



FALTERING MEMORY

DR.NOR AZLINA ABU BAKAR

GERIATRICIAN/PHYSICIAN

HOSPITAL RAJA PERMAISURI BAINUN IPOH

22.6.2019 ASEAN & Perak Health Congress
on Primary Health Care

Falter

Verb: ...to lose strength or purpose and stop, or almost stop.

Synonyms: hesitate, delay, drag one's feet, stall, think twice, get cold feet, change one's mind, waver, oscillate, fluctuate, vacillate, be undecided, be indecisive, be irresolute, see-saw, yo-yo.

- Example**
1. It would be a great shame if the momentum were to **falter** at the last moment.
 2. The music **faltered** for a moment and resumed, just as happy and jaunty as ever.
 3. They could probably make it as a comedy duo if the music career **falters**.

VocabularyPronunciation.com

- ? Mild cognitive Impairment
- ? Dementia
- ??delirium

Memory system

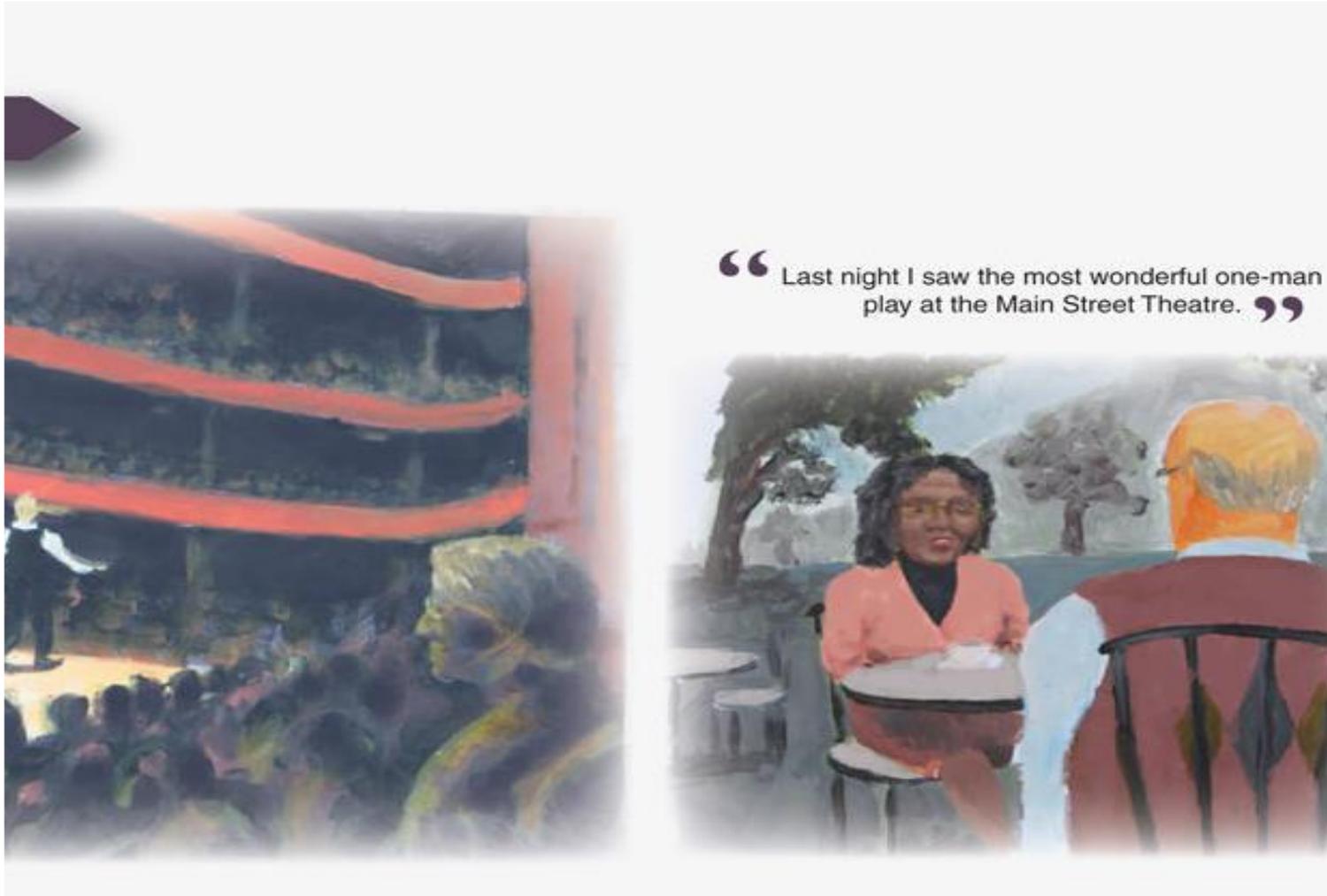


- A way for the brain to process information that will be available for use at a later time.
- Different memory systems depend on different neuroanatomical structures
- Some systems are associated with :
 - **conscious awareness (explicit)**
 - **consciously recalled (declarative)**
 - **change in behavior (implicit)**
 - **typically unconscious (nondeclarative).**

Memory can also be categorized in many other ways, such as by the nature of the material to be remembered (e.g., verbal or visuospatial)

Table 1. Selected Memory Systems.

Memory System	Major Anatomical Structures Involved	Length of Storage of Memory	Type of Awareness	Examples
Episodic memory	Medial temporal lobes, anterior thalamic nucleus, mammillary body, fornix, prefrontal cortex	Minutes to years	Explicit, declarative	Remembering a short story, what you had for dinner last night, and what you did on your last birthday
Semantic memory	Inferolateral temporal lobes	Minutes to years	Explicit, declarative	Knowing who was the first president of the United States, the color of a lion, and how a fork differs from a comb
Procedural memory	Basal ganglia, cerebellum, supplementary motor area	Minutes to years	Explicit or implicit, nondeclarative	Driving a car with a standard transmission (explicit) and learning the sequence of numbers on a touch-tone phone without trying (implicit)
Working memory	Phonologic: prefrontal cortex, Broca's area, Wernicke's area Spatial: prefrontal cortex, visual-association areas	Seconds to minutes; information actively rehearsed or manipulated	Explicit, declarative	Phonologic: keeping a phone number "in your head" before dialing Spatial: mentally following a route or rotating an object in your mind



Episodic memory

- explicit and declarative memory system used to recall personal experiences framed in our own context

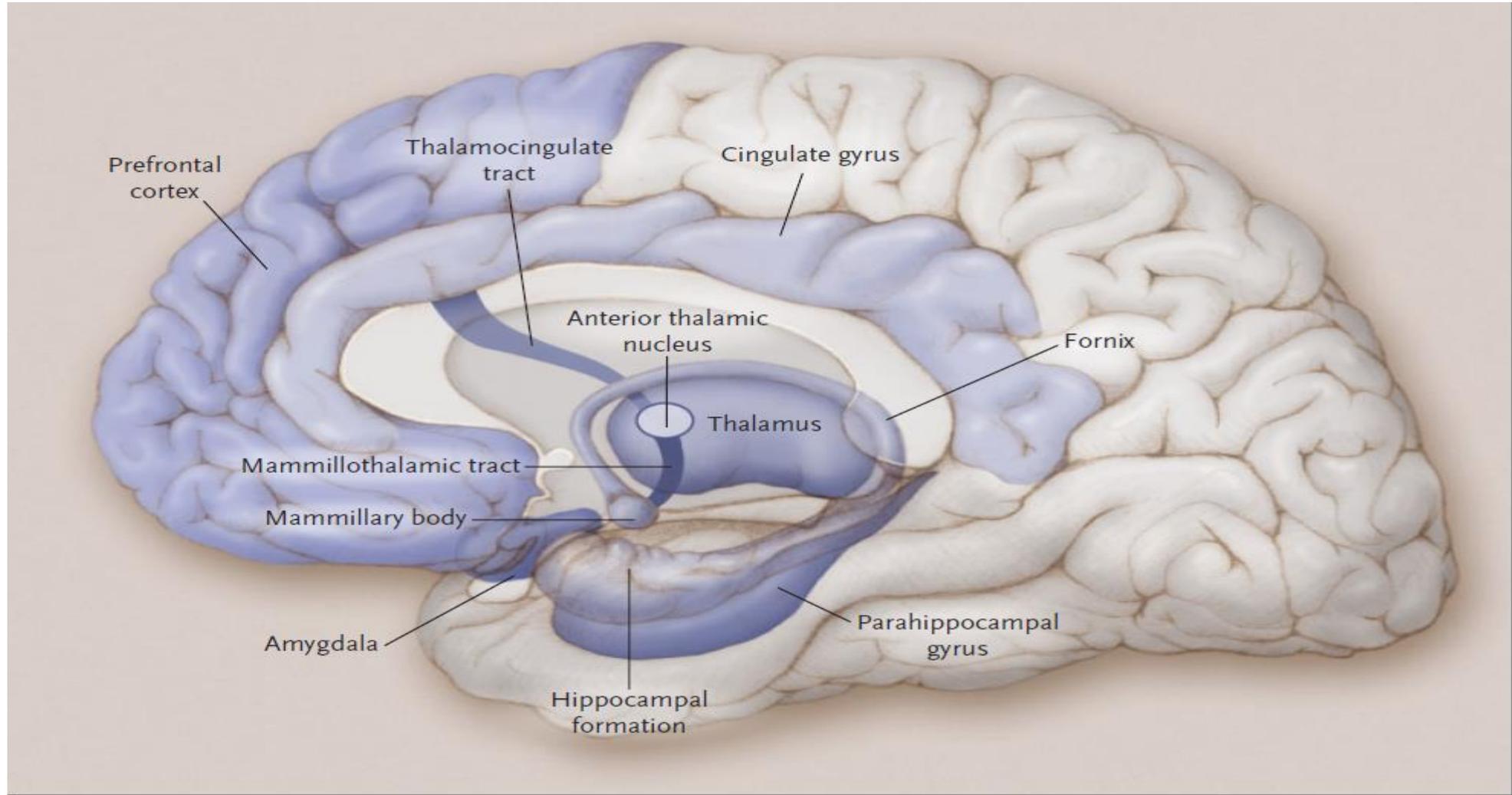


Figure 1. Episodic Memory.

The medial temporal lobes, including the hippocampus and parahippocampus, form the core of the episodic memory system. Other brain regions are also necessary for episodic memory to function correctly.

Semantic memory

“Who is this man on the one dollar bill?”



“That is George Washington. He was the first president of the United States.”



Semantic memory

- general store of conceptual and factual knowledge

Working memory

“No, I don't have a pen and paper, but I'm sure that I can remember the number. 6-8-7-4-7...”



Working Memory

- Combination of the traditional fields of attention, concentration and short-term memory.
- It refers to the ability to temporarily maintain and manipulate information that one needs to keep in mind

Procedural memory

“Grandma, will you play a song for me on the piano, please?”

“I’ll try, but I haven’t played in a long time.”

“I still remember how to play this song after all these years.”



Procedural memory

- ability to learn behavioral and cognitive skills and algorithms that are used at an automatic, unconscious level.

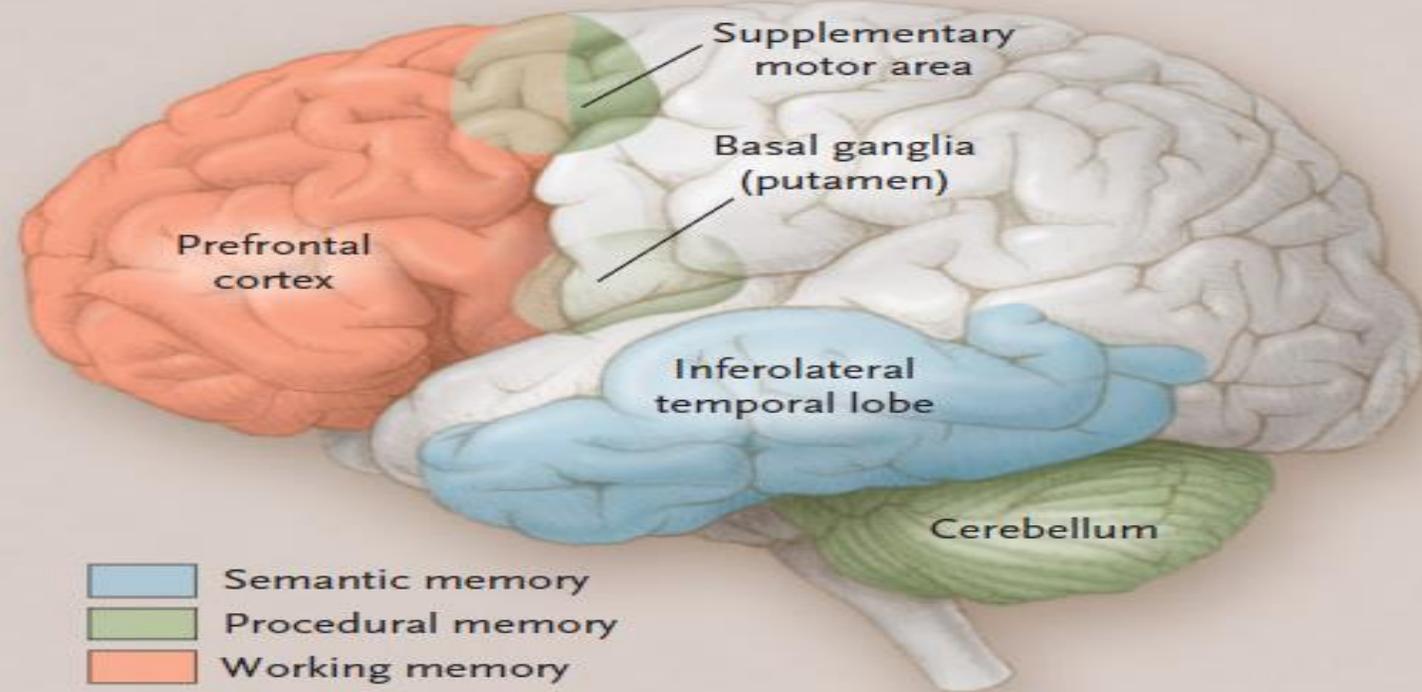


Figure 2. Semantic, Procedural, and Working Memories.

The inferolateral temporal lobes are important in the naming and categorization tasks by which semantic memory is typically assessed. However, in the broadest sense, semantic memory may reside in multiple and diverse cortical areas that are related to various types of knowledge. The basal ganglia, cerebellum, and supplementary motor area are critical for procedural memory. The prefrontal cortex is active in virtually all working memory tasks. Other cortical and subcortical brain regions will also be active, depending on the type and complexity of the working memory task.

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Episodic Memory

- Alzheimer's disease
 - Mild cognitive impairment, amnesic type
 - Dementia with Lewy bodies
 - Encephalitis (most commonly, herpes simple encephalitis)
 - Frontal variant of frontotemporal dementia
 - Korsakoff's syndrome
 - Transient global amnesia
 - Concussion / Traumatic brain injury
-
- Seizure
 - Hypoxic–ischemic injury
 - Cardiopulmonary bypass
 - Side effects of medication
 - Deficiency of vitamin B 12
 - Hypoglycemia
 - Anxiety
 - Temporal-lobe surgery
 - Vascular dementia
 - Multiple sclerosis

Working memory

- Normal aging
 - Vascular dementia
 - Frontal variant of frontotemporal dementia
 - Alzheimer's disease
 - Dementia with Lewy bodies
 - Multiple sclerosis
 - Traumatic brain injury
 - Side effects of medication
-
- Attention deficit–hyperactivity disorder
 - Obsessive–compulsive disorder
 - Schizophrenia
 - Parkinson's disease
 - Huntington's disease
 - Progressive supranuclear palsy
 - Cardiopulmonary bypass
 - Deficiency of vitamin B12

Semantic memory

Alzheimer's disease

Semantic dementia (temporal variant
of frontotemporal dementia)

Traumatic brain injury

Encephalitis (most commonly, herpes
simplex encephalitis)

Procedural memory

Parkinson's disease

Huntington's disease

Progressive supranuclear palsy

Olivopontocerebellar degeneration

Depression

Obsessive–compulsive disorder

Faltering Memory



Normal aging - **Age-associated
normal cognitive changes**



**Mild cognitive Impairment
(mild neurocognitive disorder)**



**Dementia (Major
neurocognitive disorder)**

Age-associated normal cognitive changes

Complain about memory loss but are able to provide detailed examples of forgetfulness

Difficulty retrieving words and names

Slower processing speed

Difficulty sustaining attention when faced with competing environmental stimuli

Learning something new needs a bigger effort

Judgment and decision-making ability same

No functional impairment

MY LONG TERM VS SHORT TERM MEMORY



Mild Cognitive Impairment

Memory loss not meeting criteria for dementia

Prevalence of 10-20% for adults aged ≥ 65 years

Increases with age, and men appear to be at higher risk.

Lower educational level, vascular risk factors (e.g., diabetes and hypertension), Apolipoprotein E (APOE) e4 genotype, Vitamin D deficiency, sleep-disordered breathing, and prior critical illness (eg, sepsis).

Progress to AD at rate 10-15% per year

May be the earliest phase of AD

Clinical diagnosis

Criteria for the Diagnosis of Mild Cognitive Impairment (MCI)

Concern regarding a change in cognition from the patient, knowledgeable informant, or from a skilled clinician observing the patient

Objective evidence of impairment (from cognitive testing) in one or more cognitive domains, including memory, executive function, attention, language, or visuospatial skills

Preservation of independence in functional abilities (although individuals may be less efficient and make more errors at performing ADLs / IADLs than in the past)

No evidence of a significant impairment in social or occupational functioning (i.e., “not demented”)

Clinical Characteristics Suggestive that MCI is due to Alzheimer's Disease

Memory impairment present

Progressive decline in cognition over months to years (very rapid decline may suggest prion disease, neoplasm, or metabolic disorders)

Lack of Parkinsonism and visual hallucinations (suggestive of dementia with Lewy bodies)

Lack of vascular risk factors and extensive cerebrovascular disease on brain imaging (suggestive of vascular cognitive impairment)

Lack of prominent behavioral or language disorders (suggestive of frontotemporal lobar degeneration)

Concern regarding a decline in cognition obtained from patient, informant, or clinician, or as the result of worsening performance on cognitive testing



Perform **history** focused on:

- Changes in cognitive function (onset, trajectory, examples)
- Changes in functional status (ADLs and IADLs, especially a change in ability to manage finances)
- Current prescription and over-the-counter medications
- Neurological symptoms (vision, hearing, speech, sleep-disordered breathing, gait, numbness and tingling)
- Psychiatric symptoms (depression, anxiety, behavioral or personality changes)

Physical/Neurological examination

Cognitive history

Changes in **memory** (is the patient misplacing things more, using notes and reminders more, repeating questions, having trouble keeping track of dates and appointments?)

Changes in **language** (word-finding difficulties?)

Changes in **visuospatial function** (new driving difficulties, including being slow to identify roadway hazards, late to apply brakes, or difficulty staying in lane?)

Changes in **attention/executive function** (easily distracted, new difficulties preparing meals or using household appliances, new difficulty writing checks, new safety concerns from family members?)

Functional History

bADLs

- Dressing
- Eating
- Ambulating
- Toileting
- Hygiene

iADLs

- Shopping
- Housekeeping
- Financing
- Food Preparation
- Transportation
- Medication



Certain classes and combinations of medications can contribute to cognitive impairment



All current prescription and over-the-counter medications should be reviewed.

- 1) anticholinergics
- 2) opiates
- 3) benzodiazepines and nonbenzodiazepine hypnotics (e.g., zolpidem)
- 4) antihistamines
- 5) tricyclic anti-depressants
- 6) skeletal muscle relaxants
- 7) antiepileptics.



Classes most likely to contribute to cognitive impairment include:



Hypotension related to intensive treatment of hypertension and hypoglycemia related to intensive treatment of diabetes may also contribute to cognitive decline.

Medication review

Cognitive Testing

Montreal Cognitive Assessment (MoCA) is a screening tool that was developed specifically for detection of MCI

Using a cut-point of 25/26, the MoCA has a sensitivity of 80 to 100% and specificity of 50 to 76% for detecting MCI.

The Mini-Mental State Exam (MMSE) has a sensitivity of 45 to 60% and specificity of 65 to 90% for detecting MCI using cut-points of 27 or 28.

Recent study directly comparing the MoCA and MMSE found MoCA to be more sensitive for accurately differentiating individuals with MCI from those with normal cognition.

Clinicians may also consider the Mini-cog test (which combines the Clock Drawing Test with a 3-word recall test), as it also has acceptable test performance characteristics, and can be performed in ≤ 3 minutes

Neuropsychological test if available

Geriatric Depression Scale if suspect depression

MMSE

Mini-Mental State Examination (MMSE)

Patient's Name: _____ Date: _____

Instructions: Score one point for each correct response within each question or activity.

Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day? Month?"
5		"Where are we now? State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then the instructor asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible.
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, ...) Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.) 
30		TOTAL

Clock Drawing Test

HOSPITAL KUALA LUMPUR

NAME : *Zalina* Patient's Particular
VC : *670724-05-5000*
DATE : *8/2/2017*

CLOCK DRAWING TEST

TIME :
SCORE : *0/3*
DONE BY : *[Signature]*

FALL NURSE
GERIATRIC CLINIC SGACC
LJM 52578

K.01/00.TK.APRIL 2010

GERIATRIC UNIT
HOSPITAL KUALA LUMPUR

Name : Patient's Particular
RN : *Zalina*
05 - 5000

Clock Drawing Test

DATE : *11/9/17*
TIME : *110*
SCORE : *0/3*

K.01/00.TK.

Diagnostic Testing -Neuroimaging

The NIA-AA diagnostic guidelines do not recommend routine neuroimaging in the typical clinical assessment of MCI, but do propose research criteria in which neuroimaging may help in determining MCI etiology and prognosis

Volumetric measures of the hippocampus that show atrophy are suggestive of MCI and have been shown to correlate with likelihood of progression to dementia

Rule out other potential causes for cognitive decline, such as subdural hematoma, stroke, NPH, or tumor -should be considered if the history, physical, or laboratory studies suggest one of these causes

MRI /CT Brain

Laboratory Test

FBC

Electrolytes

LFTs

Glucose/HbA1C

Calcium

Thyroid function

vitamin B12 and folate

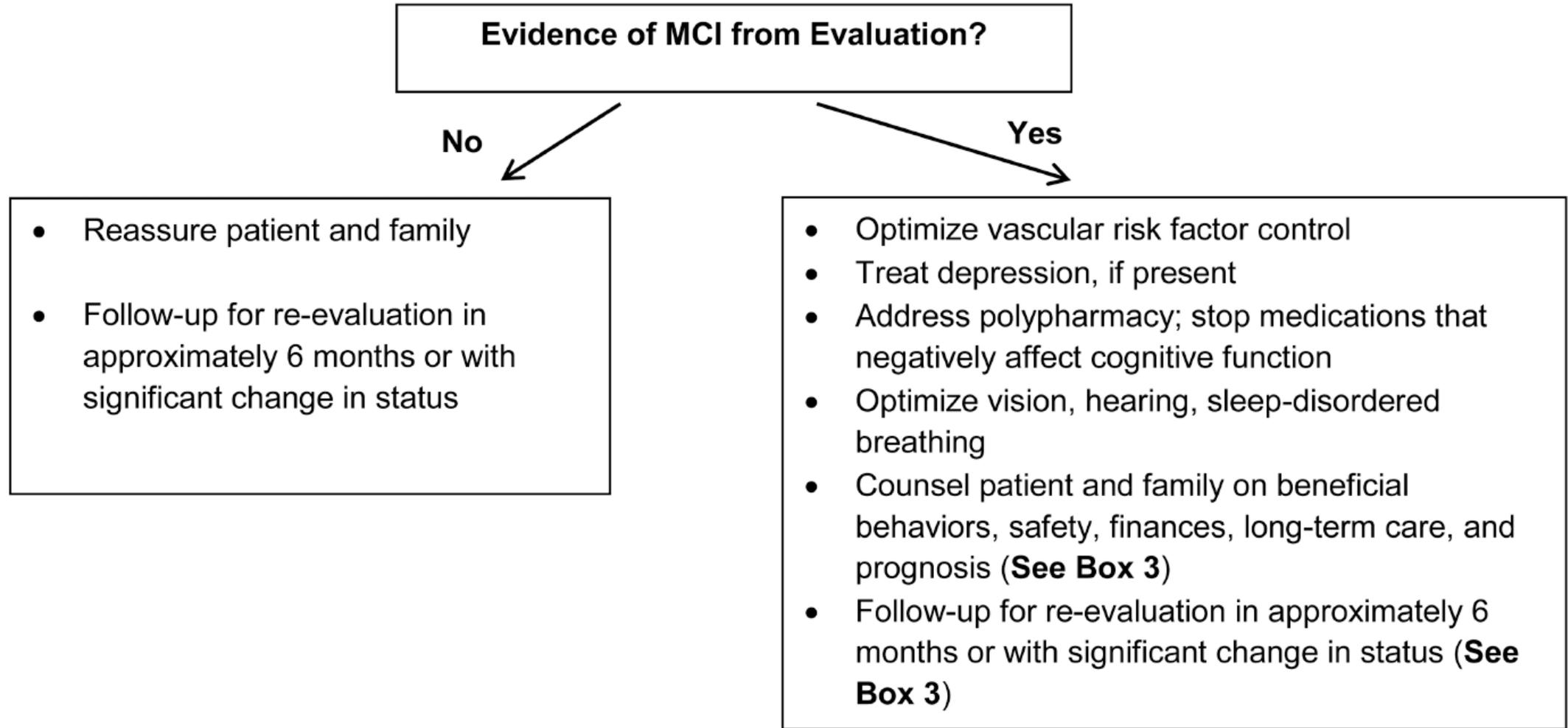


Figure. Suggested Approach to the Diagnosis and Management of Mild Cognitive Impairment

Control of vascular risk factors, and prevention of stroke and subclinical brain injury



Hypertension present: control blood pressure and avoid hypotension



Diabetes present: control severe hyperglycemia and avoid severe hypoglycemia



Statin if indicated for primary or secondary stroke prevention



Atrial fibrillation present: initiate anti-coagulant or anti-thrombotic therapy if no contraindications

Beneficial behaviors



Abstain from heavy alcohol or illicit drug use



Engage in mental activity



Engage in physical activity



Stop smoking

Social Needs



Encourage and facilitate social interactions



Discuss living will, durable power of attorney, financial and long-term care plans



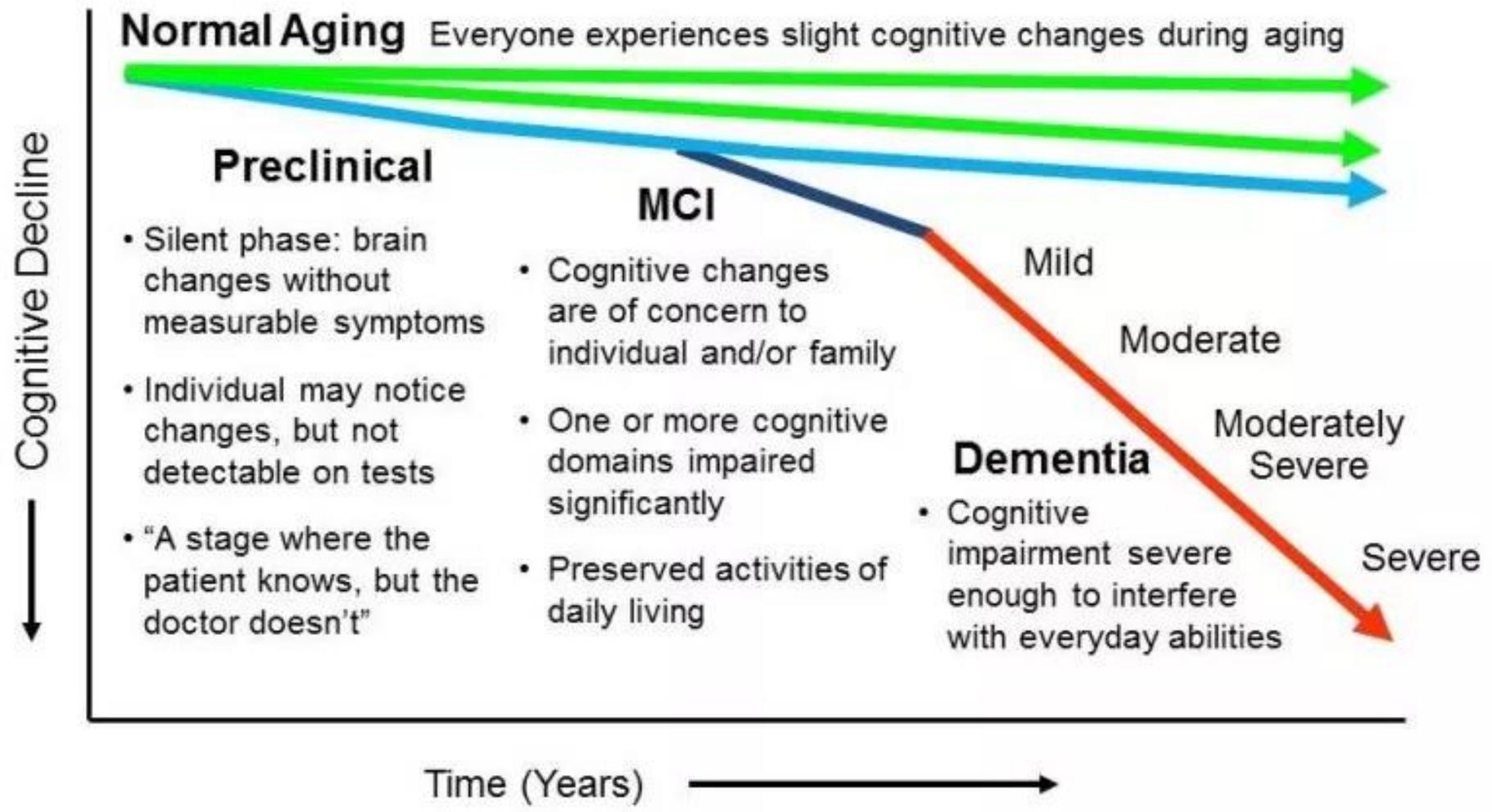
Provide community resources for patient and caregivers



Discuss driving safety



Discuss home safety, including kitchen safety, firearms, poisons, and potential fall risks



Dementia

- **Worldwide, around 50 million people have dementia.**
- **Every year, there are nearly 10 million new cases.**
- **The estimated proportion of people aged 60 between 5 to 8 per 100 people.**
- **The total number of people with dementia is projected to reach 82 million in 2030**

Epidemiology of Dementia in Malaysia

- **Prevalence of dementia in community dwelling in Malaysia is 14.3%.**
- **Increasing in trend by increasing age group**
- **Doubles every 10 years (from 9.5% in 60-69 years age group to 26.3% in more than 80 years old)**

Hamid TA, Dement Geriatr Cogn Disord

Dementia DSM-IV Criteria

- Development of multiple cognitive deficits manifested by both:
 - Memory impairment
 - One or more of the following cognitive disturbances:
 - Apraxia (inability to execute learned purposeful movements)
 - Aphasia (disturbance of comprehension and formulation of language),
 - Agnosia (loss of ability to recognize objects, persons, sounds, shapes or smells),
 - Disturbances in executive functioning.

DSM-5 criteria for major neurocognitive disorder (previously dementia)

A. Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains*:

- Learning and memory
 - Language
 - Executive function
 - Complex attention
 - Perceptual-motor
 - Social cognition
-

B. The cognitive deficits interfere with independence in everyday activities. At a minimum, assistance should be required with complex instrumental activities of daily living, such as paying bills or managing medications.

C. The cognitive deficits do not occur exclusively in the context of a delirium

D. The cognitive deficits are not better explained by another mental disorder (eg, major depressive disorder, schizophrenia)

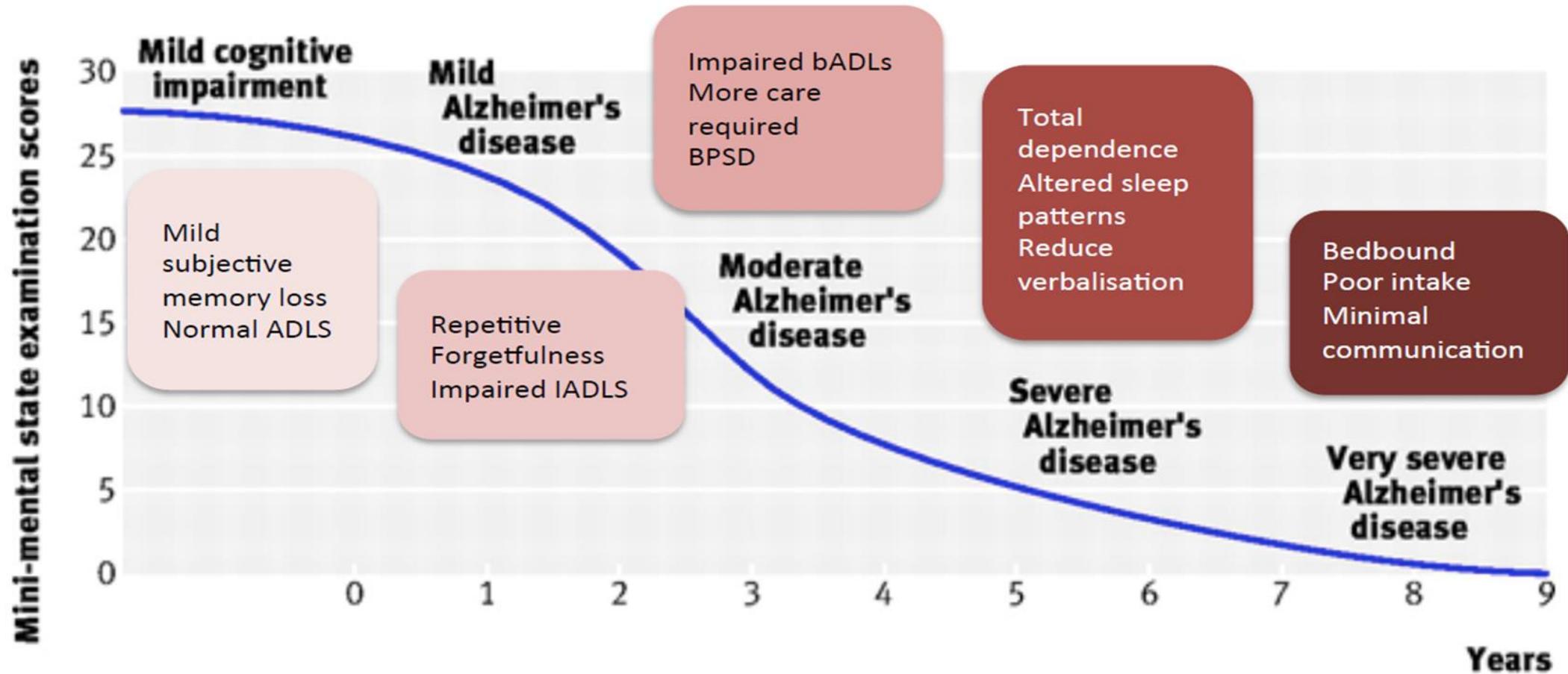
Table 3

Functional limitations associated with impairment in different cognitive domains

Cognitive domain	Examples of changes in everyday activities
Complex attention	Normal tasks take longer, especially when there are competing stimuli; easily distracted; tasks need to be simplified; difficulty holding information in mind to do mental calculations or dial a phone number
Executive functioning	Difficulty with multi-stage tasks, planning, organizing, multi-tasking, following directions, keeping up with shifting conversations
Learning and memory	Difficulty recalling recent events, repeating self, misplacing objects, losing track of actions already performed, increasing reliance on lists, reminders
Language	Word-finding difficulty, use of general phrases or wrong words, grammatical errors, difficulty with comprehension of others' language or written material
Perceptual-motor/visuospatial function	Getting lost in familiar places, more use of notes and maps, difficulty using familiar tools and appliances
Social cognition	Disinhibition or apathy, loss of empathy, inappropriate behavior, loss of judgment

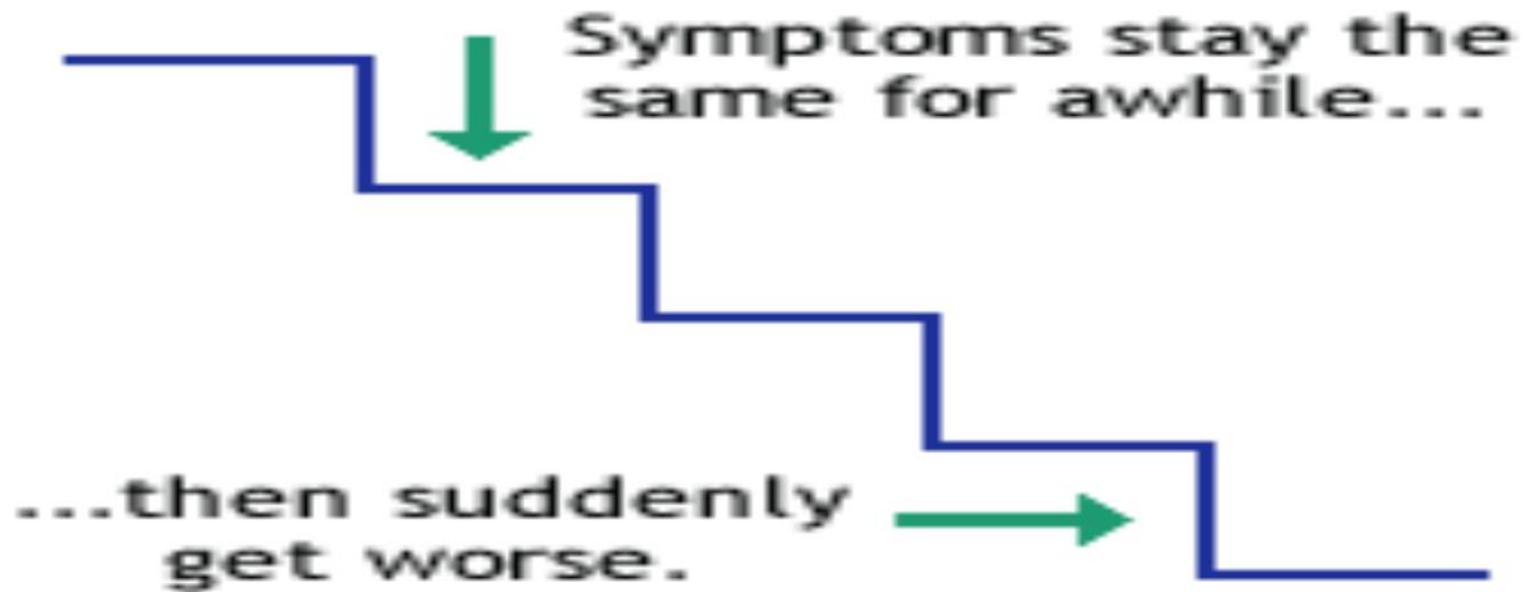
Adapted from: American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association; 2013

Alzheimer's Disease



Vascular dementia

Typical Progression of Multi-Infarct Dementia



Management

Etiology-specific treatment

If a neurocognitive disorder is diagnosed as wholly or partly due to a treatable condition, treatment specific to that condition is clearly the first line of defense.

At this time, no disease-modifying therapies are available for any of the neurodegenerative diseases.

Symptomatic and supportive treatments are usually of value.

Pharmacological

Cholinesterase inhibitors – Donepezil, Rivastigmine

-provide modest improvements in cognitive function and everyday activities and behavior in Alzheimer's disease.

-Rivastigmine -dementia in Parkinson's disease.

- Vascular dementia-mixed evidence ,start because of the frequent co-occurrence of cerebrovascular and neurodegenerative disease

NMDA receptor antagonist -Memantine

-moderate to severe dementia due to Alzheimer's disease/BPSD

Summary

Memory falters with age

Age-associated normal cognitive changes

Mild cognitive impairment- no functional impairment

Dementia –functional decline

Diagnosis requires careful history-taking and skilled clinical assessment followed by appropriate laboratory investigations.

Diagnostic imaging can be useful

Summary

Referral to subspecialists can be valuable for specific purposes

e.g. geriatricians/neurologists for diagnosis, particularly of the less common disorders, - geriatrician/geriatric psychiatrist when there are psychological or behavioral challenges, neuropsychologists for objective cognitive testing and interpretation,

Drug treatments for dementia at present provide symptomatic relief.

No drug treatment for MCI

Psychosocial and other supportive therapies are essential.

THANK YOU

