CHAPTER II
LITERATURE REVIEW

This study aimed to study prevalence and factors associated with dementia. The literature review was presented following:

2.1 Dementia
2.2 Epidemiology of dementia
2.3 Impact of dementia
2.4 Early dementia detection
2.5 The screening test for dementia
2.6 Dementia screening test
2.7 Related literatures

2.1 Dementia

2.1.1 Definition of dementia

Dementia is a disease consisting in a paralysis of the spirit characterized by abolition of the reasoning faculty. It differs from fatuitas, morosis, stultitia and stoliditas in that in the latter there is a weakening of understanding and memory; and from delirium which is a temporary impairment in the exercise of the said function.(4)

The ICD-10 criteria(World health organization,1992) described dementia as ‘a syndrome due to disease of the brain, usually of a chronic or progressive nature in which there is 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 controls, social behavior or motivation (5).

The DSM-IV (American Psychiatric Association, 1994) (20) definition incorporates similar elements, emphasizing the necessity for deteriorating performance of activities of daily living (ADLs). A number of key elements exist across all diagnostic criteria, mainly that dementia is a brain disease, tends to be progressive and globally affects higher cognitive functions as well as emotional and social functioning.

In this study, dementia is a disease of brain syndrome, worsening performance of activities of daily living (ADLs). Many numbers of patients with dementia might be got worsening memory. Someone of them group started to talk and ask as the same but someone had to worsening of cognitive function with uncontrolled emotion or behavior change.

2.1.2 Diagnosis of dementia

The most criteria for diagnosis to dementia was the DSM-V (8). It definition dementia as a worsening memory and other cognitive function at least one of four clinical diagnosis.

- language
- apraxia
- agnosia
- executive function

By absence of delirium or other clinical features consistent with physical abnormalities or chemical abnormalities Dementia established by clinical examinations, laboratory examinations, radiation examination and confirmed by neuropsychological test

2.1.3 Cause of dementia

There are two main cause of dementia (7)

1) Cause by Alzheimer disease

2) Cause by diseases or physical abnormalities that affect to brain function as well as vascular dementia or nutrition deficiency.

2.1.4 Differentia diagnosis of dementia subtypes (6, 9)

There are many type of dementia and they affect different mental abilities and progress at different rates.

1) The most common type of dementia is Alzheimer's disease. The study of Cummings and Benson (6) in 1992 found that 60% of people who had dementia were Alzheimer disease and is much more common among older people. People with Alzheimer's may wander and can get how to perform basic activities of daily living such as dressing, washing, eating a meal, or using the toilet.

Stage of Alzheimer disease

Stage 1 No cognitive impairment

Unimpaired individuals experience no memory problems and none are evident for a health care professional during a medical interview.

Stage 2 Very mild cognitive decline

Individuals feel as if they have memory lapses, especially in forgetting familiar words or names, location of keys, eyeglasses or other everyday objects.

Stage 3 Mild cognitive decline

Friends, family begin to notice deficiencies. Problems with memory or concentration may be measurable in clinical testing or discernible during a detailed medical interview. Common difficulties include word/name–finding problems, decreased ability to remember names when introduced to new people, retaining little from a reading passage, losing or misplacing valuable objects; decline in ability to plan or organize.

Stage 4 Moderate cognitive decline

At this stage a medical interview detects clear-cut deficiencies in decreased knowledge of recent or current events; impaired ability to perform mental arithmetic for example (to count backward from 100 by 7s), reduced memory of personal history.

Stage 5 Moderately severe cognitive decline

Major gaps in memory and deficits in cognitive function emerge. Some assistance with day-to-day activities becomes essential. At this stage, individuals may be unable during a medical interview to recall their current address, telephone number and other important details; become confused about where they are or about the date, day of the week, or season; have trouble with less challenging mental arithmetic (count backward from 40 by 4s); need help choosing proper clothing

for the season; usually retain substantial knowledge about themselves and require no assistance with eating or using the toilet.

Stage 6 Severe cognitive decline

Memory difficulties continue to worsen, significant personality changes may emerge and affected individuals need extensive help with customary daily activities. At this stage, individuals may lose most awareness of recent experiences and events as well ad of their surroundings; recollect their personal history imperfectly, although they generally recall their own name; occasionally forget the name of their spouse or primary care giver but generally can distinguish familiar from unfamiliar faces; need help getting dressed properly; without supervision, may make such errors as putting pyjamas over daytime clothes or shoes on wrong foot; experience disruption of their normal sleep/waking cycle; need help handling details of toileting (flushing toilet, wiping and disposing of tissue properly); have increasing episodes of urinary or fecal incontinence; experience significant personality changes and behavior symptoms (for example, believing that their caregiver is an imposter); hallucinations (seeing or hearing things that are not really there); or compulsive, repetitive behaviors such as hand-wringing or tissue shredding.

Stage 7 Severe cognitive decline

This is the final stage of the disease when individuals lose the ability to respond to their environment, the ability to speak and, ultimately, the ability to control movement. Frequently individuals lose their capacity for recognizable speech, although words or phrases may occasionally be uttered. Individuals need help with eating and toileting and there is general incontinence of urine. Individuals lose the ability to walk without assistance, then the ability to sit without support, the ability to smile, and the ability to hold their head up. Reflexes become abnormal and muscles grow rigid. Swallowing is impaired.

2) Vascular dementia (VaD) probably the second most common dementia, accounting for 10-12 percent of dementia cases

3) Dementia with Lewy bodies and Pakinson's disease dementia

4) Frontotemporallabar degeneration

5) Other dementia in human immunodeficiency virus disease and dementia in other specified disease classified elsewhere (which incorporates a list

including a variety of conditions such as epilepsy, hypothyroidism, intoxications, multiple sclerosis, neurosyphilis, niacin deficiency,, polyarthritis nodusa and vitamin B_{12}). For specific systemic disease, diagnosis can be more difficult than it first appear, as often the severity of cognitive impairment can be exacerbrated without the underlying condition being the predominant cause of the dementia.

2.1.5 Stage of dementia (21)

1) Early stage dementia- memory strategies, In early dementia the most significant cognitive impairment is typically in memory function. Impairment of new learning is most prominent, including acquisition and retention of new information. At this stage, people with dementia may forget what you have just told them, forget where they have put something, repeat the same thing as if they have not said it before or have difficulty learning how to use something.

2) Moderate dementia – working with carers, As dementia progress, people can experience increasing memory loss, language difficulties and specific disorder such as apraxia. They could be living in their own home or supported accommodation. By this stage the person's insight into their cognitive losses usually has diminished.

3) Later stage dementia – environmental adaptation, In the later stage of dementia, people experience marked confusion and widespread cognitive disturbance. Most people with advanced dementia are living in supported accommodation with professional carers. Strategies for management of cognitive impairment need to be focused more on the environment in which the person is living. Adaptations are made to the environment rather than expecting the individual to change.

2.1.6 Treatment for dementia

1) Drug treatment follow

(1) Cholinesterase inhibitors are drugs to stop or inhibit enzymes from breaking down acetylcholine when it travels from one cell to another, may improvement of memory of patient. Three drugs in a class called cholinesterase inhibitors are Donepezil, Galantamine and Rivastigmine. This drugs

were guarantee by Food and Drug Administration (FDA or USFDA) (9). As summarized by Cummimg (21). There is evidence that cholinergic agents, especially cholinesterase inhibitors, may have moderate clinically relevant psychotropic effects in some patient with dementia. For most part, the studies were not designed to address behavioural outcome as the primary goal. Cummings (23) conducted an exploratory analysis of data pertaining to the efficacy of donepezil treatment of patients with severe behavioral disturbances. The results of these analyses suggest that donepezil reduces behavioural symptoms, particularly mood disturbances and delusions, in patients with AD with relatively severe psychopathology.

Cholinergic therapies is high cost. We had to paid about 120-150 bath/day. Some people who take cholinesterase inhibitors experience side-effects. The most likely side effects are nausea, vomiting, abdominal pain and loss of appetite. The current evidence found that Cholinesterase inhibitors for treatment in people with mild to moderate dementia (9).

(2) NMDA receptor antagonist is Memantine. Memantine helps to stop glutamate from harming the brain. This can help reduce memory loss and thinking problems. A neurotransmitter (a brain chemical) called glutamate helps with memory and learning. But in large amounts, glutamate is toxic to the brain, and it may kill brain cells. Having too much glutamate might be one reason why people with Alzheimer's disease have problems with learning and remembering new things. The current evidence. Memantine is used to treat moderate to severe Alzheimer's disease. Some people with moderate to severe Alzheimer's disease try combination therapy, which is taking memantine with a Acetylcholine esterase inhibitor).(24,25,26)

2) Other drugs such as

- Vitamin E (27)
- Omega three (28)
- Gingko (29, 30, 31)
- Lipid lowering drugs (32)
- Hormone replacement therapy (33)

3) Non-pharmacological therapies

Cognitive training should to use for patient with mild to moderate dementia. The study found a significant difference between intervention (music therapy and painting therapy) and control group. The patients with moderated apathy are improvement trend in the apathy (34). The systematic review showed that Nonpharmacological therapies (NPTs) could improved the quality of life of people with Alzheimer's disease (AD) and their carers. It was achieved for institutionalization delay and improvement in cognition, activities of daily living, behavior and mood (35)

4) Other therapies (35)

People with dementia might got insomnia, paranoia or hallucinations. Low dose of antipsychotic drugs could helped reduced these symptoms

2.2 Epidemiology of Dementia

According to a Delphi consensus study, it is estimated that the number of Dementia patient more than 24 million people in the world and number of new dementia patient more than 4 million per year. Although, it expected to increased the number of dementia patient more than 81 million people in 2040(3).

Fourth National Health Examination Survey 2008 (NHES 4)(12) reported that increased from 3.3 percent prevalence of dementia patient in 1996 to 12.3 percent in 2008(17)

Second National Health Examination Survey 1996 (NHES 2)was used Chula Mental Test (CMT) to study the prevalence of global cognitive impairment and estimated the prevalence of dementia in elderly. This surveys reported 3.3 percent prevalence of dementia patient. Age, education, and address are exposure in this survey (12).

Fourth National Health Examination Survey 2008 (NHES 4) was used The Mini-Mental State Examination (MMSE-Thai 2002). This survey included 9,210 persons who >60 years old. The study found that the prevalence of dementia in men was 12.3% and 8.9% in women. The prevalence of dementia in women higher than man for every age group. The prevalence of dementia showed an increasing trend by

age, being lowest for 60-69 year olds and highest for >80 year olds (22.1% for men, 40.0 for women).When consider follow area in this survey found that the prevalence of dementia in non-municipality area (13.6%) higher than in municipality area (9.7%). This survey found the prevalence dementia patient in the south of Thailand (19.8%), north of Thailand (12.5%) and central of Thailand (11.2%) (17).

Lampang province on the northern part, it had elderly people increase from 12.59 per cent in 1999 to 15.47 per cent in 2010(18). The survey on elder population in Maeprik district found that 1,139 elderly people and elders who were dementia about 15 percent (19).

2.3 Impact of Dementia

The number of dementia patient is increasing every year (3). According to the Global Burden of Disease (GBD) estimates from the 2003 World Health Report, dementia contributed 11.2% of the YLD in people aged 60 years and older. This is more than stroke (9.5%), musculoskeletal disorders (8.9%), cardiovascular disease (5.0%), and all forms of cancer (2.4%).(36) Care giver of people with dementia suggest the need to structure activities and interventions, maximizing the potential of each person, encouraging abilities, and preventing progressive deterioration of elderly people's skills in order to improve their independence and quality of life (37).

Family is the most important informal care for people with dementia. Positive reasons include a sense of love or reciprocity, spiritual fulfillment and feelings of mastery and accomplishment (38).

The care that informal carers provide often comes at a considerable cost to their own health and well-being. For every PWD, there are several close family members deeply affected by emotional, physical, social and financial costs associated with caregiving (39,40,41).Caregiving in general is associated with increased stress and burden, and contributes to psychological morbidity, particularly depression and anxiety, and poorer physical health (42).

Dementia caregiving has been associated with higher risk of physical health problem, including cardiovascular disease, slower wound healing, higher

metabolic risk, higher level of chronic conditions (such as diabetes, arthritis, ulcers, and anemia), greater use of medications and health services, lower immunity and poorer immune response to vaccine (6)

In one study, half the carers had contact with someone outside their household once per week or less and 13percent had no personal contacts outside the home in the previous 2 week (43).

The worldwide direct costs of dementia were estimated in 2005 to be $US210 billion. Direct costs include medical consultations, investigations, pharmaceuticals, provision of personal and nursing care and residential care in the later stage (44).

2.4 Early Dementia Detection

Some evidences were found that dementia could be delayed and had a longer good quality of life if it was treated in the early stage of disease but evidence of their beneficial is insufficient to recommend for general people or elderly people (16).The good evidence that some screening tests have good sensitivity but only fair specificity in detecting cognitive impairment and dementia (45). Early recognition of cognitive impairment, in addition to helping make diagnostic and treatment decisions, allows clinicians to anticipate problems the patient may have in understanding and adhering to recommended therapy. This information may also be useful to the patient's caregivers and family members in helping to anticipate and plan for future problems that may develop as a result of progression of cognitive impairment (46).

2.5 The Screening Test for Dementia

Screening of disease is a strategy used in a population to identify an unrecognized disease. Those who may have the disease can undergo further diagnostic. The early treatment provided for people who had disease after diagnostic (13).

2.6 Dementia Screening Test

Since this study would use the Mini-Mental State Examination (MMSE-Thai 2002) and the modified informant questionnaire on cognitive decline in the elderly (modified IQCODE), this review included only these two tests**.**

The study by Fowler NR et al (47) found that perceived benefit of screening are associated with acceptance of dementia screening in primary care. However, it did not suggested which specially screening instrument for used.

2.6.1 The Mini-Mental State Examination (MMSE-Thai 2002) (Appendix B)

The Mini-Mental Status Examination (MMSE) (9, 15) was the best-studied instrument for screening for cognitive impairment. When the MMSE is used to screen unselected patients, the predictive value of a positive result is only fair. The accuracy of the MMSE depends on a person's age and educational level: Using an arbitrary cut-point may potentially lead to more false-positives among older people with lower educational levels, and more false-negatives among younger people with higher educational levels.

Moon-Doo Kim, et al (41) used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) conducted on Jeju Island. This program included 1,708 residents >65 years old who were receiving financial assistance on the MMSE-KC. The prevalence of dementia in this group was 20.5%. Multivariate logistic regression analysis revealed that the following factors were statistically significantly associated with dementia: age of 80 or older, no education, nursing home residence, and depression.

This paper presents a sample of 75 patients aged 65 or over, of both sexes, diagnosed with mental illness using ICD-9. The main diagnoses were depression (36%) and dementia (29.3%). Most patients had cognitive impairment (52%) using MMSE. The majority of the carers of these patients had global needs (met and unmet) in terms of psychological distress. Findings also reveal that a low level of functionality is associated with dementia diagnoses. The association analyses suggest that dementia is an important determinant of the functional status and needs (37).

Boonchai Nawamongkolwattanaet, al (42) studied with the prevalence and socioeconomic factors related to cognitive impairment among elderly Thai people. Participants were 3,441 elderly Thai people (male=1,702 and female=1,739) in four regions of Thailand including Bangkok. Data collection was gathered by two steps. The first step, the Mini International Neuropsychiatric Structure Interview (M.I.N.I.) was used for screening a current depressive disorder. The last step, participants who had suffered from the depressive disorder were excluded from the study after that the subjects were assessed by the Mini-Mental State Examination (MMSE-Thai 2002).

Plastino M, et al (48) studied with 104 patients with mild-to-moderate AD and DM-2. Cognitive functions were assessed by the Mini Mental State Examination (MMSE) and the Clinician's Global Impression (CGI), with a follow-up of 12 months. At the end of the study, the MMSE scores showed a significant worsening in 56.5% patients of group A and in 23.2% patients of group B, compared to baseline MMSE scores (P=.001). This study suggests that insulinic therapy could be effective in slowing cognitive decline in patients with AD.

A cross-sectional study was conducted among participants aged 50 and over in an urban community. Subjects were 1:1 matched for age and gender (diabetes group (n = 497) versus non-diabetes group (n = 497)). Each subject was interviewed for dementia and related risk factors. Fasting blood samples were drawn for glucose and APOE. Subjects were screened using the Mini Mental State Examination (MMSE). This study showed that the prevalence of dementia was significantly higher in diabetics than non-diabetics. APOE ε4 further enhanced the risk (49).

MMSE-Thai 2002 was assessed in four regions of Thailand (50). The study aimed to find the best cutoff point to minimize the limitations of MMSE for screening dementia among persons who had difference education levels. It was found that there was there cutoff point for screening dementia among those who were uneducated, completed primary school and completed secondary school. The cutoff point of 14 was used for uneducated person yielded 35.4% sensitivity and 81.1% specificity. Cutoff point of 17 was used for those who completed primary school yielded 56.6% sensitivity and 93.8% specificity. For those who completed secondary school, cutoff point of 22 gave 92% sensitivity and 92.6% specificity. It was expected that the different cutoff points would be more appropriate for people with difference education levels.

2.6.2 The modified informant questionnaire on cognitive decline in the elderly (modified IQCODE) (Appendix C)

The modified IQCODE may be used as an alternative screening test for dementia in Thailand with acceptable sensitivity and specificity. The optimal cutoff score for the modified IQCODE was 3.33, (sensitivity95% and specificity 89%). The positive and negative predictive values and accuracy were 90, 95, and 92.5%, respectively. The modified IQCODE items showed high internal consistency. The modified IQCODE scores associated with elderly persons' age, but not with their gender or educational level. In addition, the modified IQCODE (short version) consisted of 8 items with validity equal to the full version (16).

2.7 Related literatures

2.7.1 Epidemiology of dementia

It was examine the prevalence and correlates of cognitive impairment (CI) in adults over 50 years old attending primary care centers with complaints of memory failure. A sample of 580 individuals aged 50+ years with no previous diagnosis of dementia was assessed by use of the Mini Mental State Examination, the Cambridge Cognitive Assessment-Revised and the California Verbal Learning Test - to evaluate The prevalence of CI was 46.20%(51)

Afgin AE, et al (52) studied in Arab populations 944 peoples. In a door-to-door study of all residents aged ≥ 65 years in Wadi-Ara, an Arab community in northern Israel. Subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). An unusually high prevalence of MCI (32.1%) and prevalence of AD (9.8%)were observed.

Moon-Doo Kim, et al (41) used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) conducted on Jeju Island. This program included 1,708 residents >65 years old who were receiving financial assistance on the MMSE-KC. The prevalence of dementia in this group was 20.5%.

2.7.2 Risk Factors

1) Gender

Juncos-Rabadan O, et al (51) found the prevalence of cognitive impairment (CI) was 46.20% and positive associations were found for age, gender, level of education, subjective memory complaints, instrumental activities of daily living, reading habits and frequency of leisure activities. In the logistic regression, modelled CI was associated with gender (49.12% women, 39.66% men).

Afgin AE, et al (52) studied in Arab populations 944 peoples. The study collected data by a door-to-door study of all residents aged ≥ 65 years in Wadi-Ara, an Arab community in northern Israel. Subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). Female genders ($p < 0.0001$) was significant predictors of AD.

In summary, female might be associated with dementia.

2) Age

Moon-Doo Kim et al (41) used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) conducted on Jeju Island. The objective of this study was investigated the prevalence and factors correlates with dementia. The program included all residents >65 years old who were receiving financial assistance. Multivariate logistic regression analysis revealed that the age factors statistically significantly associated with dementia was age of 80 or older. The study present significant of study subjects who had age 80-84 years old would have chance of being dementia than who had age less than 80 years old 2.132 time (95%CI: 1.16-3.91) and study subjects who had age >85 years old would have chance of being dementia than who had age less than 80 years old 1.963 time (95%CI 1.07-3.62).

There was studied in Arab populations 944 peoples. The study collected data by a door-to-door study of all residents aged ≥ 65 years in Wadi-Ara, an Arab community in northern Israel. Subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). Age was significant predictors and increased the risk of MCI and AD (52).

Boonchai Nawamongkolwattana, et al (43) studied with the prevalence and socioeconomic factors related to cognitive impairment among elderly Thai people. Participants were 3,441 elderly Thai people (male = 1,702 and female = 1,739) in four regions of Thailand including Bangkok. Data collection was gathered by two steps. The first step, the Mini International Neuropsychiatric Structure Interview (M.I.N.I.) was used for screening a current depressive disorder. The last step, participants who had suffered from the depressive disorder were excluded form the study after that the subjects were assessed by the Mini-Mental State Examination (MMSE-Thai2002). The factors associated with cognitive impairment in the elderly were age more than 80 years old which have to risk more 4.24 times than the ageing had 60-69 years.

In summary, there had a close evidence of an association between age and dementia; especially, age > 80 years old tended to associate with dementia.

3) Education

Moon-Doo Kim, et al (41) used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) conducted on Jeju Island. This program included 1,708 residents >65 years old who were receiving financial assistance on the MMSE-KC. Those in the no-education group (OR=2.621, 95% CI 1.606-4.277) were more likely to have dementia than those with 7 years education or more.

There was studied in Arab populations 944 peoples. The study collect data by a door-to-door study of all residents aged ≥ 65 years in Wadi-Ara, an Arab community in northern Israel. Subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). Who had no schooling was significant increased the risk of MCI and AD (52).

Several cross-sectional studies found an association between Alzheimer's disease (AD) and limited educational experience. Five hundred and ninety three subjects who wasnondemented individuals aged 60 years or older who were listed in a registry of individuals at risk for dementia in North Manhattan, NY, were identified and followed up. The risk of dementia was increased in subjects with either low education (OR = 2.02, 95% Cl 1.33 to 3.06) (51).

In summary, education level might be associated with dementia.

4) Marital status

BoonchaiNawamongkolwattanaet, al (42) studied with the prevalence and socioeconomic factors related to cognitive impairment among elderly Thai people. Participants were 3,441 elderly Thai people (male=1,702 and female=1,739) in four regions of Thailand including Bangkok. Data collection was gathered by two steps. The first step, the Mini International Neuropsychiatric Structure Interview (M.I.N.I.) was used for screening a current depressive disorder. The last step, participants who had suffered from the depressive disorder were excluded form the study after that the subjects were assessed by the Mini-Mental State Examination (MMSE-Thai2002). The aged over 60 who were marital statuses with widow divorced or separated had been greater risk 1.75 times than who were got married.

In summary, widow divorced or separated might be associated with dementia.

5) Income

Several cross-sectional studies found an association between Alzheimer's disease (AD) and limited educational experience. A total of 593who was nondemented individuals aged 60 years or older who were listed in a registry of individuals at risk for dementia in North Manhattan, NY, were identified and followed up. Risk was greatest for subjects with low life-time occupational attainment (RR, 2.87; 95% Cl, 1.32 to 3.84) (53).

Evan et al (54) studied an averaged observation of 4.3 years. A stratified random sample of 642 community residents 65 years of age and older who were free of Alzheimer disease (AD) D at baseline. The study found who had lower socioeconomic status predicted risk of developed incident AD.

In summary, there had evidence of an association between income and dementia; especially, low income tended to associate with dementia.

6) Occupational

Krap et al (55) studied in 931 non demented subjects, aged older than 75 years old from the Kungsholmen Project, Stockholm, examined twice over 6 years. This study found lower risk of dementia was associated with complexity of work with people (RR= 0.88, 95% CI 0.80-0.97) and when adjusting for education led to similar results, although no longer statistically significant. Further, the highest degrees of complexity of work with data that involves analyzing, coordinating, and synthesizing data were associated with lower dementia risk even among lower educated subjects (relative risk: 0.52, 95% CI: 0.29-0.95) (55).

In summary, occupational tended to associate with dementia.

7) Daily activity level

Nihon Hoigaku Zasshi studied in 800 Japanese who were road traffic victims. The study found that logistic regression was used to calculate the risk of dementia caused by bone fractures after adjusting for age and gender. The risk of dementia due to bone fractures was influenced by the number of the long fractured bones, a high age group, a lower ADL, and a past history of dementia. Thus, we speculate that traumatic dementia based on bone fractures may occur (56).

In summary who was a lower daily activity level tended to associate with dementia.

8) Life crisis event

It was (57) examined the association of midlife report of crisis following parental death (CFPD) during childhood and adolescence, with dementia at old age. The study consisted a total of 9362 male participants of the Israel Ischemic Heart disease (IIHD) study were asked whether they have experienced CFPD (paternal or maternal) during the following ages: 0-6. 7-12. 13-18 or >18 years. The result found odds for dementia relative to individuals who reported crisis following paternal parental death (CFPR-P) at the age of 18 and above, were 3.06(95%CI 1.42–6.61), 2.15 (95% CI 0.87-5.31) and 2.35 (95%CI 1.05-5.28) for those who reported CFPD-P at the ages of 0-6, 7-12 and 13-18 respectively. Odds for dementia were 0.60 (95% CI0.32-1.11) for participants who reported CFPD-P at ages of 18 and above, compared

toparticipants who did not report such a crisis. Similar results were obtained for the association ofcrisis reported following maternal parental death (CFPD-M) at different age groups and dementia.

It was (58) found independent stressful life events were significantly associated with onsets of depression, when level of threat was controlled, theassociation was significantly stronger for dependent events. The odds ratio for onset of majordepression in the month of a stressful life event was 5.64 in all subjects, 4.52 within dizygoticpairs, and 3.58 within monozygotic pairs.

Devanand DP et al (59) studied with 1070 elderly individuals, aged 60 years or older, were identified as part of a registry for dementia in the Washington Heights community of North Manhattan, NY. The study found that depressed mood was associated with an increased risk of incident dementia (relative risk, 2.94; 95% confidence interval, 1.76 to 4.91; $P < .001$)

In summary, the elderly who had history of life crisis tended to associate with dementia.

9) Leisure activities

Scarmeas et al (60) studied in a total of 1,772nondemented individuals aged 65 years or older, living in northern Manhattan, New York, were identified and followed longitudinally in a community-based cohort. The risk of dementia was decreased in subjects with high leisure activities (RR, 0.62; 95% CI 0.46 to 0.83).

The study of Karp et al (61) was consisted of 776 nondemented subjects, aged 75 years and above, living in Stockholm, Sweden, who were still nondemented after 3 years and were followed for 3 more years to detect incident dementia cases. The most beneficial effect was present for subjects with high scores in all or in two of the components (RR of dementia = 0.53; 95% CI: 0.36-0.78) (60).

Crooks et al (62) examined whether social networks had a protective association with incidence of dementia among elderly women. The study population consisted 2249 members of a health maintenance organization who were 78 years or older, were classified as free of dementia in 2001, and had completed at least 1 follow-up interview in 2002 through 2005.This study identified 268 incident

cases of dementia during follow-up. Compared with women with smaller social networks, the adjusted hazard ratio for incident dementia in women with larger social networks was 0.74 (95% confidence interval=0.57, 0.97).

In summary, the elderly people who had leisure activities tended to associate with prevention dementia.

10) Family member had history of dementia

The canadian study of health and aging (63) studied the associated between risk factors and Alzheimer disease in 10 Canadian provinces. The study found family history of dementia was significantly elevated (OR=2.62; 95% CI 1.53 - 4.51) and increased with the number of relatives with dementia.

In summary, elder who had a family member with a history of dementia tended to associate with dementia.

11) Living arrangement

Wilson et al (64) studied with 792 elderly people in the United States by follow-up 4 years in-home. The study population consisted823olders persons who freed of dementia at enrollment were recruited from senior citizen facilities in and around Chicago. A person with a high degree of loneliness (score 3.2, 90th percentile) was about 2.1 times more likely to develop clinical Alzheimer disease (AD) compared with a person who had low degree of loneliness.

In summary, the elderly who live alone tended to associate with dementia.

12) Caregiver

The study of Yaffe et al (65) consisted a 2,509 well-functioning black and white elders enrolled in a prospective study. Cognitive function was measured using the Modified Mini-Mental State Examination. The study found who did not had a caregiver associated with major cognitive decline compared to minor cognitive decline (OR = 1.22, 95% CI 0.94–1.58) (62).

In summary, the elderly who did not had enough take care from caregiver tended to associate with dementia.

13) Smoking

Peters et al (66) was carried out using different search and inclusion criteria, database selection and more recent publications, twenty-eight publications with particularly aged 65 and over. The review found a significantly increased risk of Alzheimer's disease with current smoking and a likely but not significantly increased risk of vascular dementia, dementia unspecified and cognitive decline.

Aggarwal et al (67) studied the relationship between smoking status and incident Alzheimer's disease (AD). The study subject was 1,064 persons in Chicago. The study found current smoking status was associated with increased risk of incident AD (OR = 3.4, 95% CI = 1.4-8.0) compared to persons who never smoked.

Juan Deng et al (68) studied in 2,820 elderly people who aged 60 years old and over from six communities of Chongqing. Dementia was diagnosed with MMSE (Mini-Mental State Examination) and DSM-III-R (Diagnostic and Statistical Manual of Mental Disorders). Compared with never smokers, current smokers had an increased risk of Alzheimer's disease (RR = 2.72; 95% CI =1.63–5.42) and vascular dementia (RR = 1.98; 95% CI =1.53–3.12) adjusting for age, sex, education, blood pressure, and alcohol intake. Compared with light smokers, the adjusted risk of Alzheimer's disease was significantly increased among smokers with a medium level of exposure (RR = 2.56; 95% CI = 1.65–5.52), with an even higher risk of Alzheimer's disease in the heavy smoking group (RR = 3.03; 95% CI = 1.25–4.02).

Rusanen (69) consisted of 21,123 members of a health care system who participated in a survey between 1978 and 1985. The study found who had heavy smoking in midlife was associated with a greater than 100% increase in risk of dementia, AD, and VaD more than 2 decades later.

In summary, the evidence of an association between smoking and dementia.

14) Alcohol consumption

The study of James et al (70) had data showed concordant J-shaped associated between alcohol intake and dementia. Low-dose daily alcohol was associated with better health than less frequent consumption.

The longitudinal studies of subjects aged ≥65, with primary outcomes of incident dementia/cognitive decline. The twenty-three studies were identified. Meta-analyses suggest that small amounts of alcohol may be protective against dementia (71).

The study of Javenpaa et al (72) was a population-based cohort of 554 Finnish twins and followed for 25 years. Subjects were age 65 years or older at the time of dementia assessment in 1999-2001. Binge drinking (i.e. alcohol exceeding the amount of 5 bottles of beer or a bottle of wine on 1 occasion at least monthly) was associated with a relative risk of 3.2 (95% confidence interval=1.2-8.6) for dementia.

A systematic review included meta-analyses of 15 prospective studies, follow-ups ranged from 2 to 8 years. Meta-analyses were conducted on samples including 14,646 participants evaluated for Alzheimer disease (AD), 10,225 participants evaluated for vascular dementia (VaD), and 11,875 followed for any type of dementia (Any dementia). The pooled relative risks (RRs) of AD, VaD, and Any dementia for light to moderate drinkers compared with nondrinkers were 0.72 (95% CI 0.61–0.86), 0.75 (95% CI 0.57–0.98), and 0.74 (95% CI 0.61–0.91), respectively (73).

In summary, the association between alcohol consumption and dementia is J shape. It needs to study more.

15) Physical activities

The study was consisted a 4,615 elderly who had aged 65 years or older completed a 5 - year follow-up. The study found high levels of physical activity were associated with reduced risks of cognitive impairment (OR=0.58, 95%CI 0.41-0.83), Alzheimer disease (OR=0.50, 95%CI 0.28-0.90) and any type of dementia (OR=0.63 95%CI 0.40-0.98) (74).

Lindsay et al (75) used a prospective analysis of risk factors for Alzheimer's disease in 6,434 eligible subjects aged 65 years or older. The study found physical activities were associated with a reduced risk of Alzheimer's disease (OR=0.69, 95%CI 0.50-0.96).

The study of Abbott et al (76) was assessed from 1991 to 1993 in 2257 physically capable men aged 71 - 93 years old in the Honolulu-Asia Aging Study. The study found that walking is associated with a reduced risk of dementia.

The study by Scarmeas (77) was a prospective cohort study of 2 cohorts comprised 1880 community-dwelling elders without dementia lived in New York, New York, with both diet and physical activity information availabled. The study found higher physical activity were independently associated with reduced risk for AD.

Yaffe et al (65) was consisted a 2,509 well-functioning black and white elders enrolled in a prospective study. Cognitive function was measured using the Modified Mini-Mental State Examination. The study found weekly moderate/vigorous exercise variables significantly associated with being a maintainer vs a minor decliner (OR = 1.31, 95% CI 1.06-1.62).

The study subject of Verghese (78) was a 469 older who aged 75 years and over, resided in the community and did not have dementia at base line. Over a median follow-up period of 5.1 years, dementia developed in 124 subjects (Alzheimer's disease in 61 subjects, vascular dementia in 30, mixed dementia in 25, and other types of dementia in 8). Among leisure activities, reading, playing board games, playing musical instruments, and dancing were associated with a reduced risk of dementia.

In summary, the elderly people who had physical activities tended to associate with prevention dementia.

16) Drugs usage

A systematic review to summarized the epidemiologic evidence on the associated between used of non-steroidal anti-inflammatory drugs (NSAIDs) and the risk of dementia. A total of 15 case-control and 10 cohort studies with a total of 4,573 subjects who aged 55 years or older were followed for 1-18 years. The no steroidal anti-inflammatory drugs (NSAIDs) in the study were Diclofenac+misoprostol, Nimesulide, Rofecoxib and Napoxen. The study found the benefit of NSAIDs in prevented dementia or cognitive impairment was 50% in studies with prevalence of dementia cases, declined to 20% in studies with incident of dementia cases, and was absent in studies where cognitive decline was used as the endpoint. The randomized controlled trial in Celecoxib drug (200 mg/ twice a day) and Napoxen (220 mg/ twice a day) were not effects to dementia (79).

Peila et al (80) was consisted a 1,294 man who were hypertension (mean age 76.7 years), used data from the Honolulu Asia Aging Study on Japanese andfollowed since 1965.The result showed each additional year of treatment there was a reduced the risk of incident dementia (hazard ratio [HR]=0.94, 95% CI, 0.89 to 0.99). The risk for dementia in subjects with >12 years of treatment was lower compared to never-treated hypertensives (NTH) (HR for dementia (RR=0.40, 95% CI, 0.22 - 0.75) and for Alzheimer disease (RR=0.35, 95% CI, 0.16 - 0.78) and was similar to the normotensives. The subjects who wasnondementiawith 5-12 years of treatment had lower yearly CASI decline compared to never-treated hypertensives (NTH).

The study was consisted 104 patients with mild-to-moderate AD and DM-2 were divided into two groups, according to anti diabetic pharmacotherapy: group A, patients treated with oral anti diabetic drugs and group B, patients treated with insulin combined with other oral anti diabetic medications. Cognitive functions were assessed by the Mini Mental State Examination (MMSE) and the Clinician's Global Impression (CGI), with a follow-up of 12 months. This study suggests that insulinic therapy could be effective in slowing cognitive decline in patients with AD (48).

The study of a case-control and a retrospective cohort study of a community-based ambulatory primary care geriatric practice. The study consisted. After covariate adjustments, patients on statins were less likely to had dementia (OR = 0.23, 95% CI 0.1-0.56), Alzheimer's disease (OR = 0.37, 95% CI 0.19-0.74) , vascular dementia (OR = 0.25, 95% CI 0.08-0.85) (81).

The three-city study (82) was a population-based cohort of 9,294 subjects selected from the electoral rolls of three French cities (Bordeaux, Dijon, Montpellier). The result showed that after adjusted for age, gender, education level, and study center, the odds ratio (OR) for dementia was observed to be lower among lipid-lowering agent (LLA) users (OR = 0.61, 95% CI = 0.41 to 0.91) compared with subjects taking no lipid-lowering agent (LLA).

In summary, the association between drug usage and dementia is not confirm. It needs to study more in each area for conclusion.

17) Supplement usage

The study population consisted a total of 3,069 elderly who aged older than 75 years old in the United States between 2000 and 2008. In this study suggest that Gbiloba at 120 mg twice a day was not effective in reducing either the overall incidence rate of dementia or AD incidence in elderly individuals with normal cognition or those with MCI (29).

Double-blind, placebo-controlled trial involving 302 cognitively healthy (Mini-Mental State Examination score > 21) individuals aged 65 years or older. Participants were randomly assigned to 1,800 mg/d EPA-DHA, 400 mg/d EPA-DHA, or placebo capsules for 26 weeks. The result showed that no overall effect of 26 weeks of eicosapentaenoic acid and docosahexaenoic acid supplementation on cognitive performance (83).

Devore studied 5395 participants aged 55 years old or older in the Rotterdam Study. During an average follow-up of 9.6 years, dementia developed in 465 participants and in this Dutch cohort, who had a moderate consumption of fish and omega-3 PUFAs, these dietary factors do not appear to be associated with long-term dementia risk (84).

The cohort study of a Canadian aged 65 years old or older with a complete clinical examination, blood samples, and follow-up information and data conducted from 1991 to 2002. The result showed no associations between n-3 PUFAs and dementia or AD were found (85).

Evan (86) reported in The Cocharne library with five trials studied in 695 participants aged 45-70 years old in the United States, Italy, England and Germany. Controls group were intake DHEA 50 mg/d for 13 weeks -3 months. The result showed that no beneficial effect of DHEA supplementation on cognitive function of nondementia middle-aged or elderly people.

Lethaby (87) reported in The Cocharne library with sixteen trials studied in 10,114 women who had mixed surgical and natural menopausal. Participants aged 45-91 years old in Austria the United States, England, Canada, Finland, Belgium and Germany. This study studied about the effect of ERT (estrogens only) or HRT (estrogens combined with a progestagen) in comparison with placebo in RCTs on cognitive function in postmenopausal women. The result showed good

evidence that both ERT and HRT do not prevent cognitive decline in older postmenopausal women when given as short term or longer term (up to five years) therapy

Malouf, et al (88) studied with 7,000 older postmenopausal women. This study found that subjects who took hormone had risk for dementia.

In summary, the association between supplement usage and dementia is not confirm. It needs to study more in each area for conclusion.

18) Vitamin usage

Malouf (89) reported in the cocharne library with four trials studied in 1,234 participants aged 50-92 years old in Austria, Netherlands and England. Participants take750-800 mcg/day folic acid supplementation during 1 month – 3 years. However, in one trial enrolling a selected group of healthy elderly people with high homocysteine levels, 800 mcg/day folic acid supplementation over three years was associated with significant benefit in terms of global functioning, memory storage, and information-processing speed.

Malouf (90) reported in The Cocharne Library with two trial studies in 287 participants aged 20-30 years old and 70-79 years old in Austria and Netherlands, participants took 75 mg/day vitamin B6 for 35 days or 20 mg/day for 2 weeks. The review found no evidence for short-term benefit from vitamin B6 in improving mood (depression, fatigue and tension symptoms) or cognitive functions.

The Physicians' Health Study II (91) was a randomized, double-blind, placebo-controlled factorial trial of vitamin E and vitamin C that began in 1997 and continued until its scheduled completion on August 31, 2007. There were 14,641 US male physicians enrolled, who were initially aged 50 years or older. Participants were individual took supplements of 400 IU of vitamin E every other day and 500 mg of vitamin C daily. The result found neither vitamin E nor vitamin C supplementation reduced the risk of major cardiovascular events but vitamin E was associated with an increased risk of hemorrhagic stroke (92).

In summary, the association between vitamin usage and dementia is not confirm. It needs to study more in each area for conclusion.

19) Food consumption

The study was consisted a total 980 elderly, mean of aged 75.3 years old. Participants were followed for a mean of 4 years. Those in the highest quartile (1,870 kcals/day) had an increased risk of AD (hazard ratio, 1.5; 95% confidence interval [CI], 1.0-2.2) (24).

Among individuals with the apolipoprotein E epsilon4 allele, the hazard ratios of AD for the highest quartiles of calorie and fat intake were 2.3 (95% CI, 1.1-4.7) and 2.3 (95% CI, 1.1-4.9), respectively, compared with the lowest quartiles(758 kcals/day) (93).

It was consisted 3,718 participants, aged 65 years and older of the Chicago Health and Aging Project. Participants were followed for a 6 years. The result show the mean cognitive score at baseline for the analyzed cohort was 0.18, and the overall mean change in score per year was a decline of 0.04 standardized units. In mixed effects models adjusted for age, sex, race, and education, compared with the rate of cognitive decline among persons in the lowest quintile of vegetable intake (median of 0.9 servings/day), the rate for persons in the fourth quintile (median, 2.8 servings/day) was slower by 0.019 standardized units per year ($p = 0.01$), a 40% decrease, and by 0.018 standardized units per year ($p = 0.02$) for the fifth quintile (median, 4.1 servings/day), or a 38% decrease in rates. High vegetable but not fruit consumption may be associated with slower rate of cognitive decline with older age (94).

One-phase cross-sectional surveys were conducted in all residents aged 65 years old or older in 11 catchment areas in China, India, Cuba, the Dominican Republic, Venezuela, Mexico, and Peru. A total of 14,960 residents were included. This study found a dose-dependent inverse association between fish consumption and dementia (OR= 0.81, 95% CI 0.72 - 0.91) that was consistent across all sites except India and a less-consistent, dose-dependent, direct association between meat consumption and prevalence of dementia (OR= 1.19, 95% CI 1.07-1.31) (95).

The prospective seven year cohort study in a total of 1,433 people aged over 65 were followed for a mean of 7 years. The study suggested that increased fruit and vegetable consumption were likely to had the biggest impact on reduced the incidence of dementia (96).

In summary, healthy food consumption was tended to associate with prevent dementia.

20) History of exposure to organic solvent

The study was conducted to estimate the association between neuropsychiatric diseases leading to early retirement pensioning and exposure to organic solvents in the Danish wood industry. The result were who exposure to organic solvents more than 4,000 hours would have a chance to dementia compare with who not exposure to organic solvents (97).

The study of case-control study was investigated the associated between history of organic solvent exposure and Alzheimer disease. The study base included about 23,000 persons aged 60 years or more from the local membership of a health maintenance organization in Seattle, Washington. History of exposured to one or more solvent groups (benzene and toluene; phenols and alcohols; ketones; other solvents) yielded an adjusted Alzheimer's disease (OR= 2.3, 95% CI 1.1-4.7) (98).

Some study didn’t found the associated with history of organic solvent exposure is and dementia. (99, 100)

The study was examined the associated of occupational pesticide exposure and the risk of incident dementia and Alzheimer diseade in later life. Among 3,084 enrollees without dementia who were aged 65 years and older as of January 1995, were invited to participate in the study. This result showed increased risks among pesticide-exposed individuals for all-cause dementia (HR = 1.38, 95% CI 1.09-1.76), AD (HR = 1.42, 95% CI 1.06-1.91). The risk of AD associated with organophosphate exposure (HR = 1.53, 95% CI 1.05-2.23) was slightly higher than the risk associated with organochlorines (HR = 1.49, 95% CI 0.99-2.24), which was nearly significant (101).

Parrón’s study found that the prevalence rates and the risk of having Alzheimer's disease, Parkinson's disease, multiple sclerosis and suicide were significantly higher in districts with greater pesticide use as compared to those with lower pesticide use. The multivariate analyses showed that the population living in areas with high pesticide use had an increased risk for Alzheimer's disease and suicide attempts and that males living in these areas had increased risks for polyneuropathies,

affective disorders and suicide attempts. In conclusion, this study supports and extends previous findings and provides an indication that environmental exposure to pesticides may affect the human health by increasing the incidence of certain neurological disorders at the level of the general population (102).

In summary, the almost of the studies found the association between history of exposure to organic solvent and dementia is quite not consistency. It needs to study more.

21) Hypertension

Tzourio (103) studied in elderly individuals (n = 1,373) in Nantes (western France) who aged 59-70 years old. The study found an associated between high blood pressure at baseline and cognitive decline at the 4-year assessment (OR = 2.8, 95% CI 1.6 to 5.0).

The study sought to investigated whether pulse pressure was predictive of Alzheimer disease and dementia. The study was consisted a total of 1,270 who aged 75 years old or older. Subjects with higher pulse pressure had associated with increased risk for adjusted relative risks (95% CI) of 1.4 (1.0 to 2.0; P=0.04) for Alzheimer disease (OR = 1.4 95% CI 1.0-2.0) and dementia (OR = 1.3 95%CI 0.9-1.7) (104).

Ogunniyi's study (105) was investigated the relationship between hypertension and dementia incidence in community-dwelling elderly Yoruba who aged 70 years and above. Subjects who were hypertension was significant risk factor for dementia (OR = 1.52, 95% CI 1.01-2.30).

In summary, who had high blood pressure was tended to associate with dementia.

22) Diabetes mellitus

Akomolafe (106) sought the risk of developing Alzheimer disease (AD) in subjects with and without diabetes mellitus (DM), used the data from Framingham Study Original cohort with 2,210participants who were dementia free. The result showed 8.4% of persons with DM, 11.0% of persons without DM developed AD and who were diabetes mellitus was a risk factor for dementia (OR = 1.15, 95% CI 0.625-2.05).

A systematic review and meta-analysis was considered a total of 61,830 people aged 65 years old or above, followed for 2-2.17 years. The pooled adjusted risk ratio (RR) for all dementia when persons with DM were compared to those without was 1.47 (95% CI, 1.25 to 1.73). Summary RRs for Alzheimer disease and vascular dementia compared persons with diabetes mellitus (DM) to those without were 1.39 (CI, 1.16 to 1.66) and 2.38 (CI, 1.79 to 3.18), respectively (107).

The study of cross-sectional study was conducted among participants aged 50 and over in an urban community. Subjects were screened using the Mini Mental State Examination (MMSE) and were examined by a series of neuropsychological tests if screened positive. This study showed that the prevalence of dementia was significantly higher in diabetics than non-diabetics (49).

In summary, the majority of studies found an association between who were diabetes mellitus and dementia.

23) Dyslipidemia

Notkola (108) examined the possible role of serum total cholesterol in the pathogenesis of AD in a population-based sample of 444 men, aged 70-89 years, who were survivors of the Finnish cohorts of the Seven Countries Study. Previous high serum cholesterol level was a significant predictor of the prevalence of AD (OR = 3.1, 95% CI 1.2-8.5).

Prospective longitudinal community-based study was consisted a total of 1,111 non demented participants aged 65 years old and above were followed up for an average of 2.1 years. Compared with the lowest quartile, the highest quartile of LDL cholesterol was associated with an approximately 3-fold increase in risk of dementia with stroke, adjusting for vascular risk factors and demographic variables (RR = 3.1, 95% CI 1.5-6.1) (109).

In summary, the majority of studies found an association between who were dyslipidemia and dementia.

24) Body Mass Index

The study by Fitzapatrick Al et al (110) was evaluated associations between midlife and late-life obesity and risk of dementia. The study

population considered a total of 2798 adults without dementia at age 65 years or older. In evaluations of midlife obesity, an increased risk of dementia was found for obese (BMI >30) vs normal-weight (BMI 20-25) persons, adjusted for demographics (HR = 1.39, 95% CI 1.03-1.87) and for cardiovascular risk factors (HR = 1.36 95%CI 0.94-1.95). The risk estimates were reversed in assessments of late-life BMI. Underweight persons (BMI <20) had an increased risk of dementia (HR = 1.62, 95%CI 1.02-2.64), whereas being overweight (BMI >25-30) was not associated (HR = 0.92, 95%CI 0.72-1.18) and being obese reduced the risk of dementia (HR = 0.63, 95%CI 0.44-0.91) compared with those with normal BMI.

Xu (111) used the data from the Swedish Twin Registry, 8,534 twin individuals aged ≥65 to examine the association of midlife overweight and obesity with dementia, Alzheimer disease (AD), and vascular dementia (VaD) in late life, and to verify the hypothesis that genetic and early-life environmental factors contribute to the observed association. The result showed when compared normal BMI (20-25) with overweight (OR = 1.71, 95% CI 1.30-2.25) and obesity (OR = 3.88, 95%CI 2.12-7.11) at midlife were related to dementia.

Yaffe (112) studied with 1,624 Latinos aged 60 and older who participated in the Sacramento Area Latino Study of Aging for investigate the effect of metabolic syndrome on cognitive function in an elderly Latino population and to determine whether inflammation modifies this association. Of the 1,624 participants, 718 (44%) had metabolic syndrome at baseline. The results suggest that, in elderly Latinos, the composite measure of metabolic syndrome is a greater risk for cognitive decline than its individual components

In summary, the majority of studies found an association between over BMI, obesity and dementia.

25) Depression

Moon-Doo Kim (41) used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) conducted on Jeju Island. This program included 1,708 residents >65 years old who were receiving financial assistance on the MMSE-KC. The results indicate that the following depression factors were statistically significantly associated with dementia (OR=1.586, 95% CI 1.089-2.309).

The Prospective seven year cohort studied in a total of 1,433 people aged over 65 were followed for a mean of 7 years. The result showed that depression factors were statistically significantly associated with dementia (OR=1.39, 95% CI 1.13 – 1.71) and also suggest that eliminating depression are likely to have the biggest impact on reducing the incidence of dementia (98).

Royall (113) studied in a total of 547 people aged over 70 years old (mean 77.9) were followed for a mean of 3 years at the united states. The result showed that depressive symptoms were significantly associated only with the 3-year rate of decline in psychomotor speed, as measured by Trails A, and ECF, as measured by the EXIT25. Both associations withstood adjustment for age, gender, education, and baseline level of care (estimate 2.088, SE = 1.089, p = 0.005).

In summary, history of depression in the past tended to associate with dementia.

26) History of head injury

The study by of a retrospective cohort study used the data from the Longitudinal Health Insurance Database 2000, patients aged less than 15 years old. The study included 44,925 patients receiving ambulatory or hospital care and 224,625 non-TBI patients were matched for sex, age and year of index used of healthcare. The result showed that during the 5 year follow-up period, 1196 TBI (2.66%) and 224,625 non-TBI patients (1.53%) patients developed dementia. TBI was independently associated with greater risk of dementia (RR = 1.68, 95%CI 1.57-1.80) (114).

In summary, elder who had history of head injury tended to associate with dementia.