Dementia – Evaluation and Pharmacological Treatment

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Evaluation and Pharmacological Treatment

Etiologies of Dementia

Assessment -

- Cognitive Screening Cognitive Screening Tests
- Laboratory tests
- Imaging Studies

Treatment / Referral

Why is Dementia so important?

Aging population in Singapore

- The number of elderly citizens will triple to 900,000 by 2030 from the current 340,000

Current Prevalent Rates for Dementia:

- 6-8% if older than 65
- 30% if older than 80

Singapore Life Expectancy – 82.14 years old, with women 85 and men 80

Estimated Dementia Population

300,000 Citizen > 65 years old in 2030 with 210,000 citizen in 2030 > 80 years old

Hence, base on statistics,

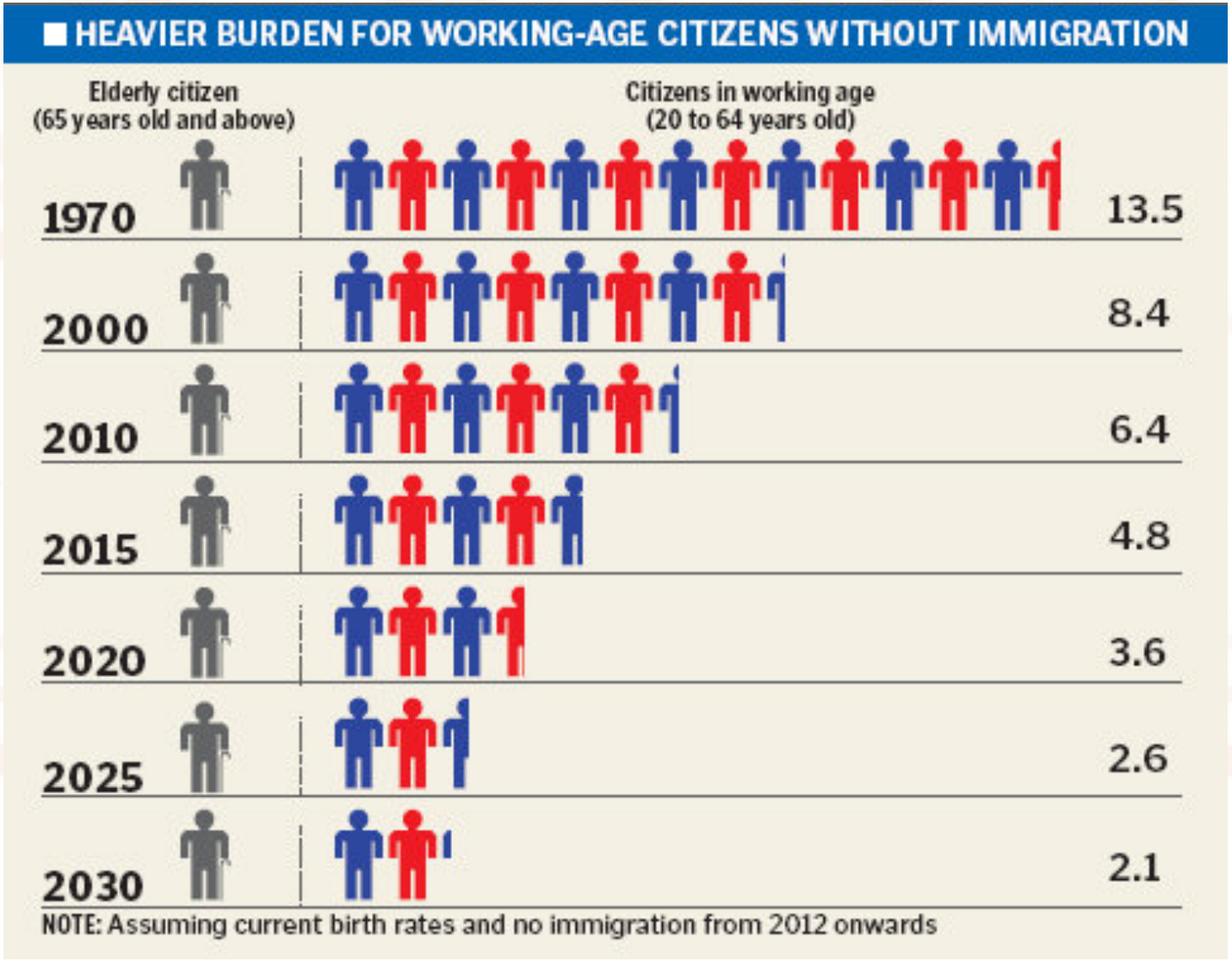
Number of Dementia patient in Singapore

= 30% x 210,000 + 6% x 90,000 = 63000 + 5400

= 68400 possible Dementia patients in 2030!

According to MOH statistic, there are currently 9300 nursing home beds in 60 nursing homes in Singapore
http://www.healthxchange.com.sg/News/Pages/Ministry-of-Health-guidelines-on-nursing-homes.aspx

Age Old Support Ratio



de·men·tia

Origin of DEMENTIA

- Latin, from *dement-, demens* mad, from *de-* + *ment-, mens* mind
- First Known Use: 1806

Definition and Diagnostic Criteria (DSM-IV)

1. An impairment of memory (inability to learn new information, or to recall previously learned materials), and
2. An impairment of at least one other domain:
   - Aphasia
   - Agnosia
   - Apraxia, and
   - Disturbance in executive function

3a. Interference with social, work, or daily activities

3b. Impairments representing a significant decline

4. Cognitive deficits do not occur exclusively during the course of a delirium or other psychotic disorder (e.g. major depression, schizophrenia)

Aphasia

- Characterized initially by a fluent aphasia
  - Able to initiate and maintain a conversation
  - Impaired comprehension
  - Intact grammar and syntax however the speech is vague with paraphasias, circumlocutions, tangential and often using nonspecific phrases ("the thing")
- Later language can be severely impaired with mutism, echolalia.

Agnosia

- The inability to recognize or identify objects despite intact sensory function
  - Typically occurs later in the course of illness
  - Can be visual or tactile

Apraxia

- Inability to carry out motor activities despite intact motor function
- Contributes to loss of ADLs

Disturbance in Executive Function

- Difficulty with planning, initiating, sequencing, monitoring or stopping complex behaviours
- Occurs early to midcourse
- Contributes to loss of instrumental activities of ADLs such as shopping, meal preparation, driving and managing finances

Features Associated with Dementia

Agitation
Aggression
Sleep disturbances
Apathy
Behavioural disinhibition
Impaired insight
Depression or anxiety
Personality changes
Delusions (often paranoid or persecutory)

Etiologies of Dementia

Alzheimer's Disease

- Commonest type and globally estimated to be about 50 to 60% of all dementias
- Earliest deficits involves episodic memory (Day to day memory and new learning),
- Evidence of atrophy of the hippocampus and medial temporal lobe
  - Underlying pathology is acumination of beta amyloid either by over production or failure to break down of the amyloid precursor protein causing amyliod plagues, neurofibrillary tangles and neuronal cell death

Etiologies of Dementia

Vascular Dementia

- Second commonest cause of dementia, can co-exist with Alzheimer's disease
- Large infract, lacunar infarcts, water shed infarcts, and small vessel disease (white matter) can result in impaired cognition
- Stepwise decline or fluctuating picture with an overall decline course would suggest vascular dementia

Etiologies of Dementia

Dementia with Lewy Bodies (DLB)

- Increasing recognized cause
- Presents with fluctuating course of dementia with deficits in attention, frontal executive tasks and visuospatial abilities
- Defined as
  - Dementia at least 6 months duration
  - Punctuated by periods of confusions, hallucinations (esp. visual), falls extrapyramidal signs (rigidity and bradykinesia), increase sensitivity to neuroleptic medications, and more rapid progression

Etiologies of Dementia

Fronto-Temoporal Dementia (FTD)

- Characterized by focal frontal and temporal atrophy.
- Present with personality and behavioral disturbances (frontal) or progressive aphasia or semantic dementia (temporal)
- Memory problems may appear late and patients may perform within the normal range on cognitive assessments

Etiologies of Dementia

Causes of Dementia

Degenerative
1. Alzheimer's disease
2. Dementia with Lewy bodies
3. Parkinson's disease
4. Frontotemporal dementia including Pick's disease
5. Progressive supranuclear palsy
6. Huntington's disease

Vascular
1. Multi-infarct dementia
2. Lacunar state
3. White matter dementia
4. Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL)
5. Vasculitis (in SLE)

Trauma
1. Post major head trauma (including boxing)
2. Cerebral anoxia e.g. post cardiac arrest, CO poisoning

Infective
1. Bacterial e.g. Neurosyphilis, tuberculosis
2. Viral e.g. post encephalitis; HIV and AIDS-dementia complex
3. Fungal e.g. Cryptococcus
4. Prion e.g. Creutzfeldt-Jakok disease

Toxic
1. Chronic Alcoholism
2. Heavy metals
3. Drug intoxication

Space Occupying lesions
1. Chronic Subdural hematoma
2. Primary or metasraric intracranial tumours (esp frontal lobes)

Metabolic/Endocrine
1. Hypothyriodism
2. B12/Folate deficiencies
3. Hypercalemia
4. Inherited metabolic disease e.g. Wilson's disease

Hydrostatic
1. Normal pressure hydrocephalus
2. Obstructive or communicating hydrocephalus

Etiologies of Dementia - Potentially Reversible Types

- Drug Toxicity
- Metabolic Disturbance
- Normal Pressure Hydrocephalus
- Mass Lesion (Tumor Chronic Subdural)
- Infectious Process (Meningitis, Syphilis)
- Collagen-Vascular Disease (SLE, Sarcoid)
- Endocrine Disorder (Thyroid, Parathyroid)
- Nutritional Disease (B12, thiamine, folate)
- Other (COPD, CHF, Liver Dz, Apnea…)

Fewer than 13%, but few is ever reversible

Staging of Dementia

Stage 1: No impairment (normal function)

- The person does not experience any memory problems. An interview with a medical professional does not show any evidence of symptoms of dementia.

Taken from www.alz.org

Staging of Dementia

Stage 2: Very mild cognitive decline (may be normal age-related changes or earliest signs of Alzheimer's disease)

- The person may feel as if he or she is having memory lapses — forgetting familiar words or the location of everyday objects.
- But no symptoms of dementia can be detected during a medical examination or by friends, family or co-workers.

Taken from www.alz.org

Staging of Dementia

Stage 3: Mild cognitive decline (early-stage Alzheimer's can be diagnosed in some, but not all, individuals with these symptoms)

- Friends, family or co-workers begin to notice difficulties. During a detailed medical interview, doctors may be able to detect problems in memory or concentration.
- Common stage 3 difficulties include:
  - Noticeable problems coming up with the right word or name
  - Trouble remembering names when introduced to new people
  - Having noticeably greater difficulty performing tasks in social or work settings
  - Forgetting material that one has just read
  - Losing or misplacing a valuable object
  - Increasing trouble with planning or organizing

Taken from www.alz.org

Staging of Dementia

Stage 4: Moderate cognitive decline (Mild or early-stage Alzheimer's disease)

- At this point, a careful medical interview should be able to detect clear-cut symptoms in several areas:
  - Forgetfulness of recent events
  - Impaired ability to perform challenging mental arithmetic — for example, counting backward from 100 by 7s
  - Greater difficulty performing complex tasks, such as planning dinner for guests, paying bills or managing finances
  - Forgetfulness about one's own personal history
  - Becoming moody or withdrawn, especially in socially or mentally challenging situations

Taken from www.alz.org

Staging of Dementia

Stage 5: Moderately severe cognitive decline (Moderate or mid-stage Alzheimer's disease)

- Gaps in memory and thinking are noticeable, and individuals begin to need help with day-to-day activities. At this stage, those with Alzheimer's may:
  - Be unable to recall their own address or telephone number or the high school or college from which they graduated
  - Become confused about where they are or what day it is
  - Have trouble with less challenging mental arithmetic; such as counting backward from 40 by subtracting 4s or from 20 by 2s
  - Need help choosing proper clothing for the season or the occasion
- Still remember significant details about themselves and their family
- Still require no assistance with eating or using the toilet

Taken from www.alz.org

Staging of Dementia

Stage 6: Severe cognitive decline (Moderately severe or mid-stage Alzheimer's disease)

- Memory continues to worsen, personality changes may take place and individuals need extensive help with daily activities. At this stage, individuals may:
  - Lose awareness of recent experiences as well as of their surroundings
  - Remember their own name but have difficulty with their personal history
  - Distinguish familiar and unfamiliar faces but have trouble remembering the name of a spouse or caregiver
  - Need help dressing properly and may, without supervision, make mistakes such as putting pajamas over daytime clothes or shoes on the wrong feet
  - Experience major changes in sleep patterns — sleeping during the day and becoming restless at night
  - Need help handling details of toileting (for example, flushing the toilet, wiping or disposing of tissue properly)
  - Have increasingly frequent trouble controlling their bladder or bowels
  - Experience major personality and behavioral changes, including suspiciousness and delusions (such as believing that their caregiver is an impostor)or compulsive, repetitive behavior like hand-wringing or tissue shredding
  - Tend to wander or become lost

Taken from www.alz.org

Staging of Dementia

Stage 7: Very severe cognitive decline (Severe or late-stage Alzheimer's disease)

- In the final stage of this disease, individuals lose the ability to respond to their environment, to carry on a conversation and, eventually, to control movement. They may still say words or phrases.
- At this stage, individuals need help with much of their daily personal care, including eating or using the toilet. They may also lose the ability to smile, to sit without support and to hold their heads up. Reflexes become abnormal. Muscles grow rigid. Swallowing impaired.

Taken from www.alz.org

Cognitive assessment

A formal evaluation needs to be carried out to quantify the degree of impairment
Tools include:

1. IADLs
2. Elderly Cognitive Assessment Questionaire (ECAQ)
3. MMSE

   Limitations of MMSE
   a. Not a quantitative scale
   b. No agreed cut off point
   c. a/w comorbid diseases and low education
   d. subjected to educational, language and cultural bias
4. ADAS – Cog
5. CAMCOG
6. Clock drawing test – reflect frontal and temporal planning

Lab

- VRDL/TPHA
- Thyroid function
- B12/Folate
- HIV
- FBC/ESR – exclude any infective casues
- Biochemistry – U/E/Cr, calcium, LFT

Neuroimaging

- CT head – hydrocephalus, tumours, lacunar infarcts
- EEG – seizures

The Lawton Instrumental Activities of Daily Living Scale

A. Ability to Use Telephone

1. Operates telephone on own initiative; looks up and dials numbers 1
2. Dials a few well-known numbers 1
3. Answers telephone, but does not dial 1
4. Does not use telephone at all 0

B. Shopping

1. Takes care of all shopping needs independently 1
2. Shops independently for small purchases 0
3. Needs to be accompanied on any shopping trip 0
4. Completely unable to shop 0

C. Food Preparation

1. Plans, prepares, and serves adequate meals independently 1
2. Prepares adequate meals if supplied with ingredients 0
3. Heats and serves prepared meals or prepares meals but does not maintain adequate diet 0
4. Needs to have meals prepared and served 0

D. Housekeeping

1. Maintains house alone with occasion assistance (heavy work) 1
2. Performs light daily tasks such as dishwashing, bed making 1
3. Performs light daily tasks, but cannot maintain acceptable level of cleanliness 1
4. Needs help with all home maintenance tasks 1
5. Does not participate in any housekeeping tasks 0

E. Laundry

1. Does personal laundry completely 1
2. Launders small items, rinses socks, stockings, etc 1
3. All laundry must be done by others 0

F. Mode of Transportation

1. Travels independently on public transportation or drives own car 1
2. Arranges own travel via taxi, but does not otherwise use public transportation 1
3. Travels on public transportation when assisted or accompanied by another 1
4. Travel limited to taxi or automobile with assistance of another 0
5. Does not travel at all 0

G. Responsibility for Own Medications

1. Is responsible for taking medication in correct dosages at correct time 1
2. Takes responsibility if medication is prepared in advance in separate dosages 0
3. Is not capable of dispensing own medication 0

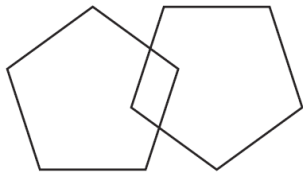
H. Ability to Handle Finances

1. Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income 1
2. Manages day-to-day purchases, but needs help with banking, major purchases, etc 1
3. Incapable of handling money 0

The Mini-Mental State Exam

Patient_____ Examiner _____ Date_____

Maximum	Score		
		Orientation	
5	( )	What is the (year) (season) (date) (day) (month)?	
5	( )	Where are we (state) (country) (town) (hospital) (floor)?	
		Registration	
3	( )	Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record. Trials _____	
		Attention and Calculation	
5	( )	Serial 7's. 1 point for each correct answer. Stop after 5 answers. Alternatively spell "world" backward.	
		Recall	
3	( )	Ask for the 3 objects repeated above. Give 1 point for each correct answer.	
		Language	
2	( )	Name a pencil and watch.	
1	( )	Repeat the following "No ifs, ands, or buts"	
3	( )	Follow a 3-stage command: "Take a paper in your hand, fold it in half, and put it on the floor."	
1	( )	Read and obey the following: CLOSE YOUR EYES	
1	( )	Write a sentence.	
1	( )	Copy the design shown.	



_____ Total Score

ASSESS level of consciousness along a continuum _____

Alert Drowsy Stupor Coma

MMSE less than 25 may Signify cognitive decline

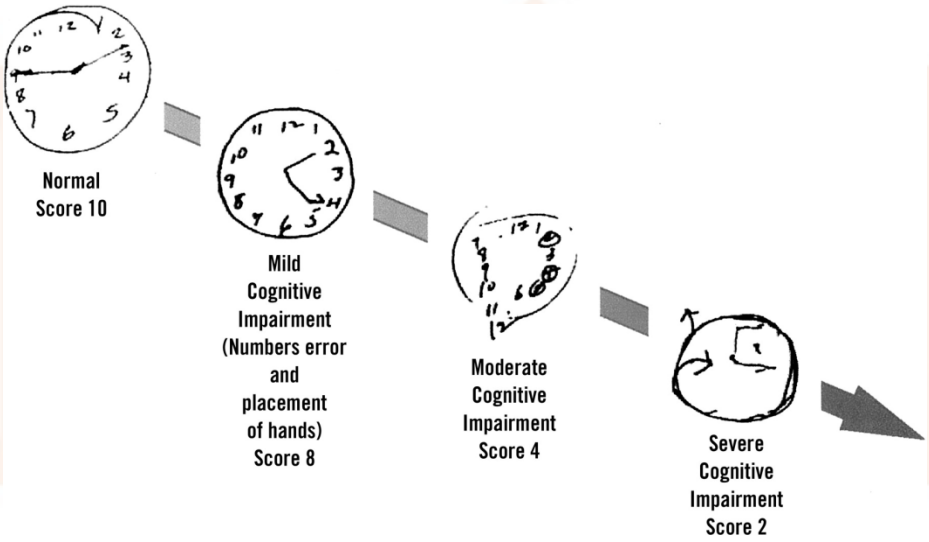
The AHCPR Guideline on Alzheimer's diagnosis recommends that confounding factors such as age and educational level be considered in interpretation of mental status test scores. The following table provides median MMSE score by age and educational level:

Age	Education				
	0-4y	5-8y	9-12y	≥12y	Total
18-24	23	28	29	30	29
25-29	23	27	29	30	29
30-34	25	26	29	30	29
35-39	26	27	29	30	29
40-44	23	27	29	30	29
45-49	23	27	29	30	29
50-54	23	27	29	29	29
55-59	22	27	29	29	29
60-64	22	27	28	29	28
65-69	22	28	28	29	28
70-74	21	26	28	29	27
75-79	21	26	27	28	26
80-84	19	25	26	28	25
≥85	20	24	26	28	25
Total	22	26	29	29	29

The larger the difference between the patient's score and the age/education associated median, the more likely significant cognitive impairment exist.

Crum RM, Anthony JC, Bassett SS et. al. Population based norms for the mini mental state examination by age and education level, JAMA 1993: 296: 2386-91

Clock Drawing Test



Sunderland, 1989

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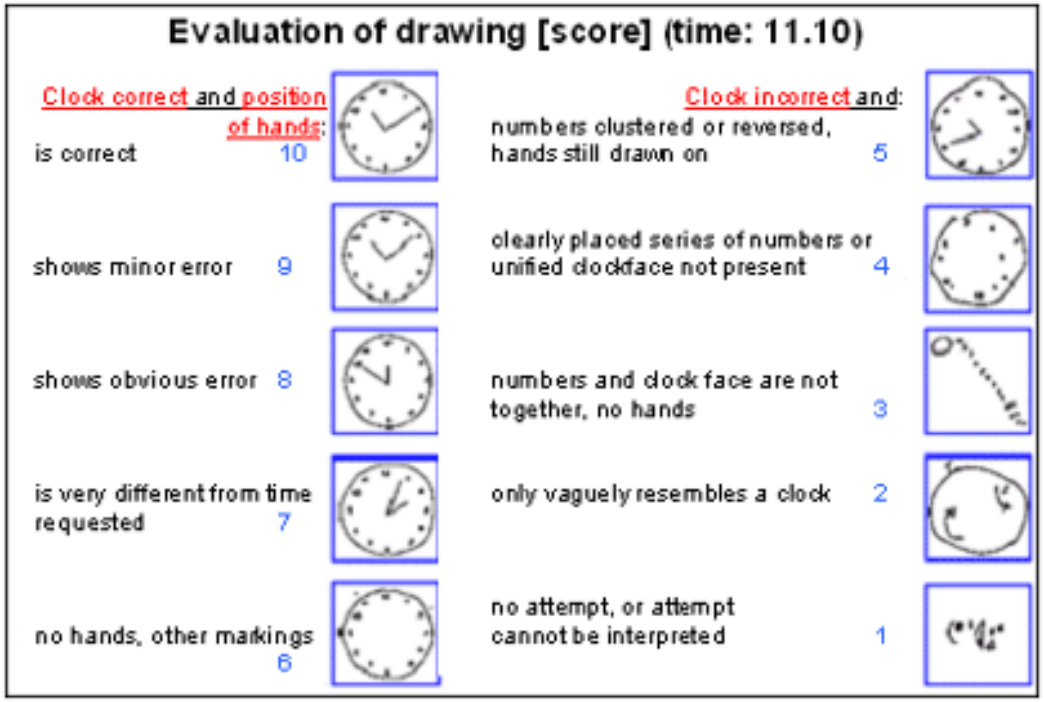

Pharmalogical Treatment

Slow down progression of Dementia

- Cholinesterase inhibitors - **Donepezil (Aricept), rivastigmine (Exelon) and galantamine (Reminyl)**
- used for symptomatic treatment of mild to moderate Alzheimer's disease
- **Memantine (Ebixa)**, a non competitive NMDA receptor antagonist
  - Modulates NMDA receptor calcium channel, preventing electrotoxicity and allowing physiological activation of the receptor during memory formation.
  - Used for treatment of moderate o severe Alzheimer's disease

- Not proven
  - Antioxidants – Vit E with Selegiline, Ginkgo Biloba extract
  - Coconut Oil

Treat behavioural complications of Dementia

- Anti-depressents
- Anti-psychotic
- Mood Stablizers

To emphasize to families that

NON PHARMACOLOGICAL INTERVENTIONS ARE STILL TREATMENTS!

Further supportive care …

- Medical and psychological support
- Explain nature of the disease and plan ahead
- Management goals and treatment goals will change as disease progresses
- Support for patient will shift from aiding failing memory in the setting of independent living
- Manage behavioural problems
- Full nursing care eventually
- Care giver needs changes as well, from providing psychological support in the early stages to respite care
- If diagnosed early, patients and relatives should be advised to settle legal and financial issues
- Group counseling