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ICMR - NCTB TESTS
(LITERATE)

**TEST OF GLOBAL COGNITIVE FUNCTION -
MONTREAL COGNITIVE ASSESSMENT (MoCA)**

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1.Introduction

The Montreal Cognitive Assessment (MoCA) was created in 1996 by Dr. Ziad Nasreddine. MoCA was used as a global cognitive screening tool as part of the ICMR-NCTB project to detect cognitive impairment. It is a rapid screening instrument with a total score of 30-points and the test can be administered in approximately 10 minutes. The sensitivity, specificity and cut-off scores of MoCA for identifying dementia and mild cognitive impairment (MCI) will be published soon.

The test and administration instructions are freely accessible for clinicians at www.mocatest.org. The test is available in 35 languages or dialects. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation.

2.Collection of data: Healthy participants centre-wise

2.1. Procedure

Participants were recruited from out-patient services of neurology, geriatric, and internal medicine clinics of participating hospitals, as well as senior citizen associations and other community centres in the respective cities. The goal was to recruit individuals aged 40 years and above, with varying levels of education. Participants with normal cognition, MCI, and dementia due to neurodegenerative disease and stroke, from both clinic and community, were included in the study.

Based on clinical evaluation, the individuals who fulfilled the following inclusionary criteria were recruited: participants who were ≥ 40 years and consented to participate; with no evidence of head injury, infections, and neurological disorders other than stroke and neurodegenerative disease that could cause cognitive impairment; with no history of major systemic medical or psychiatric conditions that could interfere with cognition; and with no significant hearing or visual impairment that could interfere with cognitive testing.

All study participants underwent cognitive assessment using tests that have been standardised to the local populations, referred to as “Gold standard battery” for which normative data were available, and have been in use for clinical diagnosis and research. This battery consists of the cognitive screening test Addenbrooke’s Cognitive Examination-III (ACE-III) and the Clinical Dementia Rating (CDR), which is administered in all participants. In addition, in participants with no dementia or questionable dementia (CDR 0 and 1), tests of episodic memory and executive functions: Rey Auditory

Verbal Learning Test (RAVLT) and Color Trails Test (CTT) were performed to identify participants with MCI. These tests have been validated and are widely used for diagnosis of MCI in India (Alladi et al., 2011, 2014; Mathuranath et al., 2007; Nandi et al., 2008; Rao et al., 2004). A participant was considered to be impaired on a test when his or her performance was below cut-off values in the gold standard battery.

Clinical diagnosis was made by a neurologist experienced in diagnosis of MCI and dementia following a semi-structured interview, clinical examination, review of performance on gold standard tests, and other available investigations. Based on a uniform diagnostic process, participants were grouped as follows:

1. Healthy controls: All participants who have no subjective cognitive complaints and scored normally on ACE-III, CDR, AVLT, and CTT.
2. MCI: Participants who fulfill modified Petersen's criteria for MCI (Petersen, 2004).
3. Dementia: DSM-IV criteria for dementia. Subtypes of dementia will be further diagnosed as follows:
 - Alzheimer's disease (AD): (McKhann et al., 2011).
 - Vascular dementia (VaD): NINDS-AIREN criteria (Román et al., 1993).
 - Frontotemporal dementia (FTD): (Rascovsky et al., 2011).
4. Vascular MCI: Participants with stroke who fulfill VASCOG criteria (Sachdev et al., 2014).

Median Absolute Deviation (MAD) analyses was carried out to identify the outliers which were subsequently removed. The demographic characteristics of the healthy cohort and the patient cohort were given in ICMR-NCTB General Manual -English.

3. Psychometric properties of the ICMR-NCTB

Data was tested for normality across all tests and centres. Parametric tests were administered to data that was normally distributed and non-parametric tests were carried out for data that was not normally distributed.

3.1. Performance of healthy participants on the ICMR – NCTB

Tables 1 show significant differences in performance on MoCA scores across the five centres. These differences may be due to demographic differences noted above between centres.

3.2. Correlation of test performance with demographic characteristics across all centres

Table 3 shows the correlation between the demographic factors (age & education) and performance on Montreal Cognitive Assessment (MoCA). Although most correlations showed significant relations between the demographic variables and test performance, the correlation coefficients were rather small, most being below 0.3. Hence, the demographic variables of age and education were not used to develop norms. Centre wise regression analyses were carried out which also did not produce strong effects of the demographic characteristics.

Table 1: Performance of the healthy participants on tests of global cognitive function across individual centres

Whole group			Centres										<i>p</i> value
Tests	Mean	SD	Hindi		Bengali		Telugu		Kannada		Malayalam		
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
MoCA	26.15	3.28	27.75	2.08	22.50	4.61	26.69	2.38	25.15	2.91	27.28	2.07	< 0.001

**p* value indicates significance level of differences across centres using the Kruskal-Wallis test or ANOVA where appropriate.

Table 2: Distribution of missing data across all tests and centres

Tests	Hindi		Bengali		Telugu		Kannada		Malayalam	
	N	Missing	N	Missing	N	Missing	N	Missing	N	Missing
MoCA	184	103	130	59	212	141	148	58	189	81

Correlations were run between age, education and MoCA score across centres to investigate associations between test MoCA score and age and education. Most correlations were weak, correlation coefficients being under 0.3. (Please see Tables 3)

Table 3: Correlation between tests of global cognitive function and age & education across all centres

Tests	Whole group		Hindi		Bengali		Telugu		Kannada		Malayalam	
	Age	Edu	Age	Edu	Age	Edu	Age	Edu	Age	Edu	Age	Edu
Global cognitive function												
MoCA	-.130**	0.444**	-.052	.225**	-.239**	.792**	-.217**	0.226**	.169*	.135	-.076	.358*

MONTREAL COGNITIVE ASSESSMENT (MoCA) - HINDI

4.1. Montreal Cognitive Assessment (MoCA) - Hindi

Administration and Scoring Instructions

1 Alternative trail making

Administration: The examiner instructs the subject:

एक रेखा खींचिए जो अंक से शुरू होकर अक्षर की ओर जाएगी। यहां से शुरू करिए (point to 1) और रेखा खींचिए 1 से क , क से 2 और 2 से ख...। यहां शर अंत करें।

1 – क - 2-ख - 3- ग- 4- ड - 5- च

Scoring: Allocate one point if the subject successfully draws the following pattern: 1 – क - 2-ख - 3- ग- 4- ड - 5- च, without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. Visuo Constructional Skills: Cube

Administration: The examiner gives the following instructions, pointing to the **cube**:

“नीचे दी गयी जगह में एक ऐसा चित्र बनाइये।”

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
 - All lines are drawn
 - No line is added
 - Lines are relatively parallel and their length is similar (rectangular prisms are accepted)
- A point is not assigned if any of the above-criteria are not met. Orientation and size does not matter.

3. Visuo Constructional Skills:Clock:

Administration: Indicate the right third of the space and give the following instructions:
“एक गोल, सूईयों वाली घड़ी बनाइये जिसमें 11 बजके 10 मिनट का समय हो।”

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);
- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;
- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met. Shape of the clock does not matter, either square, rectangle or circle shape is acceptable.

4.Naming

Administration: Beginning on the left, point to each figure and say:

“इन जानवरों के नाम बताइये”

Scoring: One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary.

5.Memory

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions:

“यह एक बुद्धि की जांच है। मैं शब्दों की सूची पढ़ूंगी जिससे आपको अभी तथा बाद में याद रखना है। ध्यान से सुनियेगा और मेरे बोलने के बाद जितने भी शब्द आपको याद रहें उन्हें दोहराइयेगा (चाहे जिस भी क्रम में हों)।”

जिन शब्दों को व्यक्ति पहले परिक्षण में दोहराने में सफल रहें उनके सामने निशान लगायें (✓)।

Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions:

“मैं ये सूची फिर दोहराऊंगी ध्यान से सुनियेगा, याद रखियेगा, और जितने शब्द हो सके, (इससे या पहले वाली सूची से) उन्हें बताइयेगा।”

Put a check in the allocated space for each word the subject recalls after the second trial. (✓)।

At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying:

“जांच खत्म होने के बाद मैं आपसे फिर एक बार इन शब्दों को पूछूंगी, याद रखियेगा ”।

Scoring: No points are given for Trials One and Two

6. Attention

Forward Digit Span: Administration: Give the following instruction:

“मैं कुछ अंक बोलूंगी मेरे बोलने के बाद उन्हें उसी प्रकार दोहराईये।”

Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction:

“अब मैं कुछ और अंक/बोलूंगी मेरे बोलने के बाद उन्हें आप उल्टे क्रम में दोहराईये।

Read the three number sequence at a rate of one digit per second.

Note: Specific examples can be given in the backward digit span, if that helps the instructions easier to understand. If the tester is simplifying the instructions- saying in terms of money to make it more easy..He/she has to make note of that.

Scoring: Allocate one point for each sequence correctly repeated, (N.B.: the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction:

“मैं शब्दों की एक सूची पढ़ने जा रही हूँ। जब जब मैं आ बोलूंगी आप अपने हाथ से ताली बजायें यदि ओर कोई अंक सुनाई दे तो ताली ना बजाएं।”

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter A).

Serial 7s: Administration: The examiner gives the following instructionn:

“100 में से 7 घटाइये जब तक मैं रुकने को ना कहूँ।” Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond “92 – 85 – 78 – 71 – 64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7. Sentence Repetition

Administration: The examiner gives the following instructions:

“मैं अब आपको एक वाक्य पढ़ें कर सुनाऊंगी मेरे बोलने के बाद बिल्कुल वैसे ही आप इसे दोहराइये। (कुछ देर ठहरिये)” “मैं सिर्फ इतना जानता हूँ कि आज राम ही मेरी मदद करने के लिये है।” Following the response, say, अब मैं एक दूसरा वाक्य बोलूंगी उसे भी बिल्कुल वैसे ही दोहराईये। (कुछ देर ठहरिये) “बिल्ली हमेशा कुर्सी के नीचे छुपती है जब भी कुत्ता कमरे में होता है।”

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.).

8-Verbal Fluency

Administration: The examiner gives the following instruction:

एक अक्षर, जो मैं आपको अभी बताने वाली हूँ, से शुरु होने वाले जितने अधिक से अधिक शब्द आप सोच सकते हैं मुझे बताइये। आप किसी भी प्रकार के शब्द बना सकते है शिवाय नाम, अंक, जगह या ऐसे शब्द

जो एक जैसे शुरू होते हैं पर खत्म अलग अलग तरीके से होते हैं, जैसे प्रेम प्रेमिका आदि। आपको एक मिनट के बाद रुकने के लिए कहा जाएगा। क्या आप तैयार हैं; चूंकि अब मुझे "पा" शब्द से शुरू होने वाले जितने भी शब्द आप बता सकते हैं बताएं। खजपउम वित 60`मब, रुक जाइए।

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject's response in the bottom or side margins.

9. Abstraction

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example: जैसे:- एक केले और संतरा में क्या समानता है। If the subject answers in a concrete manner, then say only one additional time. "क्या आप कोई और समानता बता सकते हैं। If the subject does not give the appropriate response (*fruit*), say: " हां और ये दोनों फल भी हैं। Do not give any additional instructions or clarification. After the practice trial, say:

"अब मुझे एक ट्रेन और साइकिल में समानता बताएं" Following the response, administer the second trial, saying: "एक घड़ी में और स्केल में क्या समानता है। Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:

Train-bicycle = means of transportation, means of travelling, you take trips in both; Scale-watch = measuring instruments, used to measure.

The following responses are **not** acceptable: Train-bicycle = they have wheels; Scale- watch= they have numbers

10. Delayed Recall

Administration: The examiner gives the following instruction:

"मैंने कुछ देर पहले आपको कुछ शब्द बोले थे जो मैंने आपको याद करने को कहा था। उन में से जितने भी आपको याद हैं बताइये।

Make a check mark (✓) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: Allocate 1 point for each word recalled freely without any cues.

Optional

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (✓) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction:

Use the following category and/or multiple-choice cues for each word, when appropriate:

	Category cue	Multiple choice
EYES:	शरीर का अंग	नाक, आख, हाथ
SAREE:	कपड़े का प्रकार	साड़ी, पैंट, कुर्ती
जन्मस्थान	इमारत का प्रकार	विद्यालय, अस्पताल, मंदिर
ROSE:	फूल का एक प्रकार	गुलाब, गेंदा, कमल
BLUE:	एक रंग	लाल, नीला, हरा

Scoring: **No points are allocated for words recalled with a cue.** A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

11. Orientation:

Administration: The examiner gives the following instructions:

“मुझे आज की तारीख बताएं”। If the subject does not give a complete answer, then prompt accordingly by saying : मुझे (साल, माह, सही तारीख और सप्ताह का दिन) बताएं। Then say: “अब मुझे इस जगह का नाम बताएं और यह किस शहर में है।”

Scoring: Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE:

Sum all subscores listed on the right-hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points. A final total score of 26 and above is considered normal.

Duration:

Time to administer the MoCA is approximately 10 minutes.

MONTREAL COGNITIVE ASSESSMENT (MOCA)

Version 7.1 Hindi Version

Name:

Education:

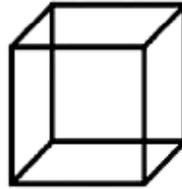
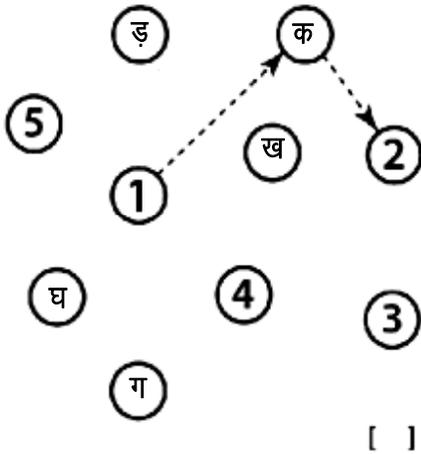
Sex:

Date of Birth:

Date:

VISUOSPATIAL / EXECUTIVE

POINTS

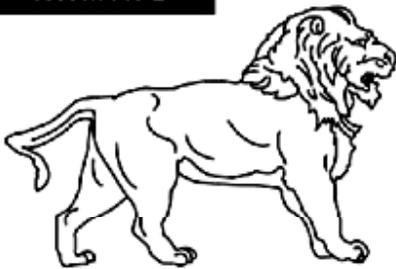


घन की नकल

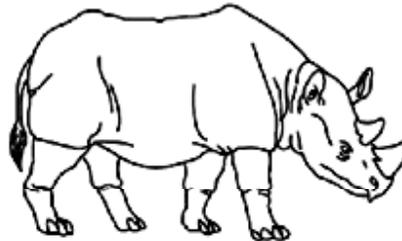
घड़ी बनाए (11 बजके 10 मिनट में)
(3 points)

[] [] []
Contour Numbers Hands ___/5

NAMING



[]



[]



[]

___/3

MEMORY

परिक्षण सफल रहे तब भी

दूसरा परिक्षण करें। पांच मिनट के बाद दोबारा पूछें।

आंख

साड़ी

मंदिर

गुलाब

नीला

1. परिक्षण

2. परिक्षण

No points

ATTENTION

अंको की सूची पढ़े [1 digit/sec.]

व्यक्ति को इसी प्रकार दोहराना है। [] 2 1 8 5 4

व्यक्ति को उल्टे क्रम में दोहराना है। [] 7 4 2

___/2

अंको की सूची को पढ़ें। व्यक्ति 'आ' अंक सुनाई देने पर ताली दें।

No points if ≥ 2 errors

[] क ख आ व र म आ आ क म न व आ र आ ग घ क म आ आ क आ न ग

___/1

100 में से 7 घटाइये

[] 93

[] 86

[] 79

[] 72

[] 65

4 or 5 correct subtractions: 3pts, 2 or 3 corrects: 2pts, 1 correct: 1pt, 0 correct: 0pt

___/3

LANGUAGE

दोहराएं "मैं सिर्फ इतना जानता हूँ कि आज राम ही मेरी मदद करने के लिए है।

"बिल्ली हमेशा कुर्सी के नीचे छुपती है। जब भी कुत्ता कमरे में होता है।

___/2

एक मिनट में "प" से शुरू होने वाले जितने शब्द आप बता सकते हैं। बताइये।

[] _____ : ($N \geq 11$ words)

___/1

ABSTRACTION

केले-संतरे के बीच की समानता-फल

[] ट्रेन-साइकिल

[] घड़ी-स्केल

___/2

DELAYED RECALL

शब्दों को दोहराना है

बिना कोई संकेत दिये

आंख

[]

साड़ी

[]

मंदिर

[]

गुलाब

[]

नीला

[]

Point for
UNCUED recall
only

___/5

Optional

Category cue

Multiple choice cue

ORIENTATION

[] तारीख

[] महीना

[] साल

[] दिन

[] जगह

[] शहर

___/6

TOTAL

___/30

4.1.2 Generating norms (Hindi)

No strong effects of age and education on test performance were found. This maybe secondary to insufficient representation of all age, gender and education levels in the given sample. Further studies using the MoCA tests may offer more robust norms from larger age, education and gender stratified samples. Table 4 display the percentile conversion for raw scores of MoCA test.

Table 4: Mean, SD, and percentiles of MoCA in Hindi

MoCA	
Mean (SD)	27.75 (2.08)
Percentile	
5 th	24
10 th	25
15 th	25
25 th	27
50 th	28
75 th	29

MONTREAL COGNITIVE ASSESSMENT (MoCA) - Bengali

4.2. Montreal Cognitive Assessment (MoCA) - Bengali

Administration and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

1. Alternating Trail Making:

Administration: The examiner instructs the subject: "পর্যায়ক্রমে সংখ্যা-অক্ষর-সংখ্যা-অক্ষর অনুযায়ী গোল চাকতিগুলোকে পেন্সিল দিয়ে লাইন কেটে সংযোগ করতে হবে। এখান থেকে শুরু করুন ('১' দেখিয়ে বলুন)। '১' থেকে 'ক', 'ক' থেকে '২', '২' থেকে 'খ' এরকম করে এই অক্ষরটি ('ঙ' দেখিয়ে বলুন) অর্ধ লাইন কেটে সংযোগ করুন।"

Scoring: Allocate one point if the subject successfully draws the following pattern:

১ – ক – ২ – খ – ৩ – গ – ৪ – ঘ – ৫ – ঙ , without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. Visuoconstructional Skills(Cube):

Administration: The examiner gives the following instructions, pointing to the **cube**: “এই ছবিটা দেখুন এবং যতটা সম্ভব এটা ঠিক ভাবে আঁকার চেষ্টা করুন, নিচের জায়গাটাতে।”

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above-criteria are not met.

3. Visuoconstructional Skills(Clock):

Administration: Indicate the right third of the space and give the following instructions: “একটা ঘড়ির ছবি আঁকুন। তাতে সব নম্বরগুলো লিখবেন আর ঘড়ির কাঁটাগুলো এমনভাবে আঁকুন যাতে বোঝা যায় এগারোটা বেজে দশ হয়েছে।”

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);
- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers

must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;

- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met.

4. **Naming:**

Administration: Beginning on the left, point to each figure and say: “এই জন্তুটার নাম বলুন।”

Scoring: One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary.

5. **Memory:**

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions: “এটা একটা মনে রাখার পরীক্ষা। আমি কতগুলো শব্দ বলব। মন দিয়ে শুনবেন এবং মনে রাখার চেষ্টা করবেন, কারণ আপনাকে পরে এই শব্দগুলো সব বলতে হবে। আপনি যে কোনও ক্রমে/অনুযায়ী শব্দগুলোকে বলতে পারেন।” Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: “আমি আগের মত একই শব্দগুলো আবার পড়িয়ে শোনাব। যতটা মনে রাখতে পারবেন আমাকে বলবেন। যেই শব্দগুলো আগে বলেছেন সেগুলোকেও বলতে হবে।” Put a check in the allocated space for each word the subject recalls after the second trial.

At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying, “আমি যেই শব্দগুলো আপনাকে বললাম, আপনি মনে রাখার চেষ্টা করবেন। আমি পরে আবার আপনাকে জিজ্ঞেস করব।”

Scoring: No points are given for Trials One and Two.

6. **Attention:**

Forward Digit Span: Administration: Give the following instruction: “আমি আপনাকে কতগুলো নম্বর বলব, আমার বলা শেষ হয়ে গেলে সেগুলোকে একই রকম ভাবে বলবেন।” Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction: “এইবার আমি আপনাকে কতগুলো নম্বর বলব, আমার বলা শেষ হয়ে গেলে সেগুলোকে পেছন থেকে সামনে অনুযায়ী সাজিয়ে বলবেন।” Read the three number sequence at a rate of one digit per second.

Scoring: Allocate one point for each sequence correctly repeated, (*N.B.*: the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction: “আমি আপনাকে কতগুলো অক্ষর পর পর বলে যাব। যখনই ‘এ’

অক্ষর'টা শুনবেন আপনি আপনার আঙ্গুল দিয়ে টোকা মারবেন। যদি আমি অন্য অক্ষর বলি তাহলে আপনি টোকা মারবেন না।”

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter ‘এ’).

Serial 7s: Administration: The examiner gives the following instruction: “এইবার ১০০ থেকে ৭ বাদ দিন। যেই নম্বর’ টা আসবে সেটা থেকে আবার ৭ বাদ দেবেন। এরকম করে ৭ বাদ দিতে দিতে বলে যান যতক্ষণ না আমি থামতে বলছি।” Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond “92 – 85 – 78 – 71 – 64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7. Sentence repetition:

Administration: The examiner gives the following instructions: “আমি আপনাকে একটা বাক্য বলব। আমার বলা শেষ হওয়ার পর সেটাকে ছবাহ্ একিভাবে পুনরাবৃত্তি করবেন (সামান্য বিরতির পর) : “**আমি শুধু জানি রাম-ই সেই যার আজকে যাওয়ার ছিল না।**” Following the response, say: “আমি আপনাকে আবার একটা বাক্য বলব। আমার বলা শেষ হওয়ার পর সেটাকে পুনরাবৃত্তি করবেন (সামান্য বিরতির পর) : **বেড়াল শুধু খাটের তলায় লুকিয়ে পড়ে কুকুরগুলো ঘরে এলে।**

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.). [Note: *Original sentences are, "I only know that John is the one to help today" and "The cat always hid under the couch when dogs were in the room"*]

8. Verbal fluency:

Administration: The examiner gives the following instruction: “আমি আপনাকে একটি অক্ষর বলব। আমি চাই আপনি ওই অক্ষরটা দিয়ে শুরু যত শব্দ বলতে পারেন বলুন। শুধু সেই শব্দগুলো বলবেন না যেটা কোন লোকের বা জায়গার নাম, কোনো নম্বর, বা শুনতে একই রকম শব্দ দিয়ে শুরু হয় কিন্তু শেষ হয় আলাদা ভাবে যেমন *করব, করছি, করছিলাম*। আমি এক মিনিট পর আপনাকে থামতে বলব। আপনি কি বুঝতে পেরেছেন? আপনি কি তৈরি? [] এবার আপনি ‘প’ অক্ষর দিয়ে শুরু যতগুলো শব্দ ‘১’ মিনিটের মধ্যে বলতে পারেন বলে যান। [time for 60 sec] থামুন।”

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject’s response in the bottom or side margins.

9. Abstraction:

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example: আমাকে বলুন কমলালেবু আর কলার মধ্যে কি মিল আছে? If the subject answers in a concrete manner, then say only one additional time: “আমাকে বলুন এই দুটো মধ্যে আর অন্য কি মিল আছে? ” If the subject does not give the appropriate response (ফল) say, “হ্যাঁ, এরা দুটোই ফল।” Do not give any additional instructions or clarification. After the practice trial, say: “ট্রেন আর সাইকেল এর মধ্যে কি মিল আছে?” Following the response, administer the second trial, saying: “স্কেল আর ঘড়ির এর মধ্যে কি মিল আছে?”

Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:

Train-bicycle = means of transportation, means of travelling, you take trips in both;

Ruler-watch = measuring instruments, used to measure.

The following responses are not acceptable: Train-bicycle = they have wheels; Ruler-watch = they have numbers.

10. Delayed recall :

Administration: The examiner gives the following instruction “কিছুক্ষণ আগে আমি কটা শব্দ আপনাকে মনে রাখতে বলেছিলাম ওই শব্দগুলো আপনি আমাকে আবার বলুন।” Make a check mark (√) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: Allocate 1 point for each word recalled freely without any cues.

Optional:

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (√) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction, “কোন শব্দটা আমি আপনাকে বলেছিলাম, নাক, চোখ নাকি হাত?”

Use the following category and/or multiple-choice cues for each word, when appropriate:

চোখঃ	<u>category cue:</u> শরীরের অঙ্গ ;	<u>multiple choice:</u> নাক , চোখ, হাত
শাড়িঃ	<u>category cue:</u> এক ধরনের কাপড় ;	<u>multiple choice:</u> প্যান্ট ,টিশার্ট , শাড়ি
মন্দিরঃ	<u>category cue:</u> এক ধরনের ভবন;	<u>multiple choice:</u> মন্দির, স্কুল, হাসপাতাল
গোলাপঃ	<u>category cue:</u> এক ধরনের ফুল ;	<u>multiple choice:</u> গোলাপ, গাঁদা, জবা
লালঃ	<u>category cue:</u> এক ধরনের রঙ;	<u>multiple choice:</u> লাল, নীল, সবুজ

Scoring: No points are allocated for words recalled with a cue. A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

11. Orientation:

Administration: The examiner gives the following instructions: “আজকে কত তারিখ?” If the subject does not give a complete answer, then prompt accordingly by saying: “আমাকে বলুন আজকে কত সাল, মাস , তারিখ আর সপ্তাহের কোন দিন। Then Say: “এবার আমাকে বলুন যে এই জায়গাটার নাম কি আর এই শহরটার নাম কি?”

Scoring: Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE: Sum all subscores listed on the right-hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points.

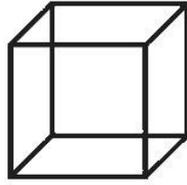
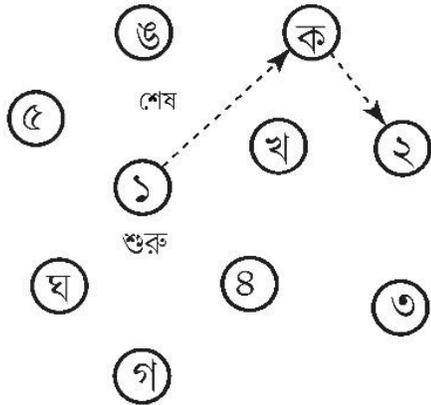
A final total score of 26 and above is considered normal.

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Bengali Version

NAME :
Education :
Sex :

Date of birth :
DATE :

VISUOSPATIAL / EXECUTIVE



ঘনক আঁকা

ঘড়ি আঁকা (এগারোটা বেজে দশ)
(3 points)

POINTS

[]

[]

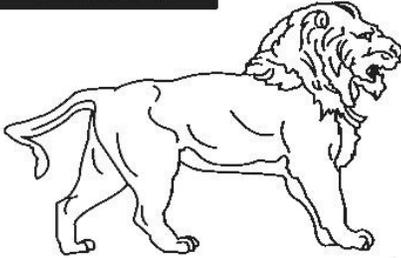
[]
Contour

[]
Numbers

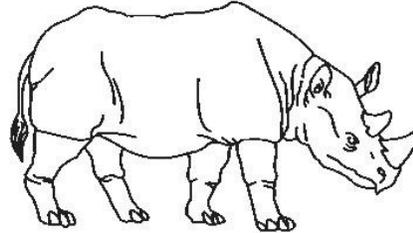
[]
Hands

—/5

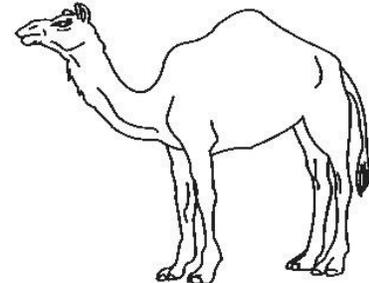
NAMING



[]



[]



[]

—/3

MEMORY

শব্দগুলি পড়ুন, আর আপনার বলার পরীক্ষার্থীকে বলতে বলুন। ২ বার করে শব্দগুলি পড়ুন। প্রথমবারে সব শব্দগুলি ঠিক ঠিক মনে থাকলেও দ্বিতীয়বার শব্দগুলিকে আবার পড়ুন। ৫ মিনিট পরে আবার শব্দগুলি জিজ্ঞাসা করুন।

	চোখ	শাড়ি	মন্দির	গোলাপ	নীল
১ বার					
২ বার					

No points

ATTENTION

নম্বরের তালিকাটি পড়ুন (১ নং/সেকেন্ড) সোজা-আমি নম্বরগুলি যেভাবে বলছি আপনি সেভাবে বলুন [] ২ ১ ৮ ৫ ৪
উল্টো- আমি নম্বরগুলি যেভাবে বলছি আপনি সেইগুলি উল্টো বলুন [] ৭ ৪ ২

—/2

অক্ষরগুলো পড়ুন। যখনই 'এ' শুনবে, পরীক্ষার্থীকে আঙুল দিয়ে টোকা মারতে হবে। No points if ≥ 2 errors

[]

ফ ব এ স ম ন এ এ জ ক ল ব এ ফ এ ক ড আ এ এ এ জ এ ম ও ফ এ এ ব

—/1

ক্রমান্বয় ১০০ থেকে ৭ বিয়োগ

[] ৯৩ [] ৮৬ [] ৭৯ [] ৭২ [] ৬৫

4 or 5 correct subtractions : 3 pts, 2 or 3 correct : 2 pts, 1 correct : 1 pt, 0 correct : 0 pt

—/3

LANGUAGE

বলুন : আমি শুধু জন্মি রাম ই সেই বার আজকে যাওয়ার ছিল না।
বেড়াল শুধু খাটের তলায় লুকিয়ে পড়ে কুকুরগুলো ঘরে এলে।

—/2

এক মিনিটের মধ্যে 'প' দিয়ে যেকটা শব্দ জানা আছে বলতে থাকুন

[] (— N ≥ 11 words)

—/1

ABSTRACTION

মিল কি - যেমন : কলা- কমলা লেবু = ফল [] ট্রেন - সাইকেল [] ঘড়ি - স্কেল

—/2

DELAYED RECALL

আগের শব্দগুলি স্মরণ করা সাহায্য ছাড়া

চোখ	শাড়ি	মন্দির	গোলাপ	নীল
[]	[]	[]	[]	[]

Points for UNCUEDE recall only

—/5

Optional

Category Cue
Multiple choice cue

ORIENTATION

[] তারিখ [] মাস [] বছর [] দিন [] এলাকা [] শহর

—/6

TOTAL

—/30

4.2.2 Generating norms (Bengali)

No strong effects of age and education on test performance were found. This maybe secondary to insufficient representation of all age, gender and education levels in the given sample. Further studies using the MoCA tests may offer more robust norms from larger age, education and gender stratified samples. Table 5 display the percentile conversion for raw scores of MoCA test.

Table 5: Mean, SD, and percentiles of MoCA in Bengali

MoCA	
Mean (SD)	22.50 (4.61)
Percentile	
5 th	19
10 th	20
15 th	22
25 th	23
50 th	24
75 th	25

MONTREAL COGNITIVE ASSESSMENT (MoCA) - Telugu

4.3. Montreal Cognitive Assessment (MoCA) - Telugu

Administration and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

1. Alternating Trail Making:

Administration: The examiner instructs the subject: " దయచేసి ఒక సంఖ్య నుండి ఒక అక్షరంను క్రమంగా కలిపే రేఖను గీయండి. ఇక్కడి నుండి మొదలు పెట్టండి ('1' ని చూపండి). '1' నుండి ' క ', ' క ' నుండి '2' మరియు '2' నుండి ' ఖ ' కి అలా ' జ్జ ' వరకు కలపండి(' జ్జ ' చూపండి).."

Scoring: Allocate one point if the subject successfully draws the following pattern:
1 - క - 2- ఖ - 3- గ - 4- ఘ - 5- జ్జ , without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. Visuoconstructional Skills(Cube):

Administration: The examiner gives the following instructions, pointing to the **cube**: "మీరు ఈ డ్రాయింగ్ ని వీలైనంత ఖచ్చితంగా క్రింది స్థలంలో గీయండి (copy చేయండి)."

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above-criteria are not met.

3. Visuoconstructional Skills(Clock):

Administration: Indicate the right third of the space and give the following instructions: "ఒక గడియారాన్ని గీయండి, అన్ని సంఖ్యలను రాయండి మరియు 11 గంటల 10 నిమిషాల సమయాన్ని చూపండి."

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);
- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;
- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met.

4. **Naming:**

Administration: Beginning on the left, point to each figure and say: “ఈ జంతువు ఏరు చెప్పండి.”

Scoring: One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary.

5. **Memory:**

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions: “ఇది ఒక జ్ఞాపక శక్తి పరీక్ష. నేను కొన్ని పదాల జాబితాను చదువుతాను అవి మీరు గుర్తుపెట్టుకోవాలి. జాగ్రత్తగా వినండి. నేను చెప్పిన తరువాత మీకు ఎన్ని పదాలు గుర్తుంటే అన్ని పదాలు చెప్పండి. మీరు పదాలను ఏ క్రమంలో చెప్పినా పరవాలేదు”. Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: “నేను రెండవ సారి అవే పదాల జాబితాను చదువుతాను. మీరు మొదటిసారి చెప్పిన పదాలతో పాటు ఇంకా ఎక్కువ పదాలు గుర్తు పెట్టుకోవడానికి ప్రయత్నించండి..” Put a check in the allocated space for each word the subject recalls after the second trial. At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying, “నేను పరీక్ష చివరలో మళ్ళీ ఆ పదాలను అడుగుతాను, గుర్తుపెట్టుకోండి.”

Scoring: No points are given for Trials One and Two.

6. **Attention:**

Forward Digit Span: Administration: Give the following instruction: “నేను కొన్ని సంఖ్యలను చెపుతాను, నేను చెప్పిన తరువాత ఖచ్చితంగా అదే క్రమంలో తిరిగి చెప్పండి.” Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction: “ఇప్పుడు నేను మరిన్ని సంఖ్యలు చెపుతాను, కానీ నేను చెప్పిన క్రమంలో కాకుండా వాటిని వెనుక క్రమంలో తిరిగి చెప్పాలి.” Read the three number sequence at a rate of one digit per second.

Scoring: Allocate one point for each sequence correctly repeated, (*N.B.*: the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction: “నేను కొన్ని అక్షరాల క్రమాన్ని చదువుతాను. నేను 'అ' అనే అక్షరం చెప్పిన ప్రతిసారి, మీ చేయితో ఒకసారి తట్టాలి. నేను వేరే అక్షరం చెప్పినప్పుడు మీ చేయిని తట్టకూడదు.”

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter 'అ').

Serial 7s: Administration: The examiner gives the following instruction: “ఇప్పుడు, వంద నుండి ఏడు తీసివేయండి, ఆ తరువాత ఆ సమాధానం నుండి అలా క్రమంగా నేను ఆపమని చెప్పేంత వరకు 7 ను తీసివేస్తూ ఉండండి..” Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond “92 – 85 – 78 – 71 – 64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7. Sentence repetition:

Administration: The examiner gives the following instructions: “నేను మీకు ఒక వాక్యం చెబుతాను. ఖచ్చితంగా నేనేమి చెప్పానో అలాగే దాన్ని తిరిగి చెప్పాలి (విరామం): రాజు ఒక్కడే ఈ రోజు సహాయం చేస్తాడని నేను అనుకుంటున్నాను.” Following the response, say: “నేను ఇప్పుడు వేరొక వాక్యం చెబుతాను. ఖచ్చితంగా నేనేమి చెప్పానో అలాగే తిరిగి చెప్పండి. (విరామం) : కుక్కను గదిలో చూసినప్పుడల్లా పిల్లి మంచం కింద దాక్కుంటుంది.”

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.). [Note: *Original sentences are, "I only know that John is the one to help today" and "The cat always hid under the couch when dogs were in the room"*]

8. Verbal fluency:

Administration: The examiner gives the following instruction: “నేను మీకు ఒక అక్షరం చెప్తాను మీరు ఆ అక్షరం నుండి మొదలయ్యే పదాలు ఎన్ని ఎక్కువ చెప్పగలరో అన్ని చెప్పండి. మనుషుల పేర్లు మరియు ప్రాంతాల పేర్లు మాత్రం చెప్పకూడదు. మీకు ఒక నిమిషం సమయం ఇస్తాను. ఇప్పుడు, మీరు 'ప' అనే అక్షరంతో మొదలయ్యే పదాలు ఎన్ని వీలైతే అన్ని చెప్పండి.”

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject's response in the bottom or side margins.

9. Abstraction:

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example: “ఒక టమాట మరియు బంగాళదుంపకు ఏ విధమైన పోలిక ఉందో నాకు చెప్పండి.” If the subject answers in a concrete manner, then say only one additional time: “ఈ రెండూ ఇంకా వేరే ఏ విధమైన సంబంధం / పోలికను కలిగి ఉన్నాయి.” If the subject does not give the appropriate response (కూరగాయలు), say, “అవును, అవి రెండూ కుడా కూరగాయలే.” Do not give any additional instructions or clarification. After the practice trial, say: “ఇప్పుడు చెప్పండి ఒక రైలు మరియు సైకిల్ కి ఏ విధమయిన పోలిక / సంబంధం ఉంది.” Following the response, administer the second trial, saying: “ఇప్పుడు చెప్పండి ఒక స్కీలు మరియు గడియారం ఏ విధమైన పోలికను కలిగి ఉన్నాయి.” Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:
Train-bicycle = means of transportation, means of travelling, you take trips in both;

Ruler-watch = measuring instruments, used to measure.

The following responses are not acceptable: Train-bicycle = they have wheels;

Ruler-watch = they have numbers.

10. Delayed recall:

Administration: The examiner gives the following instruction: “నేను ఇంతకముందు మీకు కొన్ని పదాలు చెప్పాను, వాటిని గుర్తుపెట్టుకోమన్నాను. మీకు ఆ పదాలు ఎన్ని గుర్తుంటే అన్ని చెప్పండి.” Make a check mark (✓) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: Allocate 1 point for each word recalled freely without any cues.

Optional:

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (✓) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction, “ఈ పదాలలో మీరు ఏది అని అనుకుంటున్నారు. కన్ను ముక్కు లేదా చెవి?”

Use the following category and/or multiple-choice cues for each word, when appropriate:

కన్ను: category cue: ముఖంలో ఒక భాగం.

multiple choice: కన్ను, ముక్కు, చెవి

చీర: category cue: దుస్తులు/వస్త్రాలలో ఒక రకం.

multiple choice: వోణి, పంచ, చీర

గుడి: category cue: భవనాలలో ఒక రకం.

multiple choice: గుడి, బడి, ఆసుపత్రి

గులాబీ: category cue: పూలలో ఒక రకం.

multiple choice: మల్లె, గులాబీ, చామంతి

నీలం: category cue: ఒక రంగు.

multiple choice: తెలుపు, ఎరుపు, నీలం

Scoring: No points are allocated for words recalled with a cue. A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

11. Orientation:

Administration: The examiner gives the following instructions: “నాకు ఈ రోజు తేదీ చెప్పండి”. If the subject does not give a complete answer, then prompt accordingly by saying: “చెప్పండి (సంవత్సరం, నెల, తేదీ మరియు రోజు).” ఇప్పుడు నాకు ఈ స్థలం పేరు చెప్పండి, మరియు ఇది ఏ నగరం లో ఉందో చెప్పండి.”

Scoring: Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE: Sum all subscores listed on the right-hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points.

A final total score of 26 and above is considered normal.

VISUOSPATIAL / EXECUTIVE

జ
అపండి

5

1 మొదలు పెట్టండి

ఖ

2

ఘ

4

3

గ

[] [] [] [] []

చిత్రాన్ని గీయండి.

గడియారం గీయండి. (పదకొండు గంటల పది నిమిషాలు) (3 Points)

[] [] [] [] []

Contour Numbers Hands

___/5

NAMING

[]

[]

[]

___/3

MEMORY	పదాల జాబితా చదవండి. పేషెంట్/సబ్జెక్ట్ ఆ పదాలను తిరిగి చెప్పాలి. మొదటి ప్రయత్నం సరి అయినా కూడా రెండు ప్రయత్నాలు చేయండి. 5 నిమిషాల తరువాత మళ్ళీ అడగండి.	కన్ను	చీర	గుడి	గులాబీ	నీలం	No points
1వ ప్రయత్నం							
2వ ప్రయత్నం							

ATTENTION ఈ అంకెలు చదవండి. [1 Digit / sec.] పేషెంట్/ సబ్జెక్ట్ అంకెలను వరుస క్రమంలో చెప్పాలి. [] 2 1 8 5 4
పేషెంట్/ సబ్జెక్ట్ అంకెలను వెనుక క్రమంలో చెప్పాలి. [] 7 4 2

___/2

అక్షరాల జాబితా చదవండి. 'అ' అనే అక్షరం విన్నప్పుడల్లా పేషెంట్/వ్యక్తి చేయి తో ఒకసారి తట్టాలి. No points if ≥ 2 errors

ప బ అ క మ న అ అ జ క ల బ అ ప అ క డ ఈ అ అ అ జ అ మా ఓ ప అ అ బ

___/1

100 నుండి క్రమంగా 7 ను తీసివేయండి. [] 93 [] 86 [] 79 [] 72 [] 65

4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt**

___/3

LANGUAGE తిరిగి చెప్పండి: రాజు ఒక్కడే ఈ రోజు సహాయం చేస్తాడని నేను అనుకుంటున్నాను. కుక్కను గదిలో చూసినప్పుడల్లా పిల్లి మంచం కింద దాక్కుంటుంది.

___/2

ఒక నిమిషంలో 'ప' అక్షరంతో మొదలయ్యే పదాలు ఎన్ని ఎక్కువ చెప్పగలిగితే అన్ని చెప్పండి. [] _____ (N ≥ 11 words)

___/1

ABSTRACTION పోలికలు : టమాట - బంగాళాదుంప = కూరగాయలు [] రైలు - సైకిల్ [] గడియారం - స్కేలు

___/2

DELAYED RECALL	ఇంతకుముందు చెప్పిన పదాలను చెప్పండి. (ఎటువంటి సూచన లేకుండా)	కన్ను	చీర	గుడి	గులాబీ	నీలం	Points for UNCUED recall only
		[]	[]	[]	[]	[]	

Optional	Category cue	కన్ను	చీర	గుడి	గులాబీ	నీలం	Points for UNCUED recall only
	Multiple choice cue						

ORIENTATION [] తేది [] నెల [] సంవత్సరం [] రోజు [] స్థలం [] నగరం

___/6

TOTAL ___/30

4.3.2 Generating norms (Telugu)

No strong effects of age and education on test performance were found. This may be secondary to insufficient representation of all age, gender and education levels in the given sample. Further studies using the MoCA tests may offer more robust norms from larger age, education and gender stratified samples. Table 6 display the percentile conversion for raw scores of MoCA test.

Table 6: Mean, SD, and percentiles of MoCA in Telugu

MoCA	
Mean (SD)	26.69 (2.38)
Percentile	
5 th	22
10 th	24
15 th	25
25 th	25
50 th	27
75 th	28

**MONTREAL COGNITIVE ASSESSMENT
(MoCA) - Kannada**

4.4. Montreal Cognitive Assessment (MoCA) - Kannada

Administration and Scoring Instructions

Administration and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

1. Alternating Trail Making:

Administration: The examiner instructs the subject: "ಒಂದು ಗೆರೆಯನ್ನು ಎಳೆಇರಿ. ಗೆರೆ ಸಂಖ್ಯೆಂಡಾ ಅಕ್ಷರಕ್ಕೆ ಆ ಅಕ್ಷರದಿಂದ ಮುಂದಿನ ಸಖ್ಯೆಗೆ ಎಳೆಇರಿ. ಇಲ್ಲಿಂದ ಶುರು ಮಾಡಿ (೧ ತೋರಿಸಿ) . ಇಲ್ಲಿಂದ ಕಾ ಅಕ್ಷರಕ್ಕೆ ಕಾ ಅಕ್ಷರದಿಂದ ೨ ಕೆ ಗೆರೆ ಎಳೆಇರಿ. ಇಲ್ಲಿ ಮುಗಿಸಿ (ಜ್ಞ ತೋರಿಸಿ).

Scoring: Allocate one point if the subject successfully draws the following pattern:

೧ - ಕ - ೨ - ಖ - ೩ - ಗ - ೪ - ಘ - ೫ - ಜ್ಞ

, without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. Visuoconstructional Skills(Cube):

Administration: The examiner gives the following instructions, pointing to the cube: "ಈ ಚಿತ್ರವನ್ನು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವ ಜಾಗದಲ್ಲಿ ಯಥಾವತ್ತಾಗಿ ಚಿತ್ರಿಸಿ."

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
 - All lines are drawn
 - No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted) A point is not assigned if any of the above-criteria are not met.

3. Visuoconstructional Skills(Clock):

Administration: Indicate the right third of the space and give the following instructions: "ಒಂದು ಗಡಿಯಾರವನ್ನು ಚಿತ್ರಿಸಿ. ಅದರಲ್ಲಿ ಎಲ್ಲ ಸಂಖ್ಯೆಗಳನ್ನು ಬರೆದು, ಹಾನೊಂದು ಗಂಟೆ ಹತ್ತು ನಿಮಿಷ ಸಮಯ ತೋರಿಸುವಂತೆ ಗಡಿಯಾರದ ಮುಳ್ಳುಗಳನ್ನು ಬರೆಯಿರಿ."

Scoring: One point is allocated for each of the following three criteria:

- **Contour (1 pt.):** the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);

- **Numbers (1 pt.):** all clock numbers must be present with no additional numbers; numbers

must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;

- **Hands (1 pt.):** there must be two hands jointly indicating the correct time; the hour hand must

be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met.

4. **Naming:**

Administration: Beginning on the left, point to each figure and say: “ಈ ಪ್ರಾಣಿಯ ಹೆಸರೇನು?”.

Scoring: One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary.

5. **Memory:**

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions: “ಇದು ನೆನಪಿನ ಶಕ್ತಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಒಂದು ಸಣ್ಣ ಪರಿಕ್ಷೆ. ನಾನು ಈಗ ಕೆಲವು ಪದಗಳನ್ನು ಓದುತ್ತೇನೆ. ನಾನು ಓದುವ ಗಮನವಿಟ್ಟು ಕೇಳಿಸಿಕೊಳ್ಳಿ. ನಾನು ಕೇಳಿದ ಪದಗಳನ್ನು ನೀವು ಈಗ್ಗೆ ಮತ್ತು ಸ್ವಲ್ಪ ಸಮಯದ ನಂತರ ನೆನಪಿಸಿಕೊಂಡು ಹೇಳಬೇಕಾಗುತ್ತದೆ. ನೀವು ಪದಗಳನ್ನು ನಾನು ಹೇಳಿದ ಕ್ರಮದಲ್ಲೇ ಹೇಳಬೇಕೆಂದೇನು ಇಲ್ಲ. ಯಾವ ಕ್ರಮದಲ್ಲಿ ಬೇಕಾದರೂ ಹೇಳಬಹುದು.” Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: “ನಾನು ಆಗಲೇ ಓದಿದ ಪದಗಳನ್ನು ಮತ್ತೊಮ್ಮೆ ಓದುವೆ. ನಿಮಗೆ ಯಷ್ಟು ಸಾಧ್ಯವಾ, ಅಷ್ಟು ಪದಗಳನ್ನು ನೆನಪಿಸಿಕೊಂಡು ಹೇಳಿ. ಮೊದಲೇ ಸಲ ಹೇಳಿದ ಪದಗಳನ್ನು ಹೇಳಬೇಕು.” Put a check in the allocated space for each word the subject recalls after the second trial. At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying, “ಈ ಪರಿಕ್ಷೆಯು ಮುಗಿಯಕ್ಕೆ ಬಂದಾಗ ಈಗ ಹೇಳಿರುವ ಪದಗಳನ್ನು ಮತ್ತೆ ನೆನಪಿಸಿಕೊಳ್ಳಾಕೆ ನಿಮಗೆ ಕೇಳುತ್ತೇನೆ.”

Scoring: No points are given for Trials One and Two.

6. Attention:

Forward Digit Span: Administration: Give the following instruction: “ನಾನೀಗ ಕೆಲವು ಸಂಖ್ಯೆಗಳನ್ನು ಹೇಳುತ್ತೇನೆ. ನಾನು ಹೇಳಿ ಮುಗಿಸಿದ ನಂತರ ನೀವದನ್ನು ನಾನು ಹೇಳಿದ ಹಾಗೆಯೇ ಹೇಳಬೇಕು.”
Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction: "ನಾನೀಗ ಕೆಲವು ಸಂಖ್ಯೆಗಳನ್ನು ಓದುತ್ತೇನೆ. ನಾನು ಓದಿ ಮುಗಿಸಿದ ನಂತರ ನೀವದನ್ನು ನಾನು ಹೇಳಿದ ಉಲ್ಲಾ ಕ್ರಮದಲ್ಲಿ ಹೇಳಬೇಕು. ಉದಾಹರಣೆ: ನಾನು 1-4-2 ಅಂತ ಓದಿದರೆ ನೀವು 2-4-1- ಅಂತಹೇಳಬೇಕು." Read the three number sequence at a rate of one digit per second.

Scoring: Allocate one point for each sequence correctly repeated, (*N.B.:* the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction: “ನಾನೀಗ ಕೆಲವು ಅಕ್ಷರಗಳನ್ನು ಓದುತ್ತೇನೆ. ನಾನು 'ಅ' ಅಕ್ಷರವನ್ನು ಹೇಳಿದಾಗ ನೀವು ಕೈಯನ್ನು ತಟ್ಟಬೇಕು. ನಾನು ಬೇರೆ ಅಕ್ಷರಗಳನ್ನು ಹೇಳಿದಾಗ ನೀವು ಕೈಯನ್ನು ತಟ್ಟಬಾರದು.”

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter 'ಅ').

Serial 7s: Administration: The examiner gives the following instruction: “ನೀವೀಗ 7ನ್ನು 100 ರಿಂದ ಕಲಿಯಬೇಕು. ಹಾಗೆ ಪ್ರತಿ ಹೊಸ ಉತ್ತರದಿಂದ 7ನ್ನು ಕಳೆಯಬೇಕು. ನಾನು ನಿಲ್ಲಿಸಿ ಅಂತ ಹೇಳುವಾತನಕ ನೀವಿದನ್ನು ಮಾಡಬೇಕು.” Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond “92 – 85 – 78 – 71 – 64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7. Sentence repetition:

Administration: The examiner gives the following instructions: “ನಾನೀಗ ಒಂದು ವಾಕ್ಯವನ್ನು ಓದುತ್ತೇನೆ. ಆ ವಾಕ್ಯವನ್ನು ನಾನು ಓದಿದ ಹಾಗೆಯೇ ನೀವು ಆ ವಾಕ್ಯವನ್ನು ಪುನರಾವರ್ತಿತಿಸಬೇಕು: ನನಗೆ ಗೊತ್ತು ಈ ದಿನ ನನಗೆ ಸಹಾಯ ಮಾಡುವವು ರಾಮು ಮಾತ್ರಾ.” Following the response, say: “ನಾನೆಗೆ ಮತ್ತೆ ಇನ್ನೊಂದು ವಾಕ್ಯವನ್ನು ಓದುತ್ತೇನೆ. ನಾನು ಹೇಳಿದ ರೀತಿಯಲ್ಲೇ ನೀವು ಆ ವಾಕ್ಯವನ್ನು ಹೇಳಬೇಕು: ಕೊನೆಯಲ್ಲಿ ನಾಯಿ ಬಣದರೆ ಬೆಕ್ಕು ಯಾವಾಗಲೂ ಮಾಚಂಡ ಕೆಳಗೆ ಬಚ್ಚಿತ್ತಿಕೊಳ್ಳುತ್ತದೆ.”

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.). [Note: Original sentences are, "I only know that John is the one to help today" and "The cat always hid under the couch when dogs were in the room"]

8. Verbal fluency:

Administration: The examiner gives the following instruction: "ನಾನೀಗಾ ನಿಮಗೆ ಯಾವದಾದರೂ ಒಂದು ಅಕ್ಷರವನ್ನು ಹೇಳುತ್ತೇನೆ. ನೀವು ಆ ಅಕ್ಷರದಿಂದ ಶುರುವಾಗುವ ಪದಗಳನ್ನು ಹೇಳಬೇಕು. ನಾನು ನಿಮಗೆ ಒಂದು ನಿಮಿಷ ಸಮಯ ನೀಡುತ್ತೇನೆ. ಒಂದು ನಿಮಿಷದಲ್ಲಿ ಎಷ್ಟು ಪದಗಳನ್ನು ಹೇಳುವುದಕ್ಕೆ ಸಾಧ್ಯವೋ ಅಷ್ಟು ಹೇಳಿ, ಆದರೆ ನೀವು ಹೇಳುವ ಪದಗಳು ನಾಮಪದಗಳಾಗಿರಬಾರದು. (ಉದಾಹರಣೆ: ಬಾ ಅಕ್ಷರದಿಂದ ಬಾಬು, ಬೆಂಗಳೂರು ತರ ಪದಗಳನ್ನು ಹೇಳಬಾರದು.) ನೀವು ಹೇಳುವ ಪದಗಳು ಒಂದೇ ಶಬ್ದದಿಂದ ಶುರುವಾಗಿ ವಿಂಭಿನ್ನ ಅನ್ವಯಗಳಾಗಿರಬಾರದು (ಉದಾಹರಣೆ: ಪ್ರತಿ, ಪ್ರತಿಸಲು, ಪ್ರತಿಗಾತಿ, ಇತ್ಯಾದಿ ತಪ್ಪು ಇರಬಾರದು. "

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject's response in the bottom or side margins.

9. Abstraction:

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example: "ಬಾಳೆಹಣ್ಣು ಮತ್ತು ಕಿಟ್ಟಿಹಣ್ಣಿನಲ್ಲಿ ನಡುವಿನ ಸಮಾನ ಅಂಶವನ್ನು ಹೇಳಿ." If the subject answers in a concrete manner, then say only one additional time: "ಬೇರೆ ಯಾವುದು ತರ ಸಮಾನ ಇಡಿಯ?" If the subject does not give the appropriate response (ಹಣ್ಣುಗಳು), say, "ಹೌದು, ಆದರೆ ಅವು ಹಣ್ಣುಗಳು ಕೂಡ." Do not give any additional instructions or clarification. After the practice trial, say: "ಈಗ ಹೇಳಿ ಟೈನ್ ಮತ್ತು ಸೈಕಲ್ ನಡುವಿನ ಸಮಾನ ಅಂಶವನ್ನು ಹೇಳಿ." Following the response, administer the second trial, saying: "ಈಗ ಹೇಳಿ ಸ್ಕೇಲ್ ಮತ್ತು ಕೈಗಡಿಯಾರ ನಡುವಿನ ಸಮಾನ ಅಂಶವನ್ನು ಹೇಳಿ." Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:

Train-bicycle = means of transportation, means of travelling, you take trips in both;

Ruler-watch = measuring instruments, used to measure.

The following responses are not acceptable: Train-bicycle = they have wheels; Ruler-watch = they have numbers.

10. Delayed recall:

Administration: The examiner gives the following instruction: "ನಾನು ಆವಾಗಲೇ ಕೆಲವು ಪದಗಳನ್ನು ನೆನಪಿಸಿಕೊಳ್ಳುವುದಕ್ಕೆ ಹೇಳಿದೆ. ಈಗ ಆ ಪದಗಳನ್ನು ನೆನಪಿಸಿಕೊಂಡು ಮತ್ತೊಮ್ಮೆ ನನಗೆ ಹೇಳಿ."

"Make a check mark (✓) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: Allocate 1 point for each word recalled freely without any cues.

Optional:

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (✓) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction, “ನಿಮ್ಮ ಪ್ರಕಾರ ಈ ಪದಗಳಲ್ಲಿ ಯಾವ ಪದ ಇತ್ತು: ಕಿವಿ, ಮೂಗು, ಕಣ್ಣು?”

Use the following category and/or multiple-choice cues for each word, when appropriate:

ಕಣ್ಣು: category cue: ದೇಹದ ಒಂದು ಭಾಗ multiple choice: ಕಿವಿ, ಮೂಗು, ಕಣ್ಣು

ಸೀರೆ: category cue: ಒಂದು ತರದ ಬಟ್ಟೆ multiple choice: ಲಂಗಾ, ಪಂಚೆ, ಸೀರೆ

ದೇವಸ್ಥಾನ: category cue: ಒಂದು ತರದ ಕಟ್ಟಡ multiple choice: ದೇವಸ್ಥಾನ, ಸೇಯೆಲ್, ಆಸ್ಪತ್ರೆ

ಗುಲಾಬಿ: category cue: ಒಂದು ಹೂವು multiple choice: ಗುಲಾಬಿ, ಮಲ್ಲಿಗೆ, ಸೇವಂತಿಗೆ

ನೀಲಿ: category cue: ಒಂದು ಬಣ್ಣ multiple choice: ಬಿಳಿ, ಹಸುರು, ನೀಲಿ

Scoring: No points are allocated for words recalled with a cue. A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

11. Orientation:

Administration: The examiner gives the following instructions: “ಇವತ್ತಿನ ದಿನಾಂಕ ಹೇಳಿ.” If the subject does not give a complete answer, then prompt accordingly by saying: "ನೀವು ಇವತ್ತಿನ ದಿನಾಂಕ ಹೇಳಿ (ವರ್ಷ, ತಿಂಗಳು, ದಿನ, ಮತ್ತು ವಾರ) ಎಲ್ಲವನ್ನೂ ಹೇಳಬೇಕು. " Then say "ಈಗ ಹೇಳಿ ನೀವು ಯಾವ ಜಾಗದಲ್ಲಿದ್ದೀರಾ ಮತ್ತು ಈ ಜಾಗ ಯಾವ ಊರಲ್ಲಿದೆ ಎಂದು?"

Scoring: Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE: Sum all subscores listed on the right-hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points.

A final total score of 26 and above is considered normal.

MONTREAL COGNITIVE ASSESSMENT (MOCA)

Version 7.1 Kannada Version

NAME:

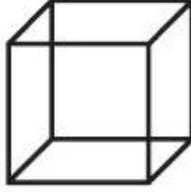
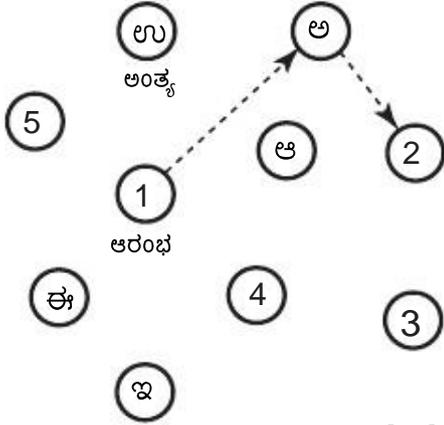
Education:

Sex:

Date of birth:

DATE:

VISUOSPATIAL / EXECUTIVE



ಕ್ಯೂಬ್
ನಕಲು
ಮಾಡಿ

ಗಡಿಯಾರ ಚಿತ್ರಿಸಿ (ಹನ್ನೊಂದು ಗಂಟೆ ಹತ್ತು ನಿಮಿಷ) (3 Points)

POINTS

[]

[]

[]

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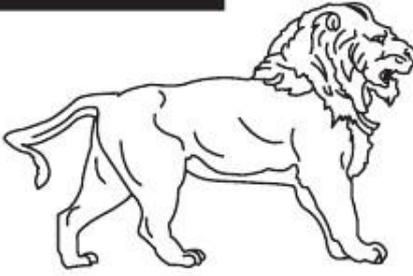
Contour

Numbers

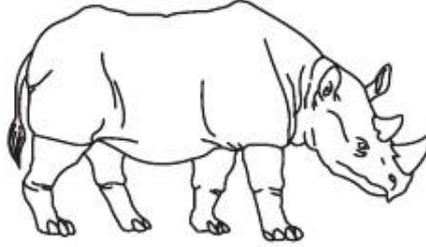
Hands

___/5

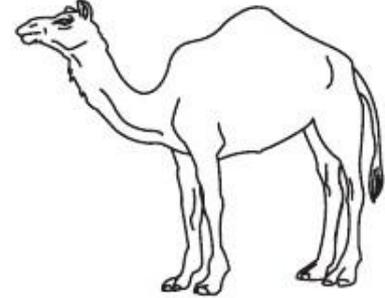
NAMING



[]



[]



[]

___/3

MEMORY

ಪದಗಳನ್ನು ಓದಿ. ಪ್ರಯೋಗಾರ್ಥಿ

ಪದಗಳನ್ನು ಪುನರಾವರ್ತಿಸಬೇಕು. ಎಲ್ಲ ಪದಗಳನ್ನು ಹೇಳಿದರು ಕೂಡ ಎರಡನೇ ಬಾರಿ ಪದಗಳನ್ನು ಹೇಳಿ. 5 ನಿಮಿಷ ಬಿಟ್ಟು ಮತ್ತೆ ಕೇಳಿ.

	ಕಣ್ಣು	ಸೀರೆ	ದೇವಸ್ಥಾನ	ಗುಲಾಬಿ	ನೀಲಿ	No points
1 ಪ್ರಯೋಗ						
2 ಪ್ರಯೋಗ						

ATTENTION

ಪಟ್ಟಿಯಲ್ಲಿರುವ ಸಂಖ್ಯೆಗಳನ್ನು ಓದಿ (1 Digit/sec)

ವ್ಯಕ್ತಿಯ ಸಂಖ್ಯೆಗಳನ್ನು ನೆನಪಿಸಿಕೊಂಡು ಮುಂದಕ್ಕೆ ಹೇಳಬೇಕು
ವ್ಯಕ್ತಿಯ ಸಂಖ್ಯೆಗಳನ್ನು ಉಲ್ಲಾಸ ಕ್ರಮದಲ್ಲಿ ಹೇಳಬೇಕು

[] 2 1 8 5 4

[] 7 4 2

___/2

ಪಟ್ಟಿಯಲ್ಲಿರುವ ಅಕ್ಷರಗಳನ್ನು ಓದಿ. ವ್ಯಕ್ತಿಯು ಅ ಅಕ್ಷರ ಬಂದಾಗ ತನ್ನ ಕೈ ತಟ್ಟಬೇಕು.

No points if ≥ 2 errors

[] ಫ, ಬ, ಅ, ಸ, ಮ, ನ, ಅ, ಅ, ಜ, ಕ ಲ, ಬ, ಅ, ಫ, ಅ, ಕ, ಡ, ಈ, ಅ, ಅ, ಅ, ಅ, ಜ, ಅ ಮ. ಬ. ಫ. ಅ. ಅ. ಬ

___/1

100 ರಿಂದ ಶುರು ಮಾಡಿ 7ನ್ನು ಕಳಿಸಿಕೊಂಡು ಹೋಗಿ. [] 93 [] 86 [] 79 [] 72 [] 65

4 or 5 correct subtractions: 3pts, 2 or 3 correct: 2pts, 1 correct: 1 pt, 0 correct: 0 pt

___/3

LANGUAGE

ಪುನರಾವರ್ತಿಸಿ: ನನಗೆ ಗೊತ್ತು ಈ ದಿನ ನನಗೆ ಸಹಾಯ ಮಾಡುವವನು ರಾಮು ಮಾತ್ರ []

ಕೋಣೆಯಲ್ಲಿ ನಾಯಿ ಬಂದರೆ ಬೆಕ್ಕು ಯಾವಾಗಲೂ ಮಂಜದ ಕೆಳಗೆ ಬಚ್ಚಿಟ್ಟುಕೊಳ್ಳುತ್ತದೆ []

___/2

ಐ ಅಕ್ಷರದಿಂದ ಶುರುವಾಗುವ ಪದಗಳನ್ನು ಹೇಳಬೇಕು, ಎಷ್ಟು ಪದಗಳು ಸಾಧ್ಯೋ ಅಷ್ಟು ಹೇಳಬೇಕು [] _____ (N ≥ 11 words)

___/1

ABSTRACTION

ನಡುವಿನ ಸಮಾನತೆ ಉದಾಹರಣೆ: ಬಾಳೆಹಣ್ಣು - ಕಿತ್ತೆಹಣ್ಣು = ಹಣ್ಣು [] ಟೈನ್ ಸೈಕಲ್ [] ಪ್ರಶ್ನೆ- ಸ್ವೇಲ್ ಕೈಗಡಿಯಾರ

___/2

DELAYED RECALL

	ಸುಳಿವು ಇಲ್ಲದೆ	ಕಣ್ಣು	ಸೀರೆ	ದೇವಸ್ಥಾನ	ಗುಲಾಬಿ	ನೀಲಿ	Points for UNCUED recall only	___/5
	[]	[]	[]	[]	[]	[]		
Optional	Category Cue							
	Multiple Choice Cue							

ORIENTATION

[] ದಿನಾಂಕ [] ತಿಂಗಳು [] ವರ್ಷ [] ದಿನ [] ಸ್ಥಳ [] ಉರು

___/6

TOTAL ___/30

4.4.2 Generating norms (Kannada)

No strong effects of age and education on test performance were found. This maybe secondary to insufficient representation of all age, gender and education levels in the given sample. Further studies using the MoCA tests may offer more robust norms from larger age, education and gender stratified samples. Table 7 display the percentile conversion for raw scores of MoCA test.

Table 7: Mean, SD, and percentiles of MoCA in Kannada

	MoCA
Mean (SD)	25.15 (2.91)
Percentile	
5 th	22
10 th	23
15 th	24
25 th	25
50 th	25
75 th	27

MONTREAL COGNITIVE ASSESSMENT (MoCA) - Malayalam

4.5. Montreal Cognitive Assessment (MoCA)- Malayalam

ADMINISTRATION AND SCORING INSTRUCTIONS

1 Alternative trail making

Administration: The examiner instructs the subject:

ആരോഹണക്രമത്തിൽ സംഖ്യയിൽ നിന്ന് അക്ഷരത്തിലേക്ക് ഒരു വര വരക്കുക. ഇവിടെ തുടങ്ങുക (1 ലേക്ക് ചുണ്ടിക്കാണിക്കുക). '1' ൽ നിന്ന് 'ക' യിലേക്ക് അവിടെ നിന്ന് രണ്ടിലേക്ക് എന്നിങ്ങനെ വരകൾ വരക്കുക. ഇവിടെ അവസാനിപ്പിക്കുക 'ച' യിലേക്ക് ചുണ്ടിക്കാണിക്കുക.

1 - ക - 2 - ഖ - 3 - ഗ - 4 - ഘ - 5 - ങ

Scoring: Allocate one point if the subject successfully draws the following pattern:

1 - ക - 2 - ഖ - 3 - ഗ - 4 - ഘ - 5 - ങ without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2- Visuo Constructional Skills: Cube

Administration: The examiner gives the following instructions, pointing to the **cube**:

താഴെക്കാണുന്ന സ്ഥലത്ത് ഇഴചിത്രം വരയ്ക്കുക.

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above-criteria are not met. Orientation and size does not matter.

3- Visuo Constructional Skills:Clock:

Administration: Indicate the right third of the space and give the following instructions:

ഒരു ഘടികാരം വരയ്ക്കുക , എല്ലാ അക്കങ്ങളും എഴുതുക., സമയം 11 മണി 10 മിനിട്ട് വരച്ച് കാണിക്കുക.

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);

- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;
- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met. Shape of the clock does not matter, either square, rectangle or circle shape is acceptable.

4-Naming

Administration: Beginning on the left, point to each figure and say:

ഈ മൃഗങ്ങളുടെ പേര് പറയുക.

Scoring: One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary.

5-Memory

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions:

ഇത് ഒരു ഓർമ്മ പരിശോധനയാണ്. ഞാൻ കുറേ വാക്കുകളടങ്ങിയ ഒരു പട്ടിക വായിക്കാൻ പോകുന്നു. താങ്കൾ അത് ശ്രദ്ധിച്ചു കേൾക്കുകയും ഓർമ്മയിൽ വയ്ക്കുകയും വേണം. ഞാൻ വായിച്ചുകഴിയുമ്പോൾ താങ്കൾക്ക് ഓർത്തിരിക്കാനാവുന്ന പരമാവധി വാക്കുകൾ പറയണം. (താങ്കൾ വാക്കുകൾ ഏത് ക്രമത്തിൽ പറഞ്ഞാലും കുഴപ്പമില്ല).

ആദ്യത്തെ ശ്രമത്തിൽ പരിശോധിക്കപ്പെടുന്ന വ്യക്തി ശരിയായി പറയുന്ന ഓരോവാക്കിനും അനുവദിച്ചിട്ടുള്ള സ്ഥലത്ത് ഒരു രേഖയിടുക. (✓)

Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions:

ഞാൻ അതേ പട്ടികതന്നെ ഒരു വട്ടംകൂടി വായിക്കാൻ പോകുന്നു. ഓർമ്മിച്ചിരിക്കുവാനും താങ്കൾ ആദ്യത്തെ പ്രാവശ്യം പറഞ്ഞുശേഷം പരമാവധി വാക്കുകൾ വീണ്ടും പറയുവാനും ശ്രമിക്കുക. വ്യക്തി രണ്ടാമത്തെ ശ്രമത്തിൽ ശരിയായി പറയുന്ന ഓരോവാക്കിനും നിർദ്ദിഷ്ട സ്ഥലത്ത് ഒരു അടയാളം രേഖപ്പെടുത്തുക.

Put a check in the allocated space for each word the subject recalls after the second trial.(✓)

At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying:

പരിശോധനയുടെ അവസാനം മേൽപ്പറഞ്ഞ വാക്കുകൾ വീണ്ടും പറയുവാൻ ഞാൻ താങ്കളോട് ആവശ്യപ്പെടും.

Scoring: No points are given for Trials One and Two

6- Attention

Forward Digit Span: Administration: Give the following instruction:

ഞാൻ ചില സംഖ്യകൾ പറയാൻ പോകുന്നു. ഞാൻ സംഖ്യകൾ പറഞ്ഞശേഷം താങ്കൾ സംഖ്യകളുടെ പട്ടിക ഞാൻ പറഞ്ഞ അതേ ക്രമത്തിൽ ആവർത്തിക്കണം.

Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction:

ഇപ്പോൾ ഞാൻ വേറെ ചില സംഖ്യകൾ കൂടി പറയാൻ പോകുന്നു. ഞാൻ പറഞ്ഞതിനു ശേഷം താങ്കൾ സംഖ്യകളുടെ പട്ടികയെ എതിർ ക്രമത്തിൽ ആവർത്തിക്കണം.

Read the three number sequence at a rate of one digit per second.

Note: Specific examples can be given in the backward digit span, if that helps the instructions easier to understand. If the tester is simplifying the instructions- saying in terms of money to make it more easy. He/she has to make note of that.

Scoring: Allocate one point for each sequence correctly repeated, (N.B.: the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction:

ഞാൻ അക്ഷരങ്ങളുടെ ഒരു പട്ടിക വായിക്കാൻ പോകുന്നു. ഞാൻ അ എന്ന അക്ഷരം പറയുന്ന ഓരോതവണയും താങ്കൾ കൈകൊണ്ട് മേശമേൽ ഒരു വട്ടം കൊട്ടുക. ഞാൻ അ അല്ലാതെ മറ്റെന്തെങ്കിലും അക്ഷരം പറയുമ്പോൾ കൊട്ടരുത്.

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter A).

Serial 7s: Administration: The examiner gives the following instruction:

ഇപ്പോൾ ഞാൻ താങ്കളോട് നൂറിൽ നിന്ന് ഏഴ് കുറച്ച് എണ്ണുവാൻ ആവശ്യപ്പെടുന്നു. എന്നിട്ട് ഞാൻ താങ്കളോട് നിർത്താൻ ആവശ്യപ്പെടുന്നതുവരെ താങ്കളുടെ ഉത്തരത്തിൽ നിന്നും ഏഴു കുറച്ചുകൊണ്ടിരിക്കണം.

Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct

subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond “92 – 85 – 78 – 71 – 64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7- Sentence Repetition

Administration: The examiner gives the following instructions:

ഞാൻ താങ്കളെ ഒരു വാചകം വായിച്ച് കേൾപ്പിക്കാൻ പോകുന്നു. ഞാൻ പറയുന്നതുപോലെ തന്നെ അത് ആവർത്തിക്കുക. ഇന്ന് സഹായിക്കുവാനായി ഉള്ളത് ജോണിയാണെന്ന് മാത്രം എനിക്കറിയാം. Following the response, say

ഇപ്പോൾ ഞാൻ താങ്കളെ വേറെ ഒരു വാചകം വായിച്ച് കേൾപ്പിക്കാൻ പോകുന്നു. ഞാൻ പറയുന്നതുപോലെ തന്നെ അത് ആവർത്തിക്കുക. മുറിയിൽ പട്ടികൾ വന്നപ്പോഴൊക്കെ പൂച്ച കട്ടിലിനടിയിൽ ഒളിച്ചു.

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.).

8-Verbal Fluency

Administration: The examiner gives the following instruction:

ഞാൻ താങ്കളോട് ഇപ്പോൾ അക്ഷരമാലയിലെ ഒരു അക്ഷരം പറയും (പ്രസ്തുത അക്ഷരം കൊണ്ട് തുടങ്ങുന്ന പരമാവധി വാക്കുകൾ താങ്കൾ എന്തോട് പറയണം സ്ഥലങ്ങളുടെയോ ആളുകളുടെയോ പേരുകൾ, ഉദാഹരണം പദ്മനാഭൻ, ചിറവം, സംഖ്യകൾ, ഉദാഹരണം പതിനഞ്ച്. അവസാനത്തെ ഏതാനും അക്ഷരങ്ങൾ കൊണ്ടുമാത്രം അർത്ഥം വ്യത്യാസപ്പെടുന്ന എന്നാൽ പരസ്പരബന്ധമുള്ള വാക്കുകൾ ഉദാഹരണം ഓണം, ഓണക്കോടി, ഓണത്തല്ല്. എന്നിവയൊഴികെ ഏതുതരം വാക്കുകളും പറയാം. ഒരുമിനിട്ട് കഴിയുമ്പോൾ ഞാൻ താങ്കളോട് നിർത്താൻ പറയും താങ്കൾ തയാറാണോ. ശരി 'പ' എന്ന അക്ഷരം കൊണ്ട് തുടങ്ങുന്ന പരമാവധി വാക്കുകൾ പറയുക.(60 സെക്കന്റ് സമയം) ശരി നിർത്തുക.

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject's response in the bottom or side margins.

9. Abstraction

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example:

ഉദാഹരണമായി ഓറഞ്ചും വാഴപ്പഴവും തമ്മിലുള്ള സാമ്യമെന്ത്.

If the subject answers in a concrete manner, then say only one additional time.

ഇവതമ്മിലുള്ള മറ്റൊരു സാമ്യം പറയുക.

If the subject does not give the appropriate response (*fruit*), say:

ഇവ രണ്ടും പഴങ്ങളുമാണ്

Do not give any additional instructions or clarification. After the practice trial, say:

ഇനി ഒരു ട്രെയിനും സൈക്കിളും തമ്മിലുള്ള സാമ്യം പറയുക.

Following the response, administer the second trial, saying

ഒരു സ്കെയിലും വാച്ചും തമ്മിലുള്ള സാമ്യം പറയുക.

Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:

Train-bicycle = means of transportation, means of travelling, you take trips in both;
Scale-watch = measuring instruments, used to measure.

The following responses are **not** acceptable: Train-bicycle = they have wheels; Scale-watch = they have numbers

10- Delayed Recall

Administration: The examiner gives the following instruction:

ഞാൻ അല്പനേരം മുൻപ് താങ്കളെ ചില വാക്കുകൾ വായിച്ച് കേൾപ്പിക്കുകയും താങ്കളോട് അവ ഓർത്തുവയ്ക്കുവാൻ ആവശ്യപ്പെടുകയും ചെയ്തിരുന്നുവല്ലോ. അവയിൽ താങ്കൾക്ക് ഇപ്പോൾ ഓർമ്മയിലുള്ള പരമാവധി വാക്കുകൾ പറയുക.

Make a check mark (√) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: Allocate 1 point for each word recalled freely without any cues.

Optional

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (√) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction:

മൂക്ക് മുഖം കൈ ഇതിലേതായിരുന്നു ആ വാക്ക് എന്നാണ് താങ്കൾക്ക് തോന്നുന്നത്.

Use the following category and/or multiple-choice cues for each word, when appropriate:

	Category cue	Multiple choice
EYES:	ശരീരത്തിന്റെ ഭാഗം	മൂക്ക്, കണ്ണു, കൈ
SAREE:	ഒരുതരം വസ്ത്രം	സാരി, പാന്റ്, ഷർട്ട്
TEMPLE:	ഒരുതരം കെട്ടിടം	പള്ളിക്കൂടം, ആശുപത്രി, അമ്പലം
ROSE:	ഒരുതരം പൂവ്	റോസ, മുല്ല, താമര
BLUE:	ഒരു നിറം	ചുവപ്പ്, നീല, പച്ച

SCORING: No points are allocated for words recalled with a cue. A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, Performance can be improved with a cue .For memory deficits due to encoding failures, performance does not improve with a cue

11 Orientation

Administration: The examiner gives the following instructions:

ഇന്നത്തെ തീയതി പറയുക. If the subject does not give a complete answer, then prompt accordingly by saying എന്നോട് ഇന്നത്തെ (വർഷം, മാസം, കൃത്യമായ തീയതി, ആഴ്ചയിലെ ദിവസത്തിന്റെ പേര്) എന്നിവ പറയുക. Then say: ശരി ഇനി ഈ സ്ഥലത്തിന്റെ പേര് പറയുക. കൂടാതെ ഈ സ്ഥലം ഏത് ജില്ലയിലാണ് എന്നും പറയുക.

Scoring : Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office) No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE: Sum all subscores listed on the right hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points. A final total score of 26 and above is considered as normal.

Duration: Time to administer the MOCA is approximately 10 minutes.

വിഷ്യാം സ്പേഷ്യൽ/എക്സിക്യൂട്ടീവ് ക്യൂബിന്റെ ചിത്രം പകർത്തുക

ഘടികാരം വരയ്ക്കുക (സമയം പതിനൊന്നു മണികഴിഞ്ഞ് പത്തു മിനിട്ട്) (മുന്ന് പോയത്ത്)

പോയിട്ടു കൾ

[] [] []
ആകൃതി സംഖ്യകൾ സൂചികൾ

___/5

പേര് പറയുക

[] [] []

___/3

<p>ഓർമ്മ</p> <p>വാക്കുകളുടെ പട്ടിക വായിക്കുക. പരിശോധിക്കപ്പെടുന്ന വ്യക്തി അവ ആവർത്തിക്കണം. ആദ്യത്തെ ശ്രമം തന്നെ വിജയകരമായാലും രണ്ട് ശ്രമങ്ങളും നടത്തുക. അഞ്ച് മിനിറ്റിനു ശേഷം ഓർമ്മിക്കാൻ ശ്രമിക്കുക</p>	കണ്ണ്	സാരി	അമ്പലം	റോസ	നീല	<p>പോയിട്ടു കൾ ഇല്ല</p>
	ആദ്യശ്രമം	[]	[]	[]	[]	
	രണ്ടാം ശ്രമം	[]	[]	[]	[]	

ശ്രദ്ധ അക്ഷരങ്ങളുടെ പട്ടിക വായിക്കുക പരിശോധിക്കപ്പെടുന്ന വ്യക്തി ഇതേക്രമത്തിൽ ആവർത്തിക്കണം [] 2 1 8 5 4
(ഒരുസെക്കന്റിൽ ഒരു അക്ഷരം എന്ന നിരക്കിൽ) പരിശോധിക്കപ്പെടുന്ന വ്യക്തി വിപരീതക്രമത്തിൽ ആവർത്തിക്കണം [] 7 4 2

അക്ഷരങ്ങളുടെ പട്ടിക വായിക്കുക. ഓരോ 'അ' അക്ഷരത്തിനും പരിശോധിക്കപ്പെടുന്ന വ്യക്തി കൈകൊണ്ട് മേശയിൽ കൊടുണം. ഒന്നിൽകൂടുതൽ തെറ്റുകൾക്ക് പോയിട്ട് ഇല്ല.
പ, ബ, അ, ക, മ, ന, അ, അ, ജ, ക, ല, ബ, അ, പ, അ, ക, ട, ഇ, അ, അ, ജ, അ, മ, ഒ, പ, അ, അ, ബ []

നഗ്നിൽ നിന്ന് ഏഴു കുറച്ച് പിന്നോട്ട് എണ്ണുക [] 93 [] 86 [] 79 [] 72 [] 65
നാലോ അഞ്ചോ ശരിയായ കിഴിക്കിന് മുന്ന് പോയിട്ട്, രണ്ടോ മൂന്നോ ശരിക്ക് രണ്ട് പോയിട്ട്, ഒരു ശരിക്ക് ഒരു പോയിട്ട്, എല്ലാം തെറ്റ് പോയിട്ട് ഇല്ല.

ഭാഷ ആവർത്തിക്കുക. ഇന്ന് സഹായിക്കുവാനായി ഉള്ളത് ജോണിയാണെന്ന് മാത്രം എനിക്കറിയാം []
മുറിയിൽ പട്ടികൾ വന്നപ്പോഴൊക്കെ പൂച്ച കട്ടിലിനടിയിൽ ഒളിച്ചു. []

ഒടുക്ക് ഒരു മിനിറ്റുകൊണ്ട് 'പ' എന്ന അക്ഷരം വച്ച് തുടങ്ങുന്ന പരമാവധി വാക്കുകൾ പറയുക [] പതിനൊന്നിൽ കൂടുതൽ വാക്കുകൾ പറയുന്നതിന് ഒരു മാർക്ക്.

അബ്സ്ട്രാക്ഷൻ സമാനത വ്യക്തമാക്കുക. ഉദാ. വാഴപ്പഴം, ഓറഞ്ച്, -രണ്ടും പഴങ്ങളാണ് ട്രെയിൻ - സൈകിൾ
വാച്ച് - സ്കൈൽ

<p>ഓർമ്മിച്ചെടുക്കൽ</p>	വാക്കുകൾ സൂചനയില്ലാതെ ഓർമ്മിച്ചെടുക്കണം	കണ്ണ്	സാരി	അമ്പലം	റോസ	നീല	<p>സൂചനയില്ലാതെ ഓർമ്മിച്ചാൽ മാത്രം പോയിട്ട് തൽക്കുക</p>
	<p>വിഭാഗത്തെപ്പറ്റിയുള്ള സൂചന</p> <p>മൾട്ടിപ്പിൾ ചോയ്സ് സൂചന</p>	[]	[]	[]	[]	[]	

സാമകാലബോധം [] തീയതി: [] മാസം [] വർഷം [] ദിവസം [] സ്ഥലം [] പട്ടണം/ഗ്രാമം

Total : / 30

4.5.2 Generating norms (Malayalam)

No strong effects of age and education on test performance were found. This maybe secondary to insufficient representation of all age, gender and education levels in the given sample. Further studies using the MoCA tests may offer more robust norms from larger age, education and gender stratified samples. Table 8 display the percentile conversion for raw scores of MoCA test.

Table 8: Mean, SD, and percentiles of MoCA in Malayalam

MoCA	
Mean (SD)	27.28 (2.07)
Percentile	
5 th	24
10 th	25
15 th	25
25 th	26
50 th	28
75 th	29

4.6. Test Score Interpretation:

Normative data are used to compare characteristics or specific conditions of a group of people or an individual with a reference population and aid in the detection of deviations (Ware & Keller, 1996). Normative scores assist test takers in interpreting the test results as raw scores are not meaningful without proper interpretation. Percentile ranks (PR) or percentiles (PC), standardized scores, and standard scores are all typical ways to describe norms (Gregory, 2007). To derive norms for tests of the ICMR-Neuro Cognitive Tool Box (ICMR-NCTB), the percentile rank method is used. Tables 4-8 display the percentile conversion (5th, 10th, 15th, 25th, 50th and 75th) for raw scores for the MoCA test.

Depending on the clinical applicability, the appropriate norms can be chosen from 5th to 75th percentile. As per the available literature, scores below 15th percentile can be considered to be indicative of probable cognitive deficit (Rao et al., 2004). Additionally, the 10th percentile can be used to identify patients with severe cognitive deficits (Mistridis et al., 2015). Values of 15th and 10th percentiles for the MoCA test of the ICMR-NCTB are provided in this manual to help the clinician/researcher in interpreting the individual raw scores.

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