 5% severe dementia.

- The diagnosis process involved data review, adjudication, and consensus by a panel of expert clinicians, ensuring reliable identification of cognitive conditions.

**Step 5: Cognitive Test Selection and Domain Classification:**

- Cognitive tests were selected based on specific criteria to ensure comprehensive coverage of key cognitive domains.

Respondent questionnaires covers cognitive functions broad domains (orientation, executive

functioning, language/fluency, memory, and visuospatial various batteries for cognitive

Assessments in Arabic as follows:

1- Cognitive Assessment Module (CG)

2- The Community Screening Instrument for Dementia (CSI-D)

3- Word List Learning - Delayed Recall

4- Verbal Fluency Test (FAS)

5- GO/NO-GO test

6- Delayed Story Recall

7- Problem solving/judgement (extracted from MOCA)

**While informant questionnaire is presented as follows:**

1- Informant demographics module (IDM)

2- Time spent with elderly

3- Short Form of the Informant Questionnaire on Cognitive Decline among the Elderly (IQ)

4- Blessed Dementia Rating scale part 2

5- Informant Community screening interview for dementia (IF)

6- Blessed Dementia Rating scale part 1

- Tests were adapted from the Lebanese cognitive study L’SAHA, translated into Arabic.

- Compatibility with HRS-HCAP for cross-country analysis was a key consideration.

- Tests were organized into broad domains (e.g., orientation, executive functioning, language/fluency, memory, visuospatial) and narrow subdomains to follow the CHC theory of human cognitive abilities.

**Step 6: Data Cleaning:**

- Collected data was cleaned and checked for missing values, outliers, and data entry errors.

- Any inconsistencies or issues were addressed to ensure the quality of the dataset.

**Step 7: Descriptive Statistics:**

- Descriptive statistics were calculated to summarize the data, including means, standard deviations, medians, and quartiles for each assessment item.

**Table 1. Descriptive Analysis for Validation of HCAP in Egypt (N = 197 Participants)**

|  |  |
| --- | --- |
| **Characteristic**  | **Mean or No. (SD)**  |
| Age, mean (SD), y  | 68.4 (6.9)  |
| Any education, No. (%)  | 44.5%  |
| Educational attainment, No. (%)  |   |
| - Never attended school  | 45.00%  |
| - Less than primary school  | 11.60%  |
| - Completed primary school  | 10.20%  |
| - Completed middle school  | 7.60%  |
| - Completed secondary school  | 7.80%  |
| - Graduate degree  | 3.40%  |
| - Postgraduate degree | 1.75%  |
| Orientation, mean (SD)  |   |
| - Month  | 0.72 (0.33)  |
| - Year  |  0.49 (0.47)  |
| - Day of the week  | 0.75 (0.36)  |
| - Day of the month  | 0.53 (0.41)  |
| - City  | 0.87 (0.22)  |
| Immediate memory, mean (SD)  |   |
| - 3-Word recall (three trials)  | 8.30 (1.15)  |
| - 10-Word recall (three trials)  | 10.98 (4.82)  |
| - Brave Man, immediate recall  | 1.03 (1.10)  |
| - Logical memory, immediate recall  | 1.06 (1.47)  |
| Delayed memory, mean (SD)  |   |
| - 10-Word delayed recall  | 2.97 (2.24)  |
| - 3-Word delayed recall  | 1.74 (0.95)  |
| - Brave Man, delayed recall  | 0.45 (0.87)  |
| - Logical memory, delayed recall  | 0.67 (1.36)  |
| - Constructional praxis, delayed  | 1.10 (0.96)  |
| Recognition memory, mean (SD)  |   |
| - 10-Word recognition  | 8.02 (2.44)  |
| - Logical memory, recognition  | 7.48 (3.22)  |
| Executive/abstract reasoning, mean (SD)  |   |
| - Go/no-go trial 1  | 6.36 (3.38)  |
| - Go/no-go trial 2  | 4.92 (3.61)  |
| Attention/speed, mean (SD)  |   |
| - Serial 7s  | 1.85 (1.75)  |
| - Backward day naming  | 3.82 (2.59)  |
| Language/fluency, mean (SD)  |   |
| - Naming described objects  | 1.76 (0.42)  |
| - Animal naming  | 11.63 (4.57)  |
| - Writing or saying sentence  | 0.90 (0.29)  |
| - Repeat a phrase  | 0.89 (0.32)  |
| - Close your eyes  | 1.55 (0.92)  |
| - 3-Stage task  | 2.61 (0.71)  |
| - Naming common objects  | 4.85 (1.19)  |
| Visuospatial, mean (SD)  |   |
| - Interlocking pentagons  | 0.52 (0.92)  |

**Next steps:**

**Step 8: Factor Analysis and Model Evaluation:**

- Unidimensional factor analysis models will be estimated for each narrow and broad cognitive domain.

- Model fit will be assessed based on predefined criteria, including CFI, RMSEA, and SRMR values.

- Residual correlations will be considered to improve model fit when necessary.

**Step 9: Hierarchical Multiple Domain Factor Analysis:**

- Measurement models will be combined into a hierarchical multiple-domain factor analysis that will include a general factor and represent all domains.

- Rigorous model fit assessment will rely on predefined cutoffs for CFI, RMSEA, and SRMR values.

**Step 10: Norming:**

- Based on the validation sample, norms and standards for the assessment protocol will be established, including percentile ranks, standard scores, or other normative values.

- Norms assist in interpreting individual performance relative to a reference group.

**Step 11: Report and Documentation:**

- A comprehensive report documenting the validation process will be prepared, including methodology, results, and psychometric properties.

- Guidelines for the administration and interpretation of the assessment will be provided.

By implementing this comprehensive data analysis plan, we aim to validate the Egyptian HCAP, ensuring its suitability for the Egyptian population. This structured approach guarantees that the assessment tool meets rigorous standards of reliability, validity, and cultural appropriateness, thereby contributing significantly to neurocognitive assessment in Egypt and facilitating effective research, clinical practice, and policymaking in the realm of cognitive health.