Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings

Module on Cognitive Impairment

2017
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Advisory Group on Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings

Hong Kong College of Psychiatrists

Hong Kong Geriatrics Society

Hospital Authority of Hong Kong
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Chapter 1: Introduction

Cognitive function refers to a person’s ability to process thoughts. Impairment of cognitive function (cognitive impairment) in older adults is a global medical and social concern in the modern era.

This Module serves as a reference to Hong Kong primary care providers in the recognition, assessment, management—emphasizing a shared care with specialists and allied health professionals, of cognitive impairment in older adults.

Cognitive function decline in older adults can be part of normal ageing; over a relatively long period of time, older adults may remain asymptomatic.

However in some older adults, their trajectories of cognitive function follow a different and seemingly pathological path. The decrement goes beyond normal ageing. As time goes on, they exhibit symptoms due to cognitive function decline. This stage can be described as mild cognitive impairment (MCI) if their activities of daily livings are relatively preserved and they remain functionally independent.

The fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) named a new category, mild neurocognitive disorder (mNCD), which described features similar to MCI. MCI or mNCD may or may not progress to dementia.

The cognitive decline in some of the older adults with MCI will eventually progress to dementia: a progressive and irreversible clinical syndrome of cognitive decline interfering daily functioning.

DSM-5 uses ‘major neurocognitive disorder’ to replace the term ‘dementia or other debilitating conditions’ in the previous DSM editions.

The changes in cognitive function in normal ageing and the ‘different path’ (pathological cognitive ageing) with time are shown in figure 1:

**Figure 1: Change in cognitive function with time**

- **Asymptomatic period**
  - Time when cognitive impairment becomes apparent

- **Mild cognitive impairment:**
  - Cognitive impairment recognized, but individual’s functional independence preserved

- **Dementia:**
  - Further decline in cognitive function, loss of individual’s functional independence
  - Time when daily functioning becomes impaired

**Key**

- Normal age-related cognitive decline
- Pathological cognitive decline
1.1 Epidemiology

Dementia is one of the major causes of disability and dependency among older people worldwide. World Health Organization (WHO) estimated 47.5 million people are currently living with dementia. People with dementia is projected to be 75.6 million globally by year 2030, and almost tripled to 135.5 million by year 2050.

In a study jointly conducted by Elderly Health Service (EHS), Department of Health and the Department of Psychiatry, the Chinese University of Hong Kong (CUHK) in 2005 to 2006, a total of 6100 community-dwelling elders aged 60 or above were interviewed in the Thematic Household Survey, and 2073 (34%) of them were suspected to be suffered from cognitive impairment after screening by trained interviewers. Of these elders, 737 of them agreed for further assessment by experienced psychiatrists and total of 143 subjects were later diagnosed to be suffering from dementia, with 84.6%, 9.8% and 5.6% of mild, moderate and severe dementia respectively. Projecting from these findings, the prevalence of dementia in community living people in Hong Kong is shown in Figure 2 and Figure 3.

The estimated number of people aged 60 years or above with dementia is 103,433 in 2009. It is estimated to be 332,688 in 2039 due to our ageing population.

Local study has shown that there was high level of misconception and low tendency in treatment seeking on dementia related information among our general population. Among those who were identified to be suffering from dementia, only 11% had ever been diagnosed.

Prevalence of mild cognitive impairment (MCI) varied from 3% to 30% according to different definitions of MCI among studies. Precise data of prevalence of MCI in Hong Kong is not yet available. A local study showed the prevalence of ‘very mild dementia’ for persons aged 70 years or above was 8.5%. 
1.2 Conditions associated with cognitive impairment in older adults

1.2.1 Dementia

Dementia is a progressive and mostly irreversible clinical syndrome of cognitive decline severe enough to interfere daily functioning.

Dementia is defined in the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) as:

- A syndrome due to disease of the brain
- Usually of a chronic or progressive nature
- Disturbance of multiple higher cortical functions, including memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement.
- Consciousness is not clouded.
- The impairments of cognitive function are commonly accompanied, and occasionally preceded, by deterioration in emotional control, social behaviour, or motivation.

At later stage, dementia is frequently associated with other comorbidities such as poor physical function and neuropsychiatric symptoms. These lead to high levels of dependency and morbidity, causing caregiver stress, and higher chance of institutionalisation. These also challenge the skills and capacity of caregivers and health services.

Subtypes of dementia

Alzheimer’s disease (AD):
- Most common cause of dementia. Accounted for nearly 65% of dementia in Hong Kong Chinese elderly.

Vascular dementia (VaD):
- Accounted for around 30% of dementia in Hong Kong Chinese elderly.

Mixed dementia:
- Two or more active coexisting causes, such as Alzheimer’s disease on top of vascular dementia

Other subtypes which are less commonly seen:
- Dementia with Lewy bodies (DLB)
- Fronto-temporal dementia (FTD)

Details of each subtype are discussed in Annex 1.
1.2.2 Mild cognitive impairment (MCI)
Mild cognitive impairment (MCI) is usually used to describe a stage of cognitive decline between what is considered normal ageing and dementia\textsuperscript{18}.

Clinical features include\textsuperscript{19}:
1. Subjective cognitive change such as memory loss (noticed from patient, informant or clinician)
2. Objective evidence of cognitive impairment in one or more cognitive domains (detected by cognitive testing)
3. Relative preservation of functional independence and no major deficits in social or occupational functioning

1.2.3 Other causes that may result in cognitive impairment
Delirium:
- Acute, fluctuating syndrome of altered attention, awareness, and cognition precipitated by an underlying condition or event in vulnerable persons\textsuperscript{20}, e.g. infections, medications, etc. The cognitive impairment is often reversible with relevant treatment.

Depression:
- May also presents with clinical features that resemble dementia. The cognitive impairment may improve with relevant treatment is given.

Other potentially reversible secondary causes of cognitive impairment are:
- Vitamin B12 deficiency
- Hypothyroidism and less commonly, hyperthyroidism in which the older adults can present with clinical features that resemble depression or altered mental status (i.e. apathetic thyrotoxicosis)\textsuperscript{21,22}
- Intracranial conditions e.g. normal pressure hydrocephalus, brain tumour, chronic subdural hematoma
- Alcoholism
- Neurosyphilis
1.3 Risk factors for cognitive impairment

There are several modifiable and non-modifiable risk factors for cognitive impairment. Identifying and managing the modifiable risk factors may help reduce cognitive function decline. The potential risk factors of cognitive impairment are shown in the Table 1, and are further discussed in Annex 2.

Table 1: Summary of potential risk factors of cognitive impairment

<table>
<thead>
<tr>
<th>Non-modifiable risk factors</th>
<th>Advancing age</th>
<th>Family History</th>
<th>Genetics</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modifiable risk factors</td>
<td>Smoking</td>
<td>Alcohol</td>
<td>Physical inactivity</td>
<td>Low participation of cognitive activities</td>
</tr>
<tr>
<td>Lifestyle factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vascular risk factors</td>
<td>Hypertension</td>
<td>Diabetes mellitus</td>
<td>Overweight &amp; obesity</td>
<td>Stroke</td>
</tr>
<tr>
<td>Other factors</td>
<td>Depression</td>
<td>Drugs</td>
<td>Low education attainment</td>
<td>Head injury</td>
</tr>
</tbody>
</table>

Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings
Chapter 2: Early recognition of cognitive impairment

Early identification of cognitive impairment can help patients, caregivers and doctors to identify comorbidities and possible underlying or reversible cause(s) of cognitive dysfunction, discuss initiation of medical therapy and planning of appropriate advance care[23].

2.1 Recommended strategies

Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings recommends primary care providers to assess cognitive function whenever cognitive impairment or deterioration is suspected; based on direct observation, patient report, or concerns raised by family members or caregivers[24].

Cognitive impairment or deterioration should be suspected in the following situations[25]:

- repeating questions,
- forgetting conversations,
- missed appointments,
- changes in compliance with medications,
- social withdrawal and other mood disturbances,
- personality changes
- deterioration in grooming and dressing, etc.

2.2 Warning signs suggestive of significant cognitive impairment

Table 2 shows the warning signs suggesting the presence of significant cognitive impairment. Presence of any of these warning signs, either reported by patient or informant, should alert the primary care providers to proceed with further assessment.

<table>
<thead>
<tr>
<th>Warning signs</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory loss that disrupts daily life</td>
<td>Forgetting recent dates or events</td>
</tr>
<tr>
<td></td>
<td>Asking for same information over and over</td>
</tr>
<tr>
<td>Challenges in planning or solving problems</td>
<td>Trouble in following a familiar recipe, keeping track of monthly bills</td>
</tr>
<tr>
<td></td>
<td>Difficulty in concentrating</td>
</tr>
<tr>
<td>Difficulty completing familiar tasks</td>
<td>Trouble in managing budget at work or remembering the rules of favourite game</td>
</tr>
<tr>
<td>Confusion with time or place</td>
<td>Forgetting where they are or how they got there</td>
</tr>
<tr>
<td>Trouble understanding visual images and spatial relationships</td>
<td>Difficulty in reading, judging distance, determining colour or contrast</td>
</tr>
<tr>
<td>New problems with words in speaking or writing</td>
<td>Trouble in following or joining a conversation</td>
</tr>
<tr>
<td></td>
<td>May stop in the middle of conversation and have no idea how</td>
</tr>
</tbody>
</table>
Have problems in finding the right word
Misplacing things and losing the ability to retrace steps
Putting things in unusual places, losing things, and may accuse others of stealing
Impaired judgement
Poor judgement when dealing with money
Paying less attention to grooming or keeping themselves clean
Withdrawal from work or social activities
Trouble in keeping up with a favourite sports or remembering how to complete a favourite hobby
Change in mood and personality
Becoming confused, suspicious, depressed, fearful or anxious
Easily upset where they are out of their comfort zone

2.3 Subjective memory/cognitive complaints

Primary care provider may encounters patient complaining of subjective memory loss.
Subjective memory complaints have been shown by some studies to be predictive of dementia although other underlying causes such as depression or anxiety should be considered\textsuperscript{27, 28}.
Clinical features which may help clinicians to differentiate simple forgetfulness and pathological cognitive impairment are shown in table 3.

Table 3: Differentiation between simple forgetfulness and dementia\textsuperscript{29}

<table>
<thead>
<tr>
<th>Simple forgetfulness</th>
<th>Pathological cognitive impairment or dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>The person complains of memory loss but can provide considerable details regarding incidents of forgetfulness</td>
<td>The person complains of memory problems only if specifically asked; cannot recall instances where memory loss was noticeable</td>
</tr>
<tr>
<td>Recent memory for important events, affairs, and conversations are not impaired</td>
<td>Recent memory for events and ability to converse are both noticeably impaired</td>
</tr>
<tr>
<td>Occasional word-finding difficulties</td>
<td>Frequent word-finding pauses and substitutions</td>
</tr>
<tr>
<td>Person does not get lost in familiar territory</td>
<td>Person gets lost in familiar territory</td>
</tr>
<tr>
<td>Preserved independence in daily activities</td>
<td>Critical dependence on others for key daily living activities</td>
</tr>
<tr>
<td>No decline in interpersonal social skills</td>
<td>Loss of interest in social activities; socially inappropriate behaviours</td>
</tr>
</tbody>
</table>
Chapter 3: Assessment of older adults with cognitive impairment in primary care settings

Aims of assessment:

1. To confirm the presence of cognitive problem and its severity;
2. To look for possible underlying and potentially reversible causes of cognitive problems such as delirium, depression or drug effect;
3. To recognise the presence of behavioural and psychological problems, and social aspects (e.g. caregiver status) especially if dementia is suspected.

It should include:\n
- History
- Physical examination
- Cognitive screening test
- Appropriate investigations
- Review of medications that may adversely affect cognitive function

The following section (3.1) is an algorithm for assessment of cognitive impairment in older adults.
3.1 Algorithm for assessment of cognitive impairment in older adults

Suspected cognitive impairment (by observation, patient or caregiver’s concerns) (Ch. 2)

**History (Ch. 3.2)**
- Cognitive symptoms (onset & progression) e.g. memory, language
- Behavioural and psychological symptoms e.g. agitation, anxiety, delusion
- Daily functioning: consider use of Barthel index
- Comorbidities
- Possible underlying causes, risk factors e.g. hypothyroidism
- Caregiver’s status

**Physical Examination (Ch. 3.3)**
- No specific physical signs in mild cognitive impairment or early stage of Alzheimer’s disease
- Look for physical signs that may suggestive of underlying causes e.g. focal neurological signs, vitamin B12 deficiency, Parkinson’s disease, thyroid disease

**Investigations (Ch. 3.5)**
(Performed base on physician’s clinical judgment and available resources)

**Laboratory tests**
- Complete blood picture
- Vitamin B12 level & folate
- Thyroid stimulating hormone
- Liver function tests
- Kidney function tests
- Serum calcium
- Fasting glucose, lipid profile
- Other tests when clinical suspicion warrants e.g. syphilis serology, HIV

**Neuroimaging (e.g. MRI brain)**

**Cognitive Screening Test (Ch. 3.4)**
Locally translated and validated cognitive tests in Hong Kong, e.g.:
- Montreal Cognitive Assessment (MoCA)
- Abbreviated Mental Test (AMT)
- Mini Mental State Examination (MMSE)*

Abbreviations:
MRI: Magnetic Resonance Imaging
GDS: Geriatric Depression Scale
PHQ: Patient Health Questionnaire

* MMSE is copyright protected

**Reversible causes?**
- e.g. depression (consider use of GDS, PHQ), thyroid disease, vitamin B12 deficiency, subdural haematoma, normal pressure hydrocephalus

**Diagnosis: consider**
1. History / clinical course of the cognitive impairment
2. Score in the cognitive screening test
3. Functional status of the older adult

**Mild Cognitive Impairment (MCI)**
1. Typical clinical course
2. At / above cut off score
3. Functional status relatively well maintained

**Dementia**
1. Typical clinical course
2. Below cut off score
3. Functional status impaired

**Management (Ch. 4) – see algorithm in Ch. 4.1**

**Referral to specialists**

**Doubt about diagnosis**
1. Unusual clinical features; e.g. age of onset < 60
2. Findings not explained by MCI or dementia

**Primary care providers**

**Allied health professionals**

**Specialists**
3.2 History

Focus on the following areas:

- Cognitive symptoms (chapter 3.2.1)
- Behavioural and psychological symptoms (chapter 3.2.2)
- Daily functioning and comorbidities (chapter 3.2.3)
- Specific information that may suggestive of underlying cause(s) (chapter 3.2.4)
- Caregiver status (chapter 3.2.5)

Input from family and caregiver is often needed.

3.2.1 Onset and progression of cognitive symptoms (Table 4)

- Onset and progression:
  - Acute onset of confusion with fluctuating clinical course and impairment of consciousness is characteristic in delirium
  - For dementia, the onset is usually gradual, the clinical course is usually progressive in nature and usually has been persisted for at least 6 months

- Examples of cognitive symptoms:
  - Table 4 below listed common complaints encountered and the respective cognitive domains concerned.

Table 4: Some of the important cognitive domains that can be assessed during history taking

<table>
<thead>
<tr>
<th>Cognitive domains</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>• Repetitiveness</td>
</tr>
<tr>
<td></td>
<td>• Ask for examples such as any forgetting conversations, recent events,</td>
</tr>
<tr>
<td></td>
<td>meals or turn of stove, stocking repeated items in refrigerator</td>
</tr>
<tr>
<td>Language</td>
<td>• Problems in finding words (may described as “forgetting” words)</td>
</tr>
<tr>
<td></td>
<td>• Breaks when speaking or increasing use of inappropriate words</td>
</tr>
<tr>
<td></td>
<td>• Circumlocutions (e.g. “thing that tells you the time” for clock)</td>
</tr>
<tr>
<td></td>
<td>• Wrong grammar or articulation of words</td>
</tr>
<tr>
<td>Visuospatial skills</td>
<td>• Such as failure to</td>
</tr>
<tr>
<td></td>
<td>- put on clothes correctly,</td>
</tr>
<tr>
<td></td>
<td>- navigate in familiar (get lost in neighbourhood) or unfamiliar places,</td>
</tr>
<tr>
<td></td>
<td>- recognise or use familiar objects</td>
</tr>
<tr>
<td></td>
<td>• Problems in recognising faces</td>
</tr>
<tr>
<td></td>
<td>• May be presented as memory problem (e.g. “forget how to use the</td>
</tr>
<tr>
<td></td>
<td>cooker”, “cannot remember where the bathroom is”)</td>
</tr>
<tr>
<td>Judgement and personality</td>
<td>• Loss of empathy (“loss of regard for the feelings of others”)</td>
</tr>
<tr>
<td></td>
<td>• Inappropriate behaviour (usually impulsive)</td>
</tr>
<tr>
<td></td>
<td>• Apathy and diminished motivation</td>
</tr>
</tbody>
</table>
3.2.2 Behavioural and psychological symptoms (Table 5)

- Assess the onset, frequency and nature of these symptoms as well as the impacts to patient and caregiver.
- Look for any imminent risks of harm to the patient or caregiver that require immediate attention or referral.

Table 5: Examples of types of possible behavioural and psychological symptoms

<table>
<thead>
<tr>
<th>Behavioural symptoms</th>
<th>Psychological symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitation e.g. easily upset, repeating questions, hoarding, pacing, screaming, crying out, rejection of care, leaving home</td>
<td>Depression** or dysphoria</td>
</tr>
<tr>
<td>Aggression (physical or verbal)</td>
<td>Anxiety</td>
</tr>
<tr>
<td>Apathy</td>
<td>Delusion, hallucinations e.g. delusion of theft by domestic maid, seeing many small people or deceased relatives, etc.</td>
</tr>
<tr>
<td>Disinhibition (social or sexually inappropriate behaviour)</td>
<td></td>
</tr>
<tr>
<td>Irritability</td>
<td></td>
</tr>
<tr>
<td>Motor disturbance (repetitive activities without purpose) e.g. wandering, rummaging</td>
<td></td>
</tr>
<tr>
<td>Night-time behaviour (waking and getting up at night)</td>
<td></td>
</tr>
</tbody>
</table>

** Useful assessment tools to screen for depression:
- Geriatric Depression Scales (GDS)
- Patient Health Questionnaire (PHQ)

(Available at: Module of Health Assessment. Hong Kong Reference Framework for Preventive Care for Older Adults)

3.2.3 Daily functioning and comorbidities

- Daily function is not affected significantly in mild cognitive impairment.
- In the early stages of dementia, instrumental activities of daily living (IADL) are often the first to become impaired.
  - E.g. fail to use telephone, handle finance (banking, paying bills), do shopping, cooking, manage medications or travel alone, reduce interests in social activities and hobbies, fail to cope with work
- In later stages, basic activities of daily living (ADL) will become impaired as the disease progresses
  - E.g. fail to select appropriate clothes and dress properly, incontinence
- Useful tools for assessing ADL and IADL are:
  - Barthel Index of ADL (for Basic ADL)
  - Chinese Lawton Instrumental Activities of ADL (for Instrumental ADL)

(Available at: Module of Health Assessment. Hong Kong Reference Framework for Preventive Care for Older Adults)

Disability Assessment for Dementia (DAD) for the disability in both activities of ADLs and IADLs in dementia. A Chinese version of DAD has been used locally.

- Look for comorbidities that may affect subsequent management e.g. malnutrition, visual and hearing impairment, dental problem, incontinence and pain

### 3.2.4 Specific information which may suggest potential underlying risk factors or causes

- **Vascular risk factors**
  e.g. hypertension, hyperglycemia, hyperlipidemia, smoking, obesity, previous history of cardiovascular disease.

- **Classic symptoms of Parkinson disease**
  e.g. resting tremor, slowness in movement

- **Symptoms of other causes of cognitive impairment**
  e.g. hypothyroidism, hyperthyroidism, depression, delirium

- **Drug history**
  e.g. psychoactive drugs, such as benzodiazepines, can cause confusion in elderly, anticholinergic drugs, sedating antihistamines, opioid-like analgesics, etc.

- **Other history**
  e.g. history of head injury, sexually transmitted disease, family history of neurocognitive disorder

### 3.2.5 Caregiver status

- Identify the main caregiver, other informal caregivers and the care they provide.
- Assess for any caregiver stress and their coping strategies
- Assess for any physical and psychosocial problems experienced by the caregivers, e.g. depression, financial burdens

### 3.3 Physical examination

In patient with mild cognitive impairment and early stage of Alzheimer’s disease, there would be no specific physical sign.

Following signs are suggestive of underlying causes:

- Pallor and glossitis: vitamin B12 deficiency
- Rigidity: Parkinson’s disease, dementia with Lewy bodies disease, vascular cognitive impairment
- Apraxic gait: normal pressure hydrocephalus
- Bradycardia and hyporeflexia: hypothyroidism
- Focal neurological signs: vascular cognitive impairment
3.4 Cognitive screening tests

Cognitive screening tests assess different cognitive domains, such as attention and concentration, orientation, short and long term memory, praxis, language and executive function.

Some of the cognitive screening tests have been locally translated and validated in Hong Kong (as shown in Table 6):

- Montreal Cognitive Assessment (MoCA)
- Abbreviated Mental Test (AMT)
- Clock Drawing Test (CDT)
- Mini Mental State Examination (MMSE)

It should be noted that MMSE is under copyright protection; permission for use at a cost would be required.

Cognitive screening test scores below the cut-off value indicate cognitive deficit is likely. Further assessment (clinical history, physical examination and investigations) is necessary.
### Table 6: Commonly used cognitive tests translated and validated locally

<table>
<thead>
<tr>
<th>Test</th>
<th>Score considered abnormal in local studies</th>
<th>Strengths and limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hong Kong Montreal Cognitive Assessment (HK-MoCA)</strong>&lt;sup&gt;Note1&lt;/sup&gt;</td>
<td>≤ 21 for detection of cognitive impairment (both MCI and dementia)&lt;sup&gt;34&lt;/sup&gt;</td>
<td><strong>Strengths</strong>&lt;sup&gt;Note1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>≤ 18 for detection of dementia (suggested by another study)&lt;sup&gt;39&lt;/sup&gt;</td>
<td>• Designed to test for MCI&lt;sup&gt;31&lt;/sup&gt;, and also useful for detecting dementia and assessing its severity</td>
</tr>
<tr>
<td></td>
<td>(&lt;+1 point to total score for subjects with ≤ 6 years of education)&lt;sup&gt;34&lt;/sup&gt;</td>
<td>• Useful for patients with vascular cognitive impairment since it also assesses executive function&lt;sup&gt;40&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Less ceiling effect and is a more appropriate test for individuals with higher education&lt;sup&gt;31&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Cantonese Chinese Montreal Cognitive Assessment</strong>&lt;sup&gt;Note2&lt;/sup&gt;</td>
<td>≤ 22 for detection of amnestic MCI&lt;sup&gt;25&lt;/sup&gt;</td>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td></td>
<td>≤ 19 for detection of Alzheimer’s disease&lt;sup&gt;35&lt;/sup&gt;</td>
<td>• May take more time to administer</td>
</tr>
<tr>
<td></td>
<td>(+2 points to total score for illiterate subjects, and +1 point for subjects with 1-6 years of education)</td>
<td>• Pencil-and-paper test, may be more difficult for individuals with low education&lt;sup&gt;31&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Abbreviated Mental Test (AMT) (Hong Kong Version)</strong>&lt;sup&gt;Note 2&lt;/sup&gt;</td>
<td>Consider abnormal if ≤ 5&lt;sup&gt;Note3&lt;/sup&gt;</td>
<td><strong>Strengths</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Easy and quick to administer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Verbal memory test (i.e. no writing or drawing)&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does not test executive function or visuospatial skills&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Can tell the individual is “at risk” of cognitive impairment only. Cannot used for measuring severity, or monitoring progress or drug response&lt;sup&gt;31&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Clock Drawing Test (CDT)</strong>&lt;sup&gt;Note4&lt;/sup&gt;</td>
<td>Consider dementia if &gt; 3&lt;sup&gt;37&lt;/sup&gt;</td>
<td><strong>Strengths</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quick survey of global cognitive functions&lt;sup&gt;31&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimal education bias&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Used as a screening test only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Scoring can be difficult in certain cases</td>
</tr>
<tr>
<td><strong>Cantonese version of Mini-Mental State Exam (CMMSE)</strong>&lt;sup&gt;Note5&lt;/sup&gt;</td>
<td>Consider abnormal when: ≤ 18 for illiterate subjects; ≤ 20 for those with 1-2 years schooling; and ≤ 22 for those with &gt; 2 years schooling&lt;sup&gt;17&lt;/sup&gt;</td>
<td><strong>Strengths</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wildly used and studied worldwide&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Has been used for monitoring progress&lt;sup&gt;31,Note5&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td></td>
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<td>• Copyrighted, fee for use</td>
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<tr>
<td></td>
<td></td>
<td>• Ceiling effect (i.e. highly educated impaired individuals may still pass the test)&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Overemphasised on orientation and language related functions, but neglected executive function and constructional abilities that may be impaired in early dementia&lt;sup&gt;42&lt;/sup&gt;. Best performance for individuals with at least moderate cognitive impairment&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Note 1** Two local versions differ in the instructions on examining visuospatial skills, and in the linguistic translation of the repetitive sentences and items. Both versions are available from MoCA website: [http://www.mocatest.org/](http://www.mocatest.org/)


**Note 3** Initial validation did not take education level into account and was performed among geriatric inpatient only. Further local data had suggested a higher value (≤ 6) for older adults with ≥ 1 year of formal education<sup>43</sup>


**Note 5** There is no information on the validated cut-off value for MCI and staging of Alzheimer’s disease using CMMSE
Each of the cognitive tests has limitations as shown above. A number of confounding factors can affect the cognitive test scores, as shown below:\cite{30,44}:

- Low intelligence or learning disability
- Low education attainment, truanting, poor literacy
- Poor vision or hearing
- Poor motivation, poor cooperation or low mood
- Test not carrying out in the patient’s first language
- Culture differences
- Prior level of functioning
- Physical, neurological or psychiatric illness

Older adults should be explained why and how the test is done before start. They should be seated at a table, without background noise, and with customary reading glasses or hearing aids\cite{30}.

Dementia cannot be diagnosed by cognitive screening tests alone. Results of cognitive screening tests should be interpreted together with other clinical findings.

### 3.5 Investigations

Patients with cognitive impairment as demonstrated in the assessment should have initial laboratory evaluations to rule out potentially reversible causes of cognitive impairment especially if such clinical feature is present. The decision in performing investigations is also based on physician’s clinical judgment and available resources.

#### 3.5.1 Laboratory tests\cite{16,45-49}

List of blood tests considered useful in assessing cognitive impairment in older adults:

- Complete blood picture
- Vitamin B12 level
- Folate
- Thyroid function test (thyroid stimulating hormone)
- Liver function tests
- Kidney function tests
- Serum calcium
- Fasting glucose, lipid profile (Atherosclerotic disease risks)

Other laboratory tests when clinical suspicion warrants\cite{16,46}:

- Syphilis serology
- Urinalysis, urine microscopy and culture
- Human immunodeficiency virus (HIV)
- Lyme disease titre
3.5.2 Neuroimaging

Neuroimaging, such as computed tomography (CT) or magnetic resonance imaging (MRI) of the brain is helpful in identifying lesion characteristics of Alzheimer’s disease and vascular dementia, as well as excluding most of the other organic causes, e.g. normal pressure hydrocephalus, brain tumours, subdural collection, etc. MRI brain is better than CT brain in terms of lesion characterisation and providing images in multi-planar format. MRI brain is the preferred modality to assist with early diagnosis and detect subcortical vascular changes. CT imaging is commonly used in acute settings and/or in clinical settings where MRI is not available or contra-indicated (e.g. pace-maker). Special indications for neuroimaging in cognitive impairment are:

1. When clinical diagnosis is in doubt
2. When secondary organic disease is suspected, e.g. recent onset of neurological signs and symptoms, acute delirium, abrupt onset or rapid decline (weeks to months), predisposing conditions (e.g. history of head injury, metastatic cancer or on anticoagulants)
3. When the result of neuroimaging affects clinical management in different subtypes of dementia

CT or MRI brain is commonly considered as baseline investigation for patients with significant cognitive impairment. Advanced neuroimaging (e.g. magnetic resonance spectroscopy, brain perfusion single photon computed tomography, etc.) and the use of biomarkers of Alzheimer’s disease are not considered as baseline investigations in primary care settings.
Chapter 4: Management of cognitive impairment in primary care setting

The management goals include:

- Improve quality of life
- Maximise functional performance by enhancing cognition
- Addressing mood and behaviour

Multi-disciplinary team approach is essential to achieve the goal. The extent of involvement by primary care providers would be affected by their clinical competence, experience and the availability of supporting resources.

The following section (4.1) is an algorithm on management of cognitive impairment in primary care setting.
4.1 Algorithm for management of cognitive impairment in older adults in primary care setting

Primary care providers

Manage treatable causes (Ch. 4.2.1)
Examples:
- Hypothyroidism/ hyperthyroidism
- Vitamin B12 deficiency

Manage comorbidities (Ch. 4.2.2)
- Physical illnesses, e.g. hypertension, diabetes mellitus
- Psychiatric illnesses, e.g. anxiety, depression
- Others, e.g. falls, incontinence

Optimize medications (Ch. 4.2.3)
- Review and be cautious on drugs affecting cognition

Provide information & advice (Ch. 4.2.5)
- Healthy lifestyle
- Disease course and prognosis
- Injury, fall, wandering prevention
- Caregiver advices
- Community resources

Pharmacological treatment (Ch. 4.3.1)
- in uncomplicated dementia patients, e.g. Cholinesterase inhibitor (ChEI)

Regular follow up (Ch. 4.2.6)
- Monitor cognition and function
- Assess patient’s and caregivers’ on-going needs
- Anticipate any acute/ episodic problems

Appropriate shared care

Allied health professionals (Ch.4.2.4)
Occupational therapists
- Cognitive stimulation / training

Social workers
- Community care and support service, residential care, financial assistance, counselling to families and caregivers

Physiotherapists
- Fall prevention, pain management, exercise programme

Speech therapists
- Prevention and advice on swallowing problem

Feedback & Advice

Specialists (Ch.4.2.7)
(Geriatricians/Neurologists/Psychiatrists)

Mild cognitive impairment
- For early assessment if there is sudden deterioration

Dementia
Management difficulties:
- Complicated cognitive and / or behavioural and psychological symptoms of dementia (BPSD)
- Complicated care (medical / psychosocial) needs, e.g. advanced stage of dementia; when intense multi-disciplinary care or palliative care would be considered appropriate

Doubt about diagnosis/ Diagnostic difficulties

Referral

Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings
4.2 Intervention in primary care setting

A significant proportion of patients labelled with mild cognitive impairment may develop cognitive decline without dementia. This decline can be caused by depression, drug use, medical comorbidities and other treatable conditions. Primary care doctors can identify these potentially reversible conditions through a systemic assessment (Chapter 3 of this Module).

Most of the management on mild cognitive impairment (MCI), and mild to moderate stages of dementia (see Chapter 5 of this Module) patients could take place at the community level. In addition, many older adults with MCI may not progress to advanced stage of dementia after a long period of time (Chapter 4.2.5). Therefore, primary care doctors are expected to have regular encounters with these older adults and their families in long term.

Primary care providers can start the intervention by taking care of the following practical issues first:

- Manage treatable causes (Chapter 4.2.1)
- Manage comorbidities (Chapter 4.2.2)
- Optimise medications (Chapter 4.2.3)

Followed by:

- Referral to allied health professionals (Chapter 4.2.4) for cognitive assessment/stimulation/training; and access to appropriate community resources.
- Provide information and advice (Chapter 4.2.5)

Consider pharmacological treatment in uncomplicated dementia patients, e.g. Cholinesterase inhibitor (ChEI) (Chapter 4.3.1, section B)

Also, as usual, provide continuous support:

- Follow up ongoing needs of patient and caregivers (Chapter 4.2.6)
- And, to have appropriate shared care with specialists (Chapter 4.2.7)

Currently, no drug has proven effective in treatment of mild cognitive impairment, including cholinesterase inhibitors. However, when cognitive function declines, pharmacological treatment on cognitive symptoms and BPSD (behavioural and psychological symptoms of dementia) is often needed (Chapter 4.3). Complex medical or psychosocial needs may arise. Referral to specialists should be sought in these situations (Chapter 4.2.7).

4.2.1 Manage treatable causes

Such as:

- Hypothyroidism: thyroxine replacement
- Hyperthyroidism: treated as appropriate
- Vitamin B12 deficiency: investigation and vitamin B12 supplementation if appropriate
- Normal pressure hydrocephalus, subdural haematoma: prompt referral to neurosurgeon

4.2.2 Manage comorbidities

- Identify and treat comorbid physical illnesses (e.g. hypertension, diabetes mellitus)
4.2.3 Optimise medications

- Aware of medications that affect cognitive status, common examples encountered in primary care setting include:
  - Sedating antihistamines. e.g. diphenhydramine, hydroxyzine, chlorpheniramine
  - Anti-emetics, e.g. metoclopramide, prochlorperazine
  - Opioid-like analgesics, e.g. tramadol, codeine
  - Neurological and psychiatric drugs, e.g. tricyclic antidepressants, clozapine, thioridazine, benzodiazepines, anti-psychotics
  - Anticholinergic drug for urinary incontinence, e.g. oxybutynin

- It would be best to avoid prescribing these medications to older adults with cognitive impairment; even patients request some of such medications on pro re nata (PRN) basis.
- Alternatives could be considered when there is a clinical indication, for example:
  - Anti-histamines: less sedating types such as loratadine, fexofenadine
  - Analgesics: paracetamol

Primary care providers should help reviewing older adults’ drug regime regularly for impacts on cognitive status. Respective specialists should be consulted for continuation of such medications.

4.2.4 Referral to allied health professionals

Allied health professionals can help older adults with cognitive impairment in a number of ways. Examples include:

- Occupational therapists
  - Structured activity training/ cognitive stimulation to maintain cognitive and functional performance. Information on relevant resources can be found in Annex 3
- Social workers
  - Stationed in the community, such as in the District Elderly Community Centres (DECCs) and the Neighbourhood Elderly Centres (NECs)
  - Assess the social needs of older adults with cognitive impairment and their caregivers, and provide necessary follow-up and referral to relevant social services, for example:
    - Financial assistance
    - Counselling services
    - Community care and support services
    - Residential care services

Refer to Annex 3 for further information

- Physiotherapists
  - Fall prevention through improving balance, muscle strength, and mobility
  - Pain management especially for older adults with medical comorbidities
  - Provision of exercise programme. Exercise appears to be beneficial in reducing some BPSD, especially depressed mood, agitation, and wandering, may also improve night-time sleep, and may also have additional benefits on preserving cognition. Engaging the older adults to exercise also encourages social interactions.
4.2.5 Provide information and advice to the older adults and their families

A. Disease course

- Speech therapists
  - Assessment and advice on management of swallowing problems which are often associated with vascular dementia and later stage of all types of dementia

- The older adults and their families often wish to know how and when their conditions will deteriorate. Precise prediction on prognosis is often difficult.
- For mild cognitive impairment (MCI), there has been reported information as follows:
  - The reported annual rates of MCI conversion to dementia in community-dwelling older adults was 6.3% in a local study\(^{57}\).
  - Certain number of patient with MCI (40 -70%) may not progress to dementia even after 10 years\(^{18}\).
  - The patients and their families could be told that the cognitive deterioration is a slow process in general. Around half of the patients may not progress to dementia even after 10 years\(^{18}\).
  - In this slow and long process, the older adults and their families can be encouraged that a number of actions can be taken to preserve cognitive functions (also see Chapter 4.4).
- For patient with dementia, consider starting with basic information such as\(^{58}\):
  - Dementia is an illness of the brain and tends to get worse over time. Although there is no cure, there is much that can be done to help and support the person and the family.
  - Many specific concerns and behaviours can be managed as they arise. Treatment can be offered to make the person more comfortable and to make life less stressful for the caregivers during the disease course.

B. Issue of health supplements and medications in prevention of cognitive impairment

- Primary care providers may face enquiries on use of health supplements in prevention of cognitive impairment / dementia. Currently there is lack of evidence for most of the supplement in the disease modification or prevention\(^{59}\).
- There is insufficient or conflicting evidence to confirm nutrients or health supplements such as vitamin B, C and E, multivitamins, folate, omega-3 polyunsaturated fatty acids, ginkgo biloba (銀杏葉) and ginseng (人蔘) in preventing cognitive decline\(^{60-68}\). The benefit of coconut oil in Alzheimer’s disease has been postulated but is yet to be proven\(^{69}\).
- The use of statins, hormonal replacement therapy, or non-steroidal anti-inflammatory drugs are not recommended as primary prevention of dementia according to current evidence or international guidelines\(^{16, 70, 71}\).
- Instead of focusing on health / vitamins supplementation, primary care providers can promote a healthy diet which would provide the essential needs of the older adults. It includes low saturated fat, limiting the amount of salt and high fibre intake (plenty of fresh fruit, vegetables and whole grains)\(^{72}\).
C. **Daily advice for family and caregiver(s)**

- Avoid adversarial debates; try to redirect conversation instead
- Maintain social activities in contact with other people
- Provide regular orientation information to the patient
- Use material such as newspapers, radio or television programmers, family albums and household items to promote communication, to orient patient to current events, to stimulate memories and to enable sharing and valuing past experiences
- Use simple short sentence to make verbal communication clear
- Offer graded assistance (as little help as possible to perform ADLs), role modelling, cueing, and positive reinforcement to increase independence
- Simplify and create a calm and quiet environment
- Use scheduled toileting and prompted toileting for incontinence
- Use services of caregiver support groups

D. **Information on community resources**

- Patient and caregiver support and education: knowledge on cognitive impairment; caregiver education, respite care, day care, residential care.
- Home and environmental safety: fall and accidental injuries prevention, risk of wandering.
- Medical and legal decision making: future plans, financial and legal issues, advance directives, enduring powers of attorney, and guardianship.

*(For more information on the legal provision, please refer to point 6 of Annex 3)*

E. **Long term care plan and advanced care planning**

- It is important for the patients and their families to understand that dementia would progress to the final stage, when the patients lost their mobility, speech, eating, and daily functioning.
- The importance of long term care plan and advance care planning should be discussed at an earlier stage so as to allow the older adults and their families to decide the future plan e.g. addressing financial and legal issues, long term medical care, etc.
- The aim of management at the late stage will switch from cognition and functional maintenance, to provision of comfort to patient as much as possible.
- Clinicians may also be required by the patients and their families to explain the three legal provisions:
  - Enduring power of attorney: it is made at the time when an adult is mentally capable and can only be used to manage finance currently but is now being reviewed to expand the scope to personal care and medical decisions
  - Advance directive: it is made at the time when an adult is mental capable and takes charge of withholding or withdrawal of life-sustaining treatment of patients in terminal conditions
  - Guardianship order: it is used to promote the interests of a mental incapacitated person without any advance instruments and can only grant limited powers to a guardian, e.g. consent to treatment (but not refusal or withdrawal of treatment), decision on finance (restricted to the use of cash or savings within a monthly limit) and residence arrangement.

- Pain is a common symptom in older adults with dementia, which may be difficult to detect and
assess at late stage. Pain detection may rely on observation by caregivers and behavioural changes of patients. There are assessment tools which may help primary care providers to detect pain in older adults with advanced dementia. These tools are based on the observation of patient body language, non-verbal vocalisation and facial expression. Examples:

- PAINAD (Pain Assessment in Advanced Dementia)\(^73\);
- NOPPAIN (Non-Communicative Patient’s Pain Assessment Instrument)\(^74\).

While accurate prediction of life expectancy is not possible, there are features that may suggest that patient with dementia entered final stage.

The Gold Standard Framework (United Kingdom) considered the following conditions as indicators of patient entering the later stage (life expectancy of approximately 12 months)\(^75\):

- Triggers that indicate that someone is entering a later stage are:
  - Unable to walk without assistance, and
  - Urinary and faecal incontinence, and
  - No consistently meaningful conversation, and
  - Unable to do Activities of Daily Living (ADL) / Barthel score <3
  
  Plus, any of the following:
  - Weight loss
  - Urinary tract Infection
  - Severe pressures sores–stage three or four
  - Recurrent fever
  - Reduced oral intake
  - Aspiration pneumonia

### 4.2.6 Regular Follow up

- Follow up once every three months, or more frequently if necessary (e.g. initiation of medications), to review medical and social needs\(^58\):
- For the patient:
  - Review cognitive symptoms
  - Manage medical and psychiatric comorbidities, e.g. pain, incontinence.
  - Monitor the abilities in daily functions and review any new needs for care.
  - Assess safety risks and risks of harm to patient or caregivers.
  - Look for features of depression and BPSD.
  - Review and optimise medication regime.
- For the caregivers:
  - Identify and acknowledge psychological distress and impacts on caregivers.
  - Assess the caregivers’ needs e.g. employment, family life, social activities and health, to ensure necessary support and resources.
  - Assess for and treat underlying depression.
  - Provide resources on training and support to caregivers in taking care of the patient.
  - Provide information on day care centre, respite or residential care if needed.
4.2.7 Referral to specialist

Shared care with specialists for older adults at different stages of cognitive impairment:

- Mild cognitive impairment (MCI):
  - For early assessment / review with specialist if there is sudden deterioration

- Dementia:
  - Management difficulties such as:
    - Complicated cognitive and / or behavioural and psychological symptoms of dementia (BPSD)
    - Complicated care (medical / psychosocial) needs, as anticipated in advanced stage of dementia. In such situations, intense multi-disciplinary care or palliative care would be considered appropriate.

- Diagnostic difficulties: doubt about the diagnosis of dementia / cause of the cognitive impairment.
  - e.g. younger patients, i.e. onset of age (< 60 years old), patients with atypical features suggesting organic or secondary causes of cognitive impairment.
4.3 Further management for progressive cognitive decline

As the cognitive function declines, the older adults would present with symptoms that go beyond the capacity of primary care provider to manage. The symptoms could be cognitive, and/ or behavioural-psychological. Referral to specialists (geriatricians, psychiatrists or neurologists) for consideration of specific pharmacological treatment would be necessary. Respective further managements are highlighted below:

4.3.1 Further management for cognitive symptoms

A. Non-pharmacological

- Structured activity training at day and community centres
  - Public hospital services, non-government and private organizations provide structured activity training programmes to eligible patients at hospitals / community centres. See Annex 3 for relevant community resources.
  - Cognitive stimulation and physical exercise programme have been shown to benefit on cognition in patients with mild to moderate dementia. Cognitive stimulation programme may also improve self-reported quality of life. The training may include:
    - Introduce memory aids and strategies in daily living
    - Organise games and activities of cognitive stimulation
    - Promote brain health through lifestyle readjustment (also see chapter 4.4)
    - Practice body-mild interaction activities such as Qigong Baduanjin (八段錦)
    - Educate mental, breathing and muscle relaxation exercises
    - Participate in self-help activities such as use of free online games
    - Monitor patient’s progress and make timely referral to primary care doctor for situations requiring medical attention

B. Pharmacological

The current medications are mainly for symptomatic relief only in established dementia especially Alzheimer’s disease. Disease-modifying therapy for dementia is still under development. Unrealistic expectations of patient and family to the medications (e.g. hope for cure of Alzheimer’s disease by drugs) should be clarified before starting drug therapy.

1. Cholinesterase inhibitor (ChEI)
   - e.g. Donepezil, Rivastigmine, Galantamine
   - By inhibiting acetylcholinesterase in the synaptic cleft, they increase the availability of the acetylcholine in the brain, and may improve memory and cognition in Alzheimer’s disease.
   - ChEI is only proven useful in Alzheimer’s disease. In a Cochrane database systemic review, the three ChEIs are efficacious for Alzheimer’s disease. There is no evidence of any differences between them with respect to efficacy.
   - ChEI is not expected to be helpful in vascular cognitive impairment or mild cognitive impairment (MCI).
   - All AChEIs have similar side effects, such as nausea, vomiting, dizziness, diarrhoea, and insomnia.
Introducing AChEIs at low doses, titrate the dose gradually will improve tolerability.

- In addition, vagotonic effects can lead to bradycardia. Caution should be exercise when prescribing in patient with cardiac conduction abnormalities and in those taking bradycardic drugs, e.g. beta blockers.
- Treatment with ChEI could be considered in uncomplicated dementia patients in primary care settings.

2. N-methyl-D-aspartate (NMDA) receptor antagonist

- e.g. Memantine (approved for moderate to severe Alzheimer’s disease)
- Postulated to work by partially inhibiting the NMDA receptors, which may protect it from the neurotoxic effect of over-stimulation by glutamate.
- Reported adverse effects include dizziness, confusion, somnolence, hallucination and nausea.
- It may lower the threshold of seizure, so it should be used with caution in epileptic patients.

4.3.2 Further management for behavioural and psychological symptoms

- Behavioural and psychological symptoms of dementia (BPSD) are defined as signs and symptoms of disturbed perception, thought content, mood, or behaviour.
- BPSD are common. The Cache County study found that 97% of persons with dementia would exhibit one or a combination of symptoms during the course of illness, with the most common symptoms being apathy, depression and anxiety.
- BPSD can cause significant caregiver stress and are the leading causes for assisted living or nursing facility placement. These symptoms are often the reason for consultations as well.
- Non-pharmacological interventions are the first line treatment to manage behavioural and psychological symptoms. Pharmacological interventions can be considered if the symptoms persist and there is imminent risk of harm.
- Referral to psychiatric service is advisable if there is difficulty in the management particularly when pharmacological intervention is considered.

A. Non-pharmacological treatment of BPSD (Table 11)

1. Identify any medical problem responsible for triggering BPSD after a thorough assessment, such as physical illness, pain, infection, dehydration and constipation.
2. Medication review for potential interaction and adverse effects of the drugs.
3. Recognising other possible triggers, such as stress, mood disturbance, boredom, and change in environment or caregiver.
4. Consider soothing, calming or distracting strategies, such as suggesting them to do the activities they enjoy (e.g. going for a walk), especially when they are feeling agitated.
Table 11. Examples of non-pharmacological intervention for BPSD

<table>
<thead>
<tr>
<th>Modifiable factor</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient</strong></td>
<td></td>
</tr>
<tr>
<td>• Any unmet needs e.g. inadequate sleep, fear, hunger?</td>
<td>✓ Take care of the physical needs of person with dementia</td>
</tr>
<tr>
<td>• Any acute medical problem e.g. infection, pain?</td>
<td>✓ Identify and treat underlying causes</td>
</tr>
<tr>
<td>• Any sensory deficit e.g. visual and hearing impairment?</td>
<td>✓ Use of eyeglasses and hearing aids can optimize sensory function, which may improve quality of life and reduce distress</td>
</tr>
<tr>
<td><strong>Caregiver</strong></td>
<td></td>
</tr>
<tr>
<td>• Any caregiver stress or burden?</td>
<td>✓ Support caregivers and advise on stress reduction techniques</td>
</tr>
<tr>
<td></td>
<td>✓ Educate caregiver on understanding of dementia and behaviour</td>
</tr>
<tr>
<td></td>
<td>✓ Advise on communication techniques e.g. using a calm voice, do not use open ended questions, keep instruction/discussion simple</td>
</tr>
<tr>
<td></td>
<td>✓ Provide information on dementia and caregiver support group</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>• Over stimulating or under stimulating environment at home?</td>
<td>✓ Regulate the amount of stimulation e.g. reducing noise, limit the number of people at home</td>
</tr>
<tr>
<td>• Unsafe environment?</td>
<td>✓ Remove sharp objects from patient’s access</td>
</tr>
<tr>
<td>• Lack of activity?</td>
<td>✓ Engage the person in activities that match interests and capabilities</td>
</tr>
<tr>
<td>• Lack of structure or established routines</td>
<td>✓ Establish daily routines</td>
</tr>
<tr>
<td></td>
<td>✓ Allow enough time for activities</td>
</tr>
<tr>
<td></td>
<td>✓ Change of routine can trigger behaviours</td>
</tr>
</tbody>
</table>

**B. Pharmacological treatment of BPSD**

- Medications, e.g. antidepressant or antipsychotics, can be considered if:
  - Non-pharmacological approaches are insufficient or fail
  - Severe symptoms
  - The patient is at risk of self-harm or causing harms to others
- Referral to psychiatric service should be considered.
- Points to note on the use of antipsychotics:
  - Typical antipsychotic is usually not the first drug of choice. They are associated with extrapyramidal (e.g. Parkinsonism, dystonia, tardive dyskinesia) and anticholinergic effects (sedation, dry mouth, constipation, prolonged QT).
Atypical antipsychotics are commonly used. However they are associated with a 1.7 fold increase in mortality compared with placebo as announced by the U.S. Food and Drug Administration (FDA) in 2005\textsuperscript{82, 83}.

A black box warning that stated ‘Treatment of behaviour disorders in elderly patient with dementia with atypical antipsychotic medication is associated with increased mortality.’ was issued by FDA. Similar warning was announced by the FDA for typical antipsychotics in 2008\textsuperscript{84}.

A local prospective study on older patients in residential care homes has shown that, if the patients were under close monitoring by geriatricians and psycho-geriatricians, the continuous use of antipsychotics for BPSD did not increase mortality\textsuperscript{85}.

### 4.4 Prevention of cognitive impairment

- Primary care providers can promote brain health for older adults with or without cognitive complaints. Advices on reducing the risk of dementia, with respect to potentially modifiable risk factors of cognitive impairment (refer to chapter 1.3 and Annex 2), are shown in box 1:

<table>
<thead>
<tr>
<th>Box 1. Ten advices on enhancing cognitive reserve and reducing the risk of dementia\textsuperscript{86}</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quit smoking</td>
</tr>
<tr>
<td>2. Stay physically active</td>
</tr>
<tr>
<td>3. Eat healthy</td>
</tr>
<tr>
<td>4. Maintain an optimal body weight and waistline</td>
</tr>
<tr>
<td>5. Take part in intellectual and leisure activities</td>
</tr>
<tr>
<td>6. Stay socially active</td>
</tr>
<tr>
<td>7. Avoid head injury</td>
</tr>
<tr>
<td>8. Avoid excessive alcohol use</td>
</tr>
<tr>
<td>9. Keep blood pressure, blood sugar and blood cholesterol at optimal levels</td>
</tr>
<tr>
<td>10. Collaborate with care providers on the management of other medical conditions including heart diseases, stroke and depression</td>
</tr>
</tbody>
</table>

- Long-term use of benzodiazepines and other hypnotics should be discouraged.
- Practicing Tai Chi may help to preserve or enhance cognitive functions\textsuperscript{87, 88}.
- Early detection of cognitive impairment can help health care providers and the patients to intervene and manage promptly. The warning signs (see chapter 2.2, table 2) should be introduced and patients should be advised to seek medical attention promptly if any of these red flag signs happen.
Chapter 5: The journey of dementia care

Older adults with cognitive impairment due to Alzheimer’s disease usually follow a slowly deteriorating course and become increasingly functional dependent. The patients and caregivers are experiencing a “dementia journey” from the time of diagnosis to end of life. They will have changing needs at different stages.

Primary care providers can anticipate such changing needs during different stages, offer individualized and updated management plan to the older adults and their caregivers.

This journey of dementia care is shown in Figure 4.
Figure 4. Journey of dementia care, from diagnosis to end of life\textsuperscript{89-93}

**Patient**
- Presented with cognitive complaint
- Questions on dementia, stage and its subtype & subsequent management plans
- Problem in coping

**Caregiver**
- Fearful, uncertain about patient’s condition, diagnosis, & subsequent management plans

---

**Diagnosis**

**Mild Stage**
- Mild disorientation, forgetfulness, lost things
- Trouble with word finding, complex planning or multistep instructions
- Lost interest in hobbies & activities
- Social withdrawal; may be depressed/ anxious due to cognitive decline

**Caregiver**
- Need more time to take care patient

---

**Moderate Stage**
- ↑language and memory impairment
- Disorientation, difficult to recognise familiar people, maintain hygiene, IADLs; some trouble with basic ADLs
- BPSD e.g. agitation, depression
- May wander or get lost, leave stove on, succumb to scams

**Caregiver**
- ↓working/activities to provide care, ↑burden
- Frustration, depression, stress, poor sleep, anxiety, anger

---

**Severe Stage**
- Mark difficulty in speech, swallowing, recognising familiar people, basic ADLs
- Incontinence
- Gait impairment, falls, or even immobility
- BPSD e.g. agitation, delusion
- May need round the clock care

**Caregiver**
- Fatigue may be severe
- May feel guilt for institutionalisation
- Problems in coping with own health problems

---

**End of Life**
- May be mute & bedridden
- May have symptoms such as anorexia, agitation, restlessness, pain, dyspnoea, aspiration, pressure sores
- Requires complete dependence for care

**Caregiver**
- Significant burden of daily care
- Grief and/or relief at time of death

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**Patient characteristics and caregiver experience in different stages of dementia**

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**Possible interventions that can be provided by primary care provider**
- Timely assessment & investigations
- Consider referral to specialist for diagnosis, staging, and subsequent management
- Education on disease course, implication and encourage making plans ahead, advanced care planning including advance directive
- Give information on resources
- Follow up for on-going needs

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- Shared care with specialist
- Optimise patient’s cognitive skills and functional status
- Continue management on other chronic and or acute problems
- Monitor compliance & adverse drug effects
- Regular follow up for cognitive skills, ADLs and needs
- Facilitate understanding between patient and caregiver, support care

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- Shared care with specialist
- Check and advise on safety
- Assess and/or refer for BPSD
- Mobilise family & friends to provide support, discuss about next steps in care, e.g. hiring helper in the home, supervised care setting
- Refer caregiver support group
- Monitor caregiver for depression, fatigue

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- Deliver shared care with specialist
- Advise on care and avoid complications (e.g. safe feeding/ avoid choking, pressure sore)
- Assess and/or refer for BPSD
- Monitor physical and psychological problems of caregiver
- Encourage caregiver on support group, respite, scheduled time away, lifestyle and self-care

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- Liaise with secondary care for palliative care
- Follow the patient’s advance care plan/directives if any
- Education to caregiver on end of life care
- Refer to bereavement support group
- Follow up caregiver for bereavement process and mood problems

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Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings
Annex 1. Subtypes of dementia

**Alzheimer’s disease**
Alzheimer’s disease (AD) is the most common cause of dementia, accounting for nearly 65% of dementia cases of Chinese elderly in Hong Kong. Common pathological features of Alzheimer’s disease include excessive extra-neuronal accumulation of the β-amyloid peptide (Aβ), and intra-neuronal neurofibrillary tangles of hyperphosphorylated tau molecules. These abnormal protein accumulations will cause oxidative and inflammatory damage to the cells, resulting in synaptic dysfunction and neurodegeneration.

The course of AD is usually slow and progressive, with insidious onset. Symptoms include memory loss, progressive deterioration in the ability to perform basic activities of daily living (ADL), and behavioural changes, such as apathy, social withdrawal and behavioural disturbances.

**Vascular dementia**
Vascular dementia (VaD) is the second most common form and accounted for around 30% of dementia cases of Chinese elderly in Hong Kong. VaD is caused by cerebrovascular disease that reduces blood flow to the brain, either focal or diffuse, and causes cognitive decline. The three most common mechanisms of VaD are: diffuse multiple cortical infarcts, strategic single-infarct dementia, and small vessel disease.

The onset of disease may be abrupt or there may be periods of sudden decline followed by a relatively stable course (stepwise deterioration). Physical problems such as urinary incontinence, decreased mobility and balance problems are commonly seen in people with vascular dementia than in people with Alzheimer’s disease.

**Dementia with Lewy bodies**
Dementia with Lewy bodies (DLB) is associated with accumulation of alpha synuclein protein in the brain. DLB is characterized by progressive cognitive decline, fluctuation of attention from day-to-day, recurrent visual hallucinations that are well formed and detailed. About 50-80% of the patients have signs of parkinsonism such as tremor, rigidity, and slowness of movement and poverty of expression. DLB should be suspected when dementia occurs before, at the same time, or shortly after the onset of parkinsonism.

**Parkinson’s disease dementia**
Parkinson’s disease dementia (PDD) and DLB share many common pathological and clinical features. About 18-40% of patients with Parkinson’s disease have dementia. The temporal sequence of symptoms is most crucial in the differentiation between DLB and PDD. In general, Parkinson’s disease should exist at least 1 year prior to the onset of dementia for the diagnosis of PDD (the 1-year rule).

**Fronto-temporal dementia (Pick’s disease)**
In fronto-temporal dementia (FTD), changes in personality and behaviour such as disinhibition, lack of judgment, loss of social awareness and loss of insight, are much more common than memory problem.
Disturbance of mood, speech and continence are frequent. FTD can be divided into behavioural variant and language under DSM-5. Fronto-temporal dementia tends to occur at a younger age than Alzheimer’s disease, usually under the age of 65. The practical assessment of the frontal lobe function involves history taking, demonstration of frontal release reflexes (e.g. grasp, pout, palmomental reflexes) and simple bedside tests (e.g. on abstract thinking, fluency, etc.)\(^{31}\). MMSE is insensitive, whereas MoCA is sensitive in detecting frontal lobe dysfunction\(^{31}\).

**Mixed dementia**
Mixtures of two or more active dementia can co-exist in the same person, with one usually dominating. In the most common form of mixed dementia, the abnormal protein deposits associated with Alzheimer’s disease coexist with blood vessel problems linked to vascular dementia\(^{97}\).

**Others**
Dementia related to certain neurodegenerative disorders, e.g. Huntington’s disease, multiple sclerosis and infections e.g. Creutzfeldt-Jakob disease (CJD) and Acquired Immune Deficiency Syndrome (AIDS).
Annex 2. Risk factors for dementia

**Non-modifiable risk factors**

1. **Advancing age** is the strongest known risk factor for cognitive impairment\(^9^8\). Overseas and Chinese studies have shown that the risk of dementia increases with age across different ethnic groups\(^9^9\). After the age of 65, the rate of Alzheimer’s disease doubles every 5 years\(^1^0^0\).

2. **Family History.** The lifetime risk of dementia for people who have a parent or sibling with Alzheimer’s disease is about 20%, compared with 10% in the general population\(^1^0^1\).

3. **Genetics.** In familial early onset Alzheimer’s disease (under age 65, which is rare), there are mutations in one of the three known causative genes: the amyloid precursor protein gene (APP) on chromosome 21, the presenilin 1 gene (PSEN1) on chromosome 14 and the presenilin 2 gene (PSEN2) on chromosome 1\(^9^8,1^0^1,1^0^2\). In late-onset Alzheimer’s disease, the apolipoprotein-E (APOE) ε4 allele is the most recognised. The genotypes APOE ε2/ε4 or ε3/ε4 triples the risk, and the genotype APOE ε4/ε4 increases the risk by approximately 15-times\(^1^0^2\). However, up to 75% of people carrying one copy of the high-risk ε4 allele remain free of Alzheimer’s disease, and up to 50% of people with Alzheimer’s disease do not carry the high-risk ε4 allele\(^1^0^3\).

4. **Gender.** Prevalence of AD is higher for all females\(^1^7,1^0^4,1^0^5\), possibly due to historically lower education level in women\(^1^0^6\), longer lifespan, or reduction of oestrogen in postmenopausal women\(^1^0^4,1^0^7\).

**Modifiable risk factors**

Barnes and Yaffe\(^1^0^8\) suggested that 1.1-3.0 million cases of AD can be prevented worldwide through a 10-25% reduction in the seven modifiable risk factors, namely diabetes, mid-life hypertension, mid-life obesity, smoking, depression, low educational attainment and physical inactivity. To reduce the risk of dementia in older adults, primary care providers should identify these potentially modifiable risk factors and manage them accordingly.

A. **Lifestyle factors**

1. **Smoking.** Current smokers, compared to never smokers, have increased incidence of Alzheimer’s disease, vascular cognitive impairment, and any dementia by 79%, 78%, and 27% respectively\(^1^0^9\). Ex-smokers do not appear to be at increased risk\(^1^1^0\).

2. **Alcohol** and dementia seems to follow a U-shaped relationship\(^1^0^2,1^1^1\). Risk of cognitive impairment is higher in heavy drinkers (>50 units/week alcohol for men and >35 units/week for women), but lower in light and moderate drinkers\(^1^1^2\).

3. **Physical inactivity** increases the risk of dementia. Physical activity preserves cognitive function in older adults\(^9^9,1^1^3-1^1^5\). A systematic review of 21 cohort studies on physical activity and risk of dementia, cognitive impairment or cognitive decline found that high physical activity level, compared to low, is associated with approximately 42% reduced risk of dementia\(^1^1^6\). The protective effect may be the results of reducing vascular risks\(^9^9\), sustaining cerebral blood flow\(^1^1^7\), improving aerobic capacity and cerebral nutrient supply\(^1^1^8,1^1^9\), as well as increasing growth factors, especially brain derived neurotropic factor\(^1^2^0,1^2^1\).
B. Vascular risk factors

1. **Hypertension** in midlife is associated with late life dementia in cohort studies\(^{122-125}\), and raised systolic blood pressure (≥160mmHg) in mid-life have a 1.3 times higher odds of developing Alzheimer’s disease than those with normal systolic blood pressure\(^{126}\). Hypertension decreases the vascular integrity of the blood-brain barrier, leading to cell damage, reduction in neuronal or synaptic function, and cell death. It may also increase the accumulation of insoluble Aβ, contributing directly to AD pathology\(^{110}\).

2. **Diabetes mellitus.** Diabetes leads to micro-angiopathy, which would reduce cerebral perfusion, and results in lacunar infarcts\(^{100}\). Compared with those without diabetes, people with diabetes have increased risk of Alzheimer’s disease, vascular cognitive impairment, and any dementia by 46-56%, 127-148%, and 51-73% respectively\(^{127, 128}\).

3. **Overweight and obesity** are risk factors of Alzheimer’s disease, hyperinsulinaemia and diabetes\(^{129}\). The risk of Alzheimer’s disease and any dementia in late-life compared with people having normal body mass index (BMI) is 35% and 26% respectively for mid-life overweight, and 104% and 64% respectively for mid-life obesity\(^{130}\). Central obesity is also associated with greater dementia risk\(^{131-133}\).

4. **Stroke.** There are 10% of people develop new dementia soon after first stroke, and more than a third had dementia after recurrent stroke\(^{134}\). A history of stroke at any point in the past doubles the risk of dementia in the population aged over 65 years\(^{135}\).

C. Other factors

1. **Depression.** People with depression would have 66%, 89%, and 55% increased incidence of Alzheimer’s disease, vascular cognitive impairment, and any dementia respectively, compare with those who did not have depression\(^{136}\). Depression and cognitive disorders often co-existed and depression in late-life is associated with a significant risk of all-cause dementia\(^{137}\).

2. **Drugs.** Cohort study in Taiwan showed that long term use of hypnotics increases dementia risk by 2-fold, especially for patients aged 50 to 65 years\(^{138}\). Another cohort also showed an increased incidence of dementia with the use of benzodiazepines\(^{139}\).

3. **Education.** High education level seems to be a protective factor. Low educational attainment increases the risk by around 2.25 times\(^{140}\). A review also showed that people with low education level would have 80%, 32% and 59% increased risk of Alzheimer’s disease, non-Alzheimer’s disease and all dementia respectively, compared with people with high education level\(^{141}\).

4. **Head injury.** People having suffered traumatic head injury would have an 82% increased risk of Alzheimer’s disease than those without a history of head trauma with loss of consciousness\(^{142}\).
Annex 3. Useful resources

Disclaimers: The list below is not exhaustive. It does not constitute endorsement of any material at these websites, organisations, products or services. Fee may be required for some of the services listed. Readers are recommended to carefully evaluate the content and contact the respective organisations for updated information.

1. **Knowledge on cognitive impairment and caregiver education**
   - ADcarer.com [http://www.adcarer.com](http://www.adcarer.com)
   - Ginkgo Web-based Resource Centre for Dementia Care, the Hong Kong Polytechnic University [http://www.ginkgogroup.org](http://www.ginkgogroup.org)
   - Institute of Mental Health, Castle Peak Hospital [http://www3.ha.org.hk/cph/imh](http://www3.ha.org.hk/cph/imh)
   - Hong Kong Alzheimer’s Disease Association [http://www.hkada.org.hk](http://www.hkada.org.hk)
   - Jockey Club Centre for Positive Ageing [http://www.jccpa.org.hk](http://www.jccpa.org.hk)

2. **Cognitive training resources**
   (a) **Community based services**
   - Hong Kong Alzheimer’s Disease Association [http://www.hkada.org.hk](http://www.hkada.org.hk)
   - Jockey Club Centre for Positive Ageing [http://www.jccpa.org.hk](http://www.jccpa.org.hk)
   - Kin Chi Dementia Care Support Service Centre, St. James’ Settlement [http://dementia.sjs.org.hk](http://dementia.sjs.org.hk)
   - Yan Chai Hospital Yim Tsui Yuk Shan Active Mind Centre [http://www.e123.hk/site/ytys/home](http://www.e123.hk/site/ytys/home)

   (b) **Web-based or mobile device apps**
   - Love Your Brain, the Hong Kong Society for the Aged (web-based) [http://www.loveyourbrain.org.hk](http://www.loveyourbrain.org.hk)
   - C-Rehab 電腦復康訓練資源站耆樂區 by Association for Engineering and Medical Volunteer Services (web-based) [http://crehab.emv.org.hk/c5-training-list-ezone.php](http://crehab.emv.org.hk/c5-training-list-ezone.php)

3. **Contact information for social worker services**
Module on Cognitive Impairment

### 4. Day care, home care or respite care

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<tr>
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<td>Total Care, Haven of Hope Christian Service</td>
<td><a href="http://www.totalcare.org.hk">http://www.totalcare.org.hk</a></td>
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<tr>
<td>The Hong Kong Society for Rehabilitation</td>
<td><a href="http://www.rehabssociety.org.hk">http://www.rehabssociety.org.hk</a></td>
</tr>
<tr>
<td>Yan Chai Hospital Yim Tsui Yuk Shan Active Mind Centre</td>
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### 5. Residential care and financial assistance

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### 6. Safety and prevention of missing

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<tr>
<td>Joyful Return, the Hong Kong Society for the Aged</td>
<td><a href="http://www.e1668.hk">http://www.e1668.hk</a></td>
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<tr>
<td>Mobile Link Service, Senior Citizen Home Safety Association</td>
<td><a href="https://www.schsa.org.hk">https://www.schsa.org.hk</a></td>
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### 7. Legal information

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<td>Part II Management of property and affairs of mentally incapacitated persons</td>
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<td>Part IVB Guardianship</td>
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<tr>
<td>Part IVC Medical and dental treatment</td>
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<tr>
<td>Senior CLIC, Law and Technology Centre, The University of Hong Kong</td>
<td><a href="http://www.s100.hk">http://www.s100.hk</a></td>
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<tr>
<td>Guardianship Board</td>
<td><a href="http://www.adultguardianship.org.hk">http://www.adultguardianship.org.hk</a></td>
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### 8. Bereavement support

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<td>Comfort Care Concern Group</td>
<td><a href="http://www.ccccg.org.hk">http://www.ccccg.org.hk</a></td>
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<tr>
<td>Society for the Promotion of Hospice Care</td>
<td><a href="http://www2.hospicecare.org.hk">http://www2.hospicecare.org.hk</a></td>
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References:


