A STUDY OF THE WECHSLER MEMORY SCALE-THRID EDITION ABRREVIATED IN THE ELDERLY DEMETIA PATIENTS

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A STUDY OF THE WECHSLER MEMORY SCALE-THIRD EDITION ABBREVIATED IN THE ELDERLY DEMENTIA PATIENTS

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ABSTRACT

The objective of this research was to compare the auditory and visual memory of elderly dementia patients and normal elderly people by using Wechsler Memory Scale-Third Edition Abbreviated (WMS-III Abbreviated).

The study group comprised 37 elderly dementia patients who were treated in the Memory Clinic, Siriraj Hospital and 37 normal elderly people at Suan Pak community, Chatuchak district. Data collection was done by the Wechsler Memory Scale-Third Edition Abbreviated to assess memory function of both sample groups. The Thai Mental State Examination and Thai Geriatric Depression Scale was used to separate normal elderly people and those who failed the criteria of the tests.

Results revealed that the subtests and composite scores of the elderly dementia group were significantly lower than the normal elderly group and showed that the test can discriminate memory function between the elderly dementia patients and normal elderly people. This is a memory screening test that is fast, standard, and systematically suitable for dementia patients.

KEY WORDS : DEMENTIA/ AUDITORY MEMORY / VISUAL MEMORY

42 pp.

การศึกษาแบบทดสอบ WECHSLER MEMORY SCALE-THIRD EDITION ABBREVIATED ในผู้สูงอายุโรคสมองเสื่อม
(A STUDY OF THE WECHSLER MEMORY SCALE- THIRD EDITION ABBREVIATED IN THE ELDERLY DEMENTIA PATIENTS)

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บทคัดย่อ

วัตถุประสงค์หลักของงานวิจัยครั้งนี้ เพื่อเปรียบเทียบความสามารถของความจำที่เกิดจากการมองเห็นและการได้ยินในผู้สูงอายุที่ป่วยด้วยโรคสมองเสื่อมและผู้สูงอายุปกติโดยใช้แบบทดสอบ Wechsler Memory Scale-Third Edition Abbreviated (WMS-III ABBREVIATED)

กลุ่มตัวอย่างประกอบด้วยผู้สูงอายุที่ป่วยด้วยโรคสมองเสื่อมได้รับการรักษา ณ คลินิกความจำ โรงพยาบาลศิริราช จำนวน 37 คนและผู้สูงอายุปกติ ณ ชุมชนสวนผัก เขตจตุจักร จำนวน 37 คน เครื่องมือที่ใช้ในการวิจัยประกอบด้วยแบบทดสอบ Wechsler Memory Scale-Third Edition (Abbreviated) ซึ่งใช้ในการประเมินความสามารถในการจำของผู้สูงอายุที่ป่วยด้วยโรคสมองเสื่อมและผู้สูงอายุปกติแบบทดสอบสมรรถภาพทางสมองของไทยและแบบคัดกรองภาวะซึมเศร้าในผู้สูงอายุเพื่อคัดกรองภาวะสมองเสื่อมและภาวะซึมเศร้าในผู้สูงอายุปกติ เพื่อนำมาเป็นกลุ่มศึกษา

ผลการทดสอบพบว่า คะแนนจากแบบทดสอบย่อยทุกมาตรและคะแนนจาก Composite scoresในผู้สูงอายุที่ป่วยด้วยโรคสมองเสื่อมมีคะแนนน้อยกว่าผู้สูงอายุปกติในทุกด้านอย่างมีนัยสำคัญ แสดงให้เห็นว่าแบบทดสอบสามารถจำแนกผู้สูงอายุที่ป่วยด้วยโรคสมองเสื่อมและผู้สูงอายุที่ปกติได้ ผลจากการวิจัยดังกล่าวทำให้มีการพัฒนาแบบทดสอบเพื่อใช้ในการคัดกรองปัญหาด้านความจำของผู้ป่วยโรคสมองเสื่อม ที่มีความสะดวกรวดเร็วและเป็นมาตรฐานขึ้นมา

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CHAPTER I
INTRODUCTION

Background and Rationale

With advances in healthcare, many diseases have allowed to be successfully treated hence people are living longer. Thailand's Office of the National Statistics reported that there are approximately 5.9 million elderly people in the country. Compared to other age groups, the statistic has shown that by 2010-2020 the elderly population will increase approximately by 5.0 percent per year, while in other age groups, the growth rates are no more than 0.5 percent (1). This situation will lead Thailand into an aging society within the near future(2). As a result, it is important to study the aging society phenomenon because there are special characteristics in this population group i.e. their pattern of living, health needs, and welfare from the government are likely to be different from other age groups (1). Because of these requirements, the government may need to prepare policies to facilitate new seniors, including those in the medical field.

Owing to the various changes in this period of life both physical and mental, many difficulties are expected to occur. Commonly noticed change is in the nervous system (3). The nervous transformation in elderly people often causes cognitive deterioration including memory loss which might cause problems in remembering things. The problem will be more severe in people with a dementing condition. The prevalence of the dementia symptom is around 10 percent in 65 year-olds and the incidence rate increases with age. A person who has the dementia is not only suffering from the memory problem but the symptoms also affect their daily lives, capacities and emotions(5). Depression and anxiety are the most common co-morbid symptoms that could occur. The patient notices they are not physically strong like before. Many things require greater psychological and physiological effort. Moreover

as certain dementia subtypes are progressive, the patient's memory and capability may decline. Hence the patients need close attention from the caregiver as the disease becomes more severe. The caregiver will undoubtedly be affected by the symptoms. Even though the symptoms alone do not result in death, however the co morbid symptoms such as depression can place them at high risk of suicide. Furthermore, dementia has a high health care cost. Thus having an effective diagnosis and early intervention of this condition is necessary in preventing the elderly people from the disease. Because the prominent early symptom is memory impairment (5), it can be difficult to distinguish between normal deterioration and dementia. To diagnose accurately, the use of neuropsychological assessments are essential, not only to diagnose, but also to track the progression of the symptoms during treatment. Many countries in America and Europe have used neuropsychological tests as the standard assessment for dementia along with results from MRI and CT scan(6).

In assessing memory or dementia, there are numerous neuropsychological tests such as Mini-Mental State Exam, Alzheimer's disease Assessment Scale, etc(7). However, in cases where dementia has not fully developed, testing with these screening tests may yield negative results. Thus many memory specific assessments were developed. One of the most validity and reliable accurately used tool is Wechsler Memory Scale. In 1945 David Wechsler established the test called Wechsler Memory Scale (WMS) to assess the declarative memory potential of patients. In 1987 the next version of WMS was came out called the Wechsler Memory Scale-Revised by the psychologists who had significant role in making the WMS. The latest version of Wechsler Memory Scale-third edition (WMS-III) was developed in 1997. In this edition, subtests and an addition of four new subtests were improved as well as a revision of scaled scores and interpretation methods through division as Primary Indexes and Auditory Process Composite(7). However, using the full WMS-III will take quite long time. Administering this test with the elderly or patients with physical impairment may not feasible. The Psychological Corporation which produced WMS-III has developed the abbreviated form of WMS-III which is known as Wechsler Memory Scale- Third Edition Abbreviated (WMS-III Abbreviated). This test is derived from WMS-III, and a fast, reliable survey of auditory and visual memory abilities (8). The four subtests in WMS-III Abbreviated are similar to WMS-

III, and can completed within 20 minutes (8). The result from WMS-III Abbreviated can predict an examinee's general memory functioning. Furthermore, in the recent studies, research has shown that memory impairment can also predict occurrence of symptoms of dementia (9). Therefore the results from this memory test can facilitate the medical teams to provide appropriate treatment or slow down the progression of dementia.

The instruments which assess the patient's organic brain symptoms are numerous. For instance, past physical examinations, Computed Axial Tomography (CT scan), Magnetic Resonance Imaging (MRI), or the neuropsychological assessment. To make an accurate diagnosis, the physician should provide a holistic assessment of the patient. However, as this is not possible in some rural areas in Thailand where medical technology of brain scanning is not yet available, or that unaffordable. The cost of this service is very expensive. Using an effective neuropsychological test to screen for memory impairment may be the most realistic option.

Objective

To compare the memory function between the elderly dementia patient and the normal elderly people by using WMS-III Abbreviated.

Hypothesis

The elderly dementia patients have immediate memory, delayed memory, and total memory capacities lower than the normal elderly people.

Scope of the Study

Population

This study consists of two sample groups, as follow:

1. Male and female dementia elderly patients receiving treatment at Siriraj Hospital and with the following criterions:

Inclusive Criterions:

1.1. Have been clinical diagnosed by the neurologists as having the dementia symptom within 6 subtypes as: Dementia of the Alzheimer's type, Vascular Dementia, Dementia due to general medical conditions, Substance-Induced persisting Dementia, Dementia due to Multiple Etiologies and Dementia not otherwise. The diagnostic was specified in the mild to moderate severity degree. The severe dementia patients were excluded from this study.

1.2. Age of 60 years old and over.

1.3. Have no other underlying mental disorder including depressive symptom from the screening of the neurologist and the observation from the researcher.

1.4. Have no severe physical disabilities that may affect the testing process.

1.5. Are willing to participate in the research.

2. Normal elderly men and women at Suan Pak community, Chatuchak district with the following criterions:

Inclusive Criterions:

2.1. Having demographic qualities similar to those of the dementia group in terms of age, gender, and education.

2.2. Screening with Thai Mental State Examination (TMSE) showed no dementia symptoms, the cut-off point being 24 and over (from 23 downward is considered to be dementia symptom.)

2.3. Screening with Thai Geriatric Depression Scale (TGDS) showed no depression symptoms, the cut-off point being 13 and over (below 13 is considered normal)

2.4. Age of 60 years old and over.

2.5. Have no severe physical disabilities that may affect the testing process.

2.6. Are willing to participate in the research.

The variables

Independent variables: The present and no present of dementia symptom.

Dependent variables: auditory immediate memory, visual immediate memory, auditory delayed memory, and visual delayed memory.

Materials

1. Thai Mental State Examination (TMSE)
2. Thai Geriatric Depression Scale (TGDS)
3. Wechsler Memory Scale- III Abbreviated.

The Outcome and Benefit

The result of this test will enable to screen for the memory impairment domain in the dementia patients practically and economically.

Definition of Terms

1. Dementia refers to the development of multiple cognitive deficits manifested by both memory impairment and one (or more) of the following cognitive disturbance as aphasia, apraxia, agnosia, and disturbance in executive functioning and other criterions as appear in the diagnostic criteria from the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). According to the criteria the dementia syndrome will be divided into six subtypes as: Dementia of the Alzheimer's type, Vascular Dementia, Dementia due to general medical conditions, Substance-Induced persisting Dementia, Dementia due to Multiple Etiologies and Dementia not otherwise specified.

2. Dementia patients refer to out-patients that have been diagnosed as having dementia symptom without any severe physical difficulties at Neurology Section Department of Medicine, Siriraj Hospital. These dementia patients are age of 60 years old and above.

3. Normal elderly people refer to people without dementia, depression and severe physical disabilities conditions at Chatuchak district, Suan Pak community. The age range is 60 years old and above.

4. Memory capacities refer to the composite score from WMS-III Abbreviated for each area;

4.1 Immediate Memory Composite refers to the degree which the examinee is able to recall information after just hearing or seeing it. By using the composite score that convert from the sum of Logical Memory I and Family Pictures I scale score.

4.2 Delayed Memory Composite refers to the degree which the examinee is able to recall information after an extended period of time has passed since the presentation of the information. The score come from the sum of Logical Memory II and Family Pictures II scale score which then convert to the composite score.

4.3 Total Memory Composite refers to the result of the sum of Immediate memory and Delayed memory scale score and converts to total memory composite scores. It is the estimate of an examinee's current memory functioning.

5. The composite score classification refers to the qualitative description of WMS-III Abbreviated composite score. Considered from percent that include in theoretical normal curve, it can divide into 7 classifications i.e. Extremely low(69 points and below), Borderline (70-79), Low Average(80-89), Average(90-109), High Average
(110-119), Superior(120-129), and Very Superior(130 and over).

CHAPTER II
LITERATURE REVIEW

A Study of the memory capabilities in the elderly demented patients with the Wechsler Memory Scale-Third Edition Abbreviated, the researcher has procured the details of documents and literatures related to the study as follow:

1. Memory and the elderly memory
2. Dementia patients
3. Wechsler Memory Scale-Third Edition Abbreviated

1. Memory and the elderly memory

The most common cognitive complaint among elderly people is a change in memory (8). Memory is a very basic cognitive process used in almost every cognitive activity (10).To perform daily tasks, memory takes the important role in some or most of the cognitive processes. The term “memory” has been used in many different ways and the concepts also vary. From Oxford Advanced Learner’s Dictionary, memory refers to an individual person’s power to remember things (10). From the neurobiologists view, memory belongs to a special case of general phenomenon known as neuronal plasticity or the ability of neurons to change their structure or function in a lasting way(11). Consistent with the meaning in the psychological perspective which said that memory is an organism’s ability to store, retain, and subsequently recall information (12). Furthermore, some researchers have suggested that the memory is also closely linked to learning. They assumed that the individual’s personality reflects habits and dispositions that have developed from experiences (13). Adaptive and maladaptive coping strategies, anxieties, and phobias are largely products of learning. Or it can implied that memory is the natural of outcome of learning or learning is the process of acquiring new information, while memory refers to the persistence of learning in the state that can be revealed at a later time(8). In the psychotic or neurotic symptom, the abnormalities can be the consequences of specific experience or repeated patterns of experience. From these meanings, memory is involved in the three main process i.e. encoding, storage and retrieval(12, 14). Encoding refers to the processing and combining of received information including the perceiving, recognizing, and further processing an object or event. It is possible that an event is forgotten because the information was not well-encoded in the first place. Following the successful storage which creates a permanent record of the encoded information, an object or event might be encoded and held for a brief period of time in short-term memory. During this process the failure to transform information from short-term memory to permanent storage can occurred. Finally, retrieval concerns searching long-term memory and finding the event that has been encoded and stored, calling back the stored information, in response to some cue for use in a process or activity.

There are several theories which classify memories. In this study, the researcher has provided two main classifications (9, 12, 14-16) composed of;

Classification by Duration

Based on the length of time information is stored, memory is divided into three systems as follows:

1. Sensory Memory refers to the ability to look at an item, and remember for a second of observation. Its function is to permit stimuli to be perceived, recognized and entered into short-term memory. Corresponding approximately to the initial 200 - 500 ms after an item is perceived. Many cognitive psychologists hypothesize that separate sensory memories exist for each sensory modality. The research on sensory memory now focuses on the iconic and echoic memory.

1.1 Iconic memory is a type of short-term visual memory, named by George Sperling in 1960. The information it holds is in a relatively unprocessed form. The persistence of information in iconic memory has been separated into two distinct phenomena, stimulus persistence and information persistence. To extract the information about what each item was, the subject must scan the icon and then translate or recode it into a more durable form. Because the memory lasts only 150-200 ms, it is followed by a recording of the stimulus into another, more meaningful code. If there are any stimuli presented immediately after, the short-term visual memory will then be erased. Studied with the patients with right temporal lobe resection were typically more impaired on tasks that require memory for nonverbal material such as visually presented, faces or tonal patterns as indicted by using the Family Pictures subtest and other neuropsychological assessment (17).

1.2 Echoic memory is equivalent to the sensory memory for auditory material. Named by Neisser in 1967, the echoic memory refers to the phenomenon in which there is a brief mental echo that continues to sound after auditory stimuli has been heard. There are some researchers suggesting that the echoic memory has a larger capacity and can last longer than the iconic. In contrast with the patients who had the right temporal lobe resection, patients who have had surgery of the left temporal lobe had more difficulty learning and remembering material such as stories

sequence from Logical Memory I and II(17).

2. Short-term memory refers to the ability to retain larger amounts of new information shortly after it is presented; Studies have shown significant age-related declines in the immediate recall of the stories. In 2003, the study of Quintan that used the logical memory subtest to determine whether brief measures of verbal memory can assess short-term verbal memory impairments relative to verbal abilities in adolescents and adults with Attention Deficit/Hyperactivity Disorder. The result showed that a majority of adolescents and adults diagnose with ADHD demonstrated significant discrepancy between performance on the short-term verbal memory measure and verbal IQ (18).

3. Long-term memory is described as the ability for storing large amounts of newly learned information for indefinite periods of time but can be modified or made temporarily unavailable as a result of other incoming information(17). In the neurobiology's perspective, the cortical neurons that are affected in Alzheimer, use a number of neurotransmitters is necessary for the long-term storage of memories(11). In the Psychological Cooperation's study with the Alzheimer's disease patients using the WMS-III Abbreviated showed greatly impaired in the delayed memory composites or having the problem encoding the information into long-term memory stores(8).

Classification by Information Type

1. Declarative memory or explicit memory is one of the most important insights to emerge from neuropsychological research (14) and refers to the conscious learning and remembering of events and facts. This type of memory can be directly accessible to conscious awareness and can be declared. Declarative memory is relatively fast and flexible; it can be expressed quickly by a number of different response systems. From the studies, it can concluded that removal of the medial temporal lobe and medial diencephalons results in profound deficits in declarative memory functioning. Test by measured of recall and recognition had shown that older people perform significantly worse on free recall than recognition tests. The declarative memory can be subdivided into semantic and episodic memory.

1.1 Semantic memory refers to memory for factual information or general knowledge. It is relatively spread until age 70 and then declines precipitously. Knowledge of words, objects, people and factual information acquired through multiple exposures is affected in the beginning stages. The level of the semantic memory impairment is related to the level of dementia. In the study of Toulopoulou and his team about the semantic memory in Schizophrenic patients and their relatives, the researchers had been used the logical memory subtest as one of the neuropsychological material to assessed the sample group memory function. Results showed that Schizophrenic patients performed significantly worse than controls on nearly all measures. And their relatives also showed significant deficit on the immediate and delayed recall of the Logical Memory. Furthermore, the Logical Memory subtest was substantially more impaired than the other measures for both patients and relatives (19).

1.2. Episodic memory involves memories for personally experienced events that occur at a specific place and time, has also been shown to decline with age. It is the main focus of neuropsychological assessment of memory. From the studies with the Alzheimer's patient's, it implies that obviously the earliest stages of the illness is the deterioration in verbal and visual episodic memory, which seem to be the hallmark of Alzheimer's disease(9, 20).Similar to semantic memory, episodic memory appears to decline progressively after the age of 70 years. On tests of episodic memory e.g. story recall or list learning in WMS, patients with the Alzheimer's disease demonstrate a rapid rate of forgetting and often did not recall the new information after 10-20 minutes. In any case, their impairment appears to worsen with disease progression. The result also similar to the study of Vondras in 2005, there was the study about everyday stress that affects the episodic test performances, episodic memory tasks was administered which included tests of the Logical Memory from WMS the results suggest that everyday stress may increase age-related decline on episodic memory(21). And in the study of Woodlard using the Logical Memory and another memory assessments the results showed that logical memory I and II were one of the most directly test that assessed the memory especially the episodic memory due to it showed less overlap with the non-episodic functioning(22).

2. Nondeclarative Memory or implicit memory refers to learning as a result of prior experienced without conscious reference to that experience. These include skill and habit learning, classic conditioning, the phenomenon of priming, and other situations in which memory is expressed through performance rather than recollection. It has been known that implicit memory decline less dramatically with age than explicit memory. Some of the limited studies that have been performed with respect to aging have generally suggested that relative to younger adults, the rate of skill learning in older adults is slower.

2. Dementia patients

Dementia is the symptom that affects many old age people. The symptom it self can be divided into six subtypes as mentioned before. The statistic has shown that half of the dementia patients have been diagnosis as having the Alzheimer's disease. It is a chronic, neurological disorder with the slow progression. The disease is found to be the most common degenerative form of dementia among older persons (8). Many studies have suggested that the initial presentation of dementia symptom involves memory lapses with an insidious onset (9). Recently researchers have focused on a biological factor which indicates that, for instance, Alzheimer's disease is caused by neuronal loss and cellular changes when compared with normal aging (3, 8).

Alzheimer's disease is so prevalent that has been called the disease of the century (17). The incidence for Dementia is around 10 percent in the elderly population (5). The number will be increase according to age especially in people who are more than 75 years old. Approximately 20-50 percent of the elderly who are 85 years old and older are suffering from the disease (5, 6). Because of a higher risk and a longer life expectancy than males (20), females are affected nearly twice as frequently as males (24). Risk factors of the disease are; people who have mental retardation in Down syndrome subtype, lower education, head injury, the age of mother is 40 years old or higher during the pregnancy period, receiving excessive Aluminum(3), having a family history of dementia, female sex, and mild cognitive impairment(23) .

According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, 4th edition, The development of multiple cognitive deficits manifested by both memory impairment and one or more of the cognitive disturbance i.e. aphasia, apraxia, agnosia and disturbance in executive functioning makes the disease the most common degenerative dementia (25). In addition, The National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's disease and Related Disorders Association Workgroup have set forth the criteria listed for diagnosis of dementia disease (20) and one of the criteria is, confirmed by neuropsychological testing, documenting deficits in two or more areas of cognition.

To make the diagnostic complete, the clinicians must provide the history interviewing from both the patient and a reliable family member, physical examination and the neuropsychological assessment for the patient as the standard procedure(23).

Evaluating the dementia symptom

Due to the fact that the normal elderly people have the memory declination, aging patients express concern about forgetfulness and memory lapses. Having the accurate diagnostic might be essential to differentiate between the normal declination and the symptom pathology. To evaluate the patient's abnormalities, both physical and mentally investigation will be performed. For instance, the test in Electroencephalogram (EEG), the APOE genotyping, Mental State Examination and the neuropsychological testing are the typical evaluation for investigate the Alzheimer's symptom.

Neuropsychology contributes greatly to the diagnosis of dementia(9). Distinguishing between age-related decline and the pathology itself might be difficult. Moreover the neuropsychological testing can also define cognitive deficits which assist the diagnostic. The assessments using for assessing the pathology are numerous such as Alzheimer's disease assessment scale (ADAS) which have been designed to assess the severity of cognitive and behavioral impairments in Alzheimer's disease, Mini-mental state exam (or in Thai version as TMSE) that designed to screen the

cognitive impairments seen in a variety of dementing conditions. And because memory impairment is generally a prominent early symptom and the pattern of memory deficits changes as the disease progresses. So the memory tests are also essential to detect the patient's memory deficit and to follow up the treatment result.

There are various types of the memory assessments from verbal to nonverbal. One commonly used is the Wechsler memory scale which have reflects the strength of the impact that neuropsychological research can have on clinical practice (11). The test constructs associated with the declarative episodic memory process which also deteriorates in the Alzheimer and other related dementia's patients. Therefore, the study conducted by the psychological corporation on the Alzheimer's demented patients had shown the patients diagnosed with mild to moderate stage of the disease performed significantly worse than examinees in the control group on all of the test composites the researchers suggest that WMS-III Abbreviated was very sensitive to impaired memory functioning in this group(8). Confirmed with the study of Douglas with eight widely used memory measures the researcher found that one of the high accurate in distinguishing between a mild dementia and the healthy elder group was the Logical Memory II and suggested that this subtest is highly useful in the diagnosis of mild dementia (26). Furthermore, the researchers also paid attention in some of the specific memory components for instance; In 2001 Backman et al had study about recall memory (8), and proposed that recall memory can be distinguished between the people who had been developing the disease and those who remained healthy from three to six years in advanced of the diagnosis. This is congruent with the results from which to assess Alzheimer's patients on tests of episodic memory (e.g. story recall or list learning from WMS-III) which indicated that these patients demonstrate a rapid rate of forgetting and often do not recall new information after 10 to 20 minutes (17). And the study of Wefel about difference cognitive functioning between participants with Alzheimer's disease reporting depressive symptomatology and a control group of nondepressed participants with Alzheimer's disease, the result showed that the Alzheimer's participants with depressive symptom obtained better Logical Memory delayed recall scores than the control group(27).

3. Wechsler Memory Scale-Third Edition Abbreviated

To identify the person's memory problem many neuropsychological assessments have been invented. Including the Wechsler Memory Scale which become the most commonly used, due to the fact that WMS has a large normative sample and co-normed with half of the normative sample of the Wechsler Adult Intelligence Scale-Third Edition(WAIS-III)(28).

However, in many cases doing a full battery of WMS-III is difficult and takes time. Thus the psychological corporation has developed the short form of WMS-III, so-called Wechsler Memory Scale-Third Edition Abbreviated (WMS-IIII Abbreviated). The test was developed in 1997 by the Psychological Corporation, to provide clinicians an estimate of the examinee's general memory functioning when extended memory testing is not indicated or is not feasible(8). Although the test is a brief version of the WMS-III, the results of the reliability indicate good reliability at the composite and subtest level. The average reliability coefficients rang from .79 to .88 and the average reliability coefficients for the composite scores range from .87 to .92(8). It consists of 4 subtests i.e. logical memory I and II, family pictures I and II. Each subtest has the following measuring capacities as follow (7),

1. Logical Memory I: This subtest contains two short stories, A and B (adapted with elements of Thai culture and society). The examiner will read the story A once and asks the examinee to recall the story. Then the examiner will read the story B twice in each time after the reading is finish the examinee will ask to recall the story. The scores resulted from the second time telling are used to assessed the examiner's ability. If they are higher than the first time, it indicates that the examinee has learned the story or receiving enough information.

2. Family Pictures I: In this subtest assesses an individual's ability to recall complex, meaningful, visually presented information. Family Pictures was designed to assess recall for characters, spatial location, and scene activity. The test has four different scenes. The family members are parents, maternal or paternal grandparents, a daughter, a son and a dog. In each picture contains only four characters and the examinee must remember who they are, where they are and the activities they are doing.

3. Logical Memory II: The examinee is asked to tell the both stories heard in Logical Memory I. The test is a delayed-recall trial and it assesses retention of memory.

4. Family Pictures II: The examiner shows an empty four-quadrant grid to the examiner and asked to remember the characters, their positions and their activities from the four scenes presented earlier. Similar to Logical Memory II, this subtest measures the examiner's delayed-recall ability.

In 2004, Pinnakarn Srisarakorn had study the WMS-III in the elderly demented patients, the study showed that the demented patients had significantly different scale scores in every subtest, including the Logical Memory I and II and Family Pictures I and II, compare to the normal elderly people (7), congruent with the research conducted by the psychological corporation. In addition, the researcher found that the Logical Memory I and II and the Family Pictures I and II had the most favorable reliability statistics (28). From the study of the Psychological Corporation with the Alzheimer's patients, the researchers concluded that the average performance for the entire group falls in the extremely low rage. The base rate for impaired performance (score of 70 and below) was 71%, 89.5%, and 86.8% for the Immediate Memory, Delayed Memory, and Total Memory composites respectively (8). Due to the fact that memory impairment is not appear only in the Alzheimer's disease, the Psychological Corporation had studied the sensitivity of the test with various neurological and psychological disorders i.e. Huntington's disease, Parkinson's disease, traumatic brain injury, multiple sclerosis, temporal lobe epilepsy, chronic alchohol abuse, Karsakoff's syndrome, Schizophrenia, attention-deficit/hyperactivity disorder, learning disabilities, and Alzheimer's disease which already mentioned in the evaluating the Alzheimer's disease topic. The result from studying with the Huntington's patients showed significantly more poorly compared to the control group, the result was similar to the level observed for the group with Parkinson's disease, traumatic brain injury, multiple sclerosis, left and right temporal lobe epilepsy, Korsakoff's syndrome, and Schizophrenia. In contrast with the clinical group diagnosed as chronic alcohol abuse, attention-deficit/hyperactivity disorder and learning disabilities that performed in the average range on WMS-III Abbreviated composites and did not significantly differ from the examinees in the control group.

From the researcher conclusion, it said that because the sample size of these groups was small the researcher expected that in a larger sample these small effects might have been more readily detected. Recently, the researchers have focused on specific subtests of the WMS-III, which WMS-III Abbreviated is derived, i.e. the Logical Memory and Family Pictures subtests.

Logical Memory seems to be the most frequently administered subtest from the Wechsler memory scale (29), researchers had been used this subtest to assess the patients in various groups. In the study of Lacritz assessing the temporal lobe epilepsy patients; the researcher analyzed and concluded the data as it was a significantly different scale score between the left temporal lope epilepsy and the right temporal lobe epilepsy(30). In the study with the normal healthy sample group and the neuropsychological impaired .the researcher suggested that the test demonstrated high sensitivity and specificity in discriminating between analog malingerers and patients(31). Myles and his colleagues studied with non-help seeking drug-naïve adolescents from the Republic of Palau, the result also showed impairments in immediate logical memory(32). Moreover the study of Price used covariance analysis to statistically adjust the dependent measures logical memory recall and recognition based on immediate recall scores, the result showed that after adjustment for the logical memory recall and recognition demonstrated comparable, slight decline with age (33).

For the Family Pictures subtests, the study in 2002, Dulay had used this subtest to assessed the epilepsy surgery patients and found that the subtest relied heavily on auditory-verbal based cognitive abilities as well as visual memory performance (34). And in the study of Gold with schizophrenia patients, the patients demonstrated impaired recall of all scenes features as well as a reduction in the number of features recalled for each remembered character (35). Consistence with Wood's study in 2006 the study using the neuropsychological tests which included the Family Pictures subtest from WMS with the brain-injured individuals who exhibited aggression, this sampling group had significant impairment in verbal memory and visuospatial abilities(36). And in the study of Langeluddecke with traumatic brain injury patients (TBI), a significant relationship was found between memory impairment and TBI severity for most of the WMS-III indexes and subtests. In

general, TBI had a greater effect on the Visual than Auditory Indexes. Effect sizes were greatest for Family Pictures subtest(37).Furthermore Duncan's in 2004 assessing the people with expressive disabilities, using several of neuropsychological assessments including the Family Pictures subtest were selected and adapted to be suitable for the assessment of cognitive functioning for such people. The result showed that this group of people were able to manage the task requirements of the adapted test (38).

Conceptual Framework

Memory is an important system that appears in most of the cognitive process. Its form the adaptive and maladaptive coping strategies and personality which leads to an individual daily living. As the result of loosen of the nerve cells, difficulty in remembering things is the most complaint among the elderly people. The cause of memory deteriorate can come from either normal declination or pathology in the nervous system. And dementia is one of the diseases that obviously affect the memory system. Based on the study of various researches, the dementia patients showed significantly impair in many aspects of the memory system such as auditory and visual memory. To distinguish between the normal deterioration and the dementia condition, various tests have been developed including WMS-III Abbreviated. The test was designed to explore the auditory and visual immediate and delayed memory. These have form the following conceptual framework.

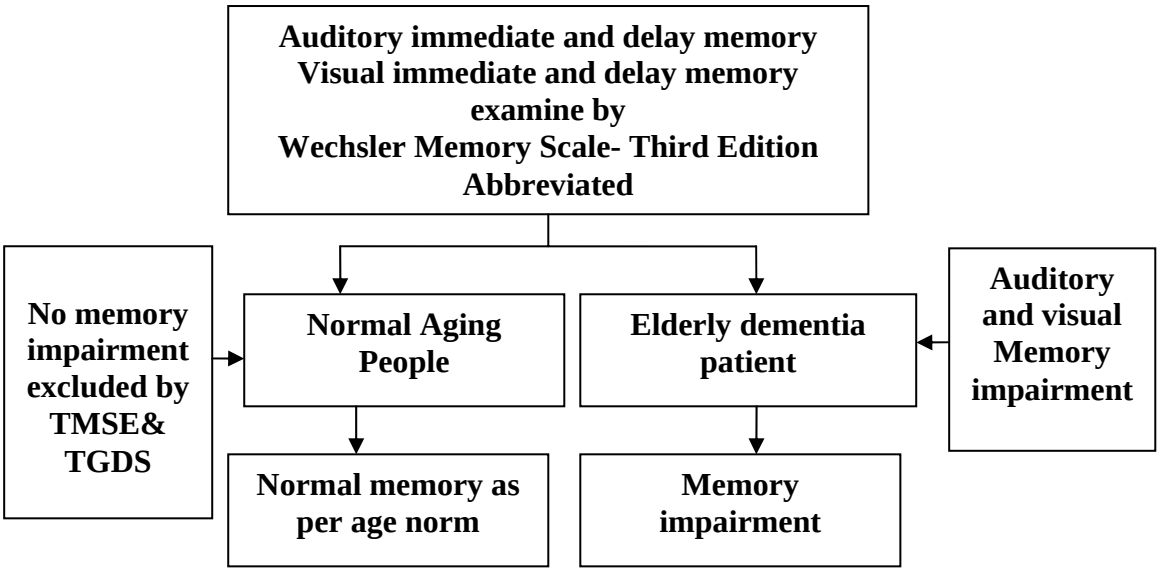

Figure 1: Conceptual Framework

CHAPTER III
MATERIALS AND METHODOLOGY

This research is a descriptive study of memory capabilities of demented patients compare to the normal elderly people. The WMS-III (Abbreviated) is used in this study with the following elements:

1. Population and Sample
2. Instruments
3. Data collecting and data analysis

Population and Sample

The population and sample of this study were the elderly dementia patients from Siriraj hospital and the normal elderly people whose the members of Suan Pak community, Chatuchak district. The clinical formulation was used (39)and the population ratio was determined from the prevalent rate of 10% of dementia prevalence. The calculation for the study's sample groups resulted in 74.35 people, on the following basis:

Fraction expose = 0.96; Relative risk = 0.10

Confidence level = 0.95; Power = 0.8; Ratio = 1.00

Sample size = 74.35; case size = 37.17; control size = 37.17

Match pair sample was used to find the similar demographic qualities as gender, age, and educational level with the two groups, as follows:

The first group:

1. Male and female dementia elderly patients receiving treatment at Siriraj Hospital and with the following criterions:

Inclusive Criterions:

1.1. Have been clinical diagnosed by the neurologists as having the dementia symptom within 6 subtypes as: Dementia of the Alzheimer's type, Vascular Dementia, Dementia due to general medical conditions, Substance-Induced persisting Dementia, Dementia due to Multiple Etiologies and Dementia not otherwise. The diagnostic was specified in the mild to moderate severity degree. The severe dementia patients was excluded from this study.

1.2. Age of 60 years old and over.

1.3. Have no other underlying mental disorder including depressive symptom from the screening of the neurologist and the observation of the researcher.

1.4. Have no severe physical disabilities that may affect the testing process.

1.5. Are willing to participate in the research.

The second group:

2.1. Having demographic qualities similar to those of the dementia group in terms of age, gender, and education.

2.2. Screening with Thai Mental State Examination (TMSE) showed no dementia symptoms, the cut-off point being 24 and over (from 23 downward is considered to be dementia symptom).

2.3. Screening with Thai Geriatric Depression Scale (TGDS) showed no depression symptoms, the cut-off point being 13 and over (below 13 is considered normal).

2.4. Age of 60 years old and over.

2.5. Have no severe physical disabilities that may affect the testing process.

2.6. Are willing to participate in the research.

Table 1 The frequency and percentage of the elderly demented patients' and the normal elderly people.

	Frequency		Percentage	
	Dementia Patients	**Normal People**	**Dementia Patients**	**Normal People**
Gender				
Male	14	14	37.83	37.83
Female	23	23	62.16	62.16
Age(years)				
60-69	13	13	35.23	35.23
70-79	15	15	40.53	40.53
80-84	9	9	24.32	24.32
Education				
Primary School	22	22	59.45	59.45
Secondary School	13	13	35.13	35.13
Bachelor Degree	2	2	5.40	5.40

In both sample groups' majority of personal character as gender was female, age ranges from 70-79 years old or 40.53% and level of education was in the primary school 59.45%.

Variables

Independent variables: The present and no present of dementia symptom.

Dependent variables: auditory immediate memory, visual immediate memory, auditory delayed memory, and visual delayed memory.

Instruments

1. Thai Mental State Examination (TMSE) which has been developed for screening the dementia condition for Thai people by Train the Brain Forum Committee. It is a quick, sensitive, reliable and applicable neuropsychiatric test (40); consists of six basic subtests concerning orientation (6 points), registration (3 points), attention (5 points), calculation (3 points), language (10 points) and recall (3 points). The score from each subtests will be calculate. The full score of this test is 30 points and the cut-off point is 23 or considered having the dementia syndrome.

2. Thai Geriatric Depression Scale (TGDS), developed by Train the Brain Forum Committee, is a self answering sheet to assess the self-perception in the last week events. By answering “yes” or “no” 30 questions the score will be sum to the total score. The total accuracy rate of this test is .93(41). This test used to assess the depression symptom due to the similarity of both depression and dementia symptom which can manifest in low score of the memory test. The full score is 30 points if the person has the score below 13 will consider as normal with the following criteria; normal (0-12points), mild depression (13-18 points), moderate depression (19-24 points), and severe depression (25-30 points).

3. The WMS-III Abbreviated developed by the Psychological Corporation is the fast and reliable memory assessment. It is designed to be easy to administer and score. The test is including 4 subtests.

3.1 Logical Memory I: having 2 different stories read by the examiner. And immediately after hearing each story, the examinee is asked to retell it from memory. This subtest measures the auditory immediate memory. This primarily verbal information is sequentially organized and contextually structured. Furthermore, this also provides a second exposure to the second story and another opportunity for the examinee to learn the content of that story. To administer this subtest, the examinee will ask to listen to the story carefully and try to remember just the way the examiner reading it as close to the same word as the examinee can remember. To recall each story the examinee will persuade to answer even the uncertain detail. When finish answering both story the examiner will tell he/she to remember stories and recall it again later.

3.2 Family Pictures I: this subtest is designed to be a visual analog of the Logical Memory subtest. The characteristics that the subtests have in common are contextual structure and recall of names, objects, locations and events. But this subtest doesn't have an inherent sequence to the events being observed and recalled. Or it can implied that this subtest measure the visual immediate memory by showing four different scenes with family members. The examiner will show the first picture consist of every family members and identify each character i.e. grandmother, grandfather, father, mother, son, daughter, and dog. Then explain that there will be four scenes with these family members in the scenes and will allow to look at each scene for 10 seconds. The examinee will ask to remember about each scene as much about the scene as they can. Before open the next scene the examiner will tell the names of each scenes i.e. the picnic scenes, the department store scene, the yard scene, and the meal scene including emphasize the examinee to remember as much about the scene as

he/ she can. After all four scenes are displayed, the examinee is asked to remember which characters were in each scene, where they were positioned in the scene, and what they were doing. The information is presented visually but may be encoded with visual and verbal strategies.

3.3 Logical Memory II: the examinee is asked to retell stories A and B from Logical Memory I without rereading by the examiner. The only cue that can give if the examinee does not recall anything in story A is the story was about a woman who was robbed and in story B is the story was about a weather bulletin. Congruence with Logical Memory I, this subtest assesses an individual's auditory delayed memory. The verbal memory is including names, objects, events, locations and activities which the examinee must recall.

3.4 Family Pictures II: presenting a four-quadrant grid and asked to remember the characters, their positions, and their activities from the four scenes presented earlier (in Family Pictures I). The four scenes are not re-presented to the examinee. This is a delayed visual delayed memory of the Family Pictures I. It requires visual-spatial recall as well as recall of names, objects and events.

The Process of data collecting and data analysis

The WMS-III Abbreviated was administered to the subtests on the individual basis in the following stages:

1. Contact Siriraj Hospital for permission of the data collection with a written request from the Graduate School of Mahidol University.

2. Using the match pair sampling to select the sample group according to the criteria.

3. Contact the physician who's in charge with the sample groups for asking their patients permission to attend the study.

4. Meet the patients and the elderly people who are willing to join the study and describe the study's detail.

5. Sign the form of consents with those who understand and intend to join the research. For the normal elderly people the researcher will inform the volunteers for not continue the study if they are not passing the screening test.

6. Arrange the appointment by using the same date and time with the doctors appointment to provide the most convenient for the patients and their caregivers. And individually administered data collection by the researcher with the following details;

6.1. TMSE was the first test to screening for the dementia condition in the control group. It would be used once before any other assessments. The test used approximately 10 minutes per persons and administered by the researcher.

6.2. TGDS was the second test to assess the depression symptoms one time in the control group. It would used 10 minutes to complete the test per person. The test would be administered by the researcher.

6.3. WMS-III Abbreviated would be the last test to use in this study. To assessed the case and the control group. The subtests would take 30-40 minutes of actual testing time. To assess the Logical Memory II there must be approximately 20 minutes interval from the completion of Logical Memory I and the beginning of Logical Memory II. During this interval the researcher would provide small discussion with the participants in order to make them feel more relax.

4. The available data was analyzed using SPSS for windows as follows:

4.1 Mean and Standard deviation were calculated in each subtest, and composite scores classification of the normal elderly group and the dementia group.

4.2 Frequencies were calculated in each composite scores' classification of the normal elderly group and the dementia group.

4.3 Analyze the difference of score in each subtest and composite scores between the normal elderly group and the dementia group using paired-samples t-test.

CHAPTER IV
RESULTS

This study was a descriptive research which aimed to compare the memory function between the elderly dementia patient and the normal elderly people by using WMS-III Abbreviated. Total numbers of subjects were 74 divided into two groups: 37 elderly demented patients who were treating at out patient department Neurology's unit, Siriraj Hospital and 37 normal elderly people from Suan Pak Community, Chatuchak District. The results are presented as follows;

1. The score of TMSE and TGDS of the normal elderly people.
2. Subtests score and composite score of elderly dementia patients.
3. Subtests score and composite score of normal elderly people.
4. The comparing the mean of subtest and composite score of the dementia elderly patients and normal elderly people.
5. Number of elderly dementia patients and normal elderly people classify by the composite scores.

Table 2 shows scores of the normal elderly people were screen for the demented and depression symptom with Thai Mental State Examination (TMSE) and Thai Geriatric Depression Scale (TGDS) to affirming that demented and depression patients were excluded in this group. The cut off-point of TMSE is 24 (from 23 downward is considered to be dementia) and 12 for TGDS cut-off point (13 and below is considered normal).

Table 2 The score of TMSE and TGDS of the normal elderly people

Test	Mean	S.D.	Minimum	Maximum
TMSE	26.24	1.51	24	30
TGDS	6.54	3.90	0	12

It showed that the mean score of TMSE and TGDS are within normal (26.24 and 6.54 consecutively).

Table 3 Subtests score and composite score of elderly dementia patients.

Subtest/Composite Scores	Mean	S.D.	Minimum	Maximum
Logical Memory I	2.22	1.64	1	7
Family Pictures I	2.08	1.67	1	7
Logical Memory II	3.14	2.14	1	10
Family Pictures II	2.35	1.44	1	7
Immediate Memory	58.24	6.43	55	74
Delayed Memory	61.54	7.98	55	85
Total Memory	58.03	6.46	55	79

Table 3 showed scores of elderly dementia patients. Considering from the mean in every subtests, it was classified in the low level. Even in the three memory

composite scores which were in the extremely low.

Table 4 Subtests score and Composite score of normal elderly people.

Subtest/Composite Scores	Mean	S.D.	Minimum	Maximum
Logical Memory I	3.95	2.60	1	11
Family Pictures I	5.43	2.53	1	11
Logical Memory II	5.41	2.92	1	13
Family Pictures II	5.81	2.88	1	11
Immediate Memory	68.86	12.82	55	94
Delayed Memory	76.62	13.71	55	101
Total Memory	71.14	12.97	55	96

This table showed scores of normal elderly people. The mean of every subtest were in the low level. Delayed memory and total memory composite scores were in the borderline classification while immediate memory was in the extremely low level. It was noticeable that the maximum scores of the normal elderly was higher than the demented in every subtest and composite scores as shown in table 3.

Table 5 The comparing mean of each subtest and composite scores of the demented elderly patients and normal elderly people

Subtest/ Composite Scores	Dementia Patients		Normal People		t
	Mean	S.D.	Mean	S.D.	
Logical Memory I	2.22	1.64	3.95	2.60	-3.26
Family Pictures I	2.08	1.67	5.43	2.53	-7.04
Logical Memory II	3.14	2.14	5.41	2.92	-3.60
Family Pictures II	2.35	1.44	5.81	2.88	-7.70
Immediate Memory	58.24	6.43	68.86	12.28	-7.28
Delayed Memory	61.54	7.98	76.62	13.71	-10.83
Total Memory	58.03	6.46	71.14	12.97	-9.11

$p<.001$

The results from each subtest and composite scores of elderly dementia group were lower than normal elderly group at the statistical significance of .001.

Table 6 Number of elderly dementia patients and normal elderly people classify by the composite scores.

Group	Classification			
	Extremely Low	Borderline	Low Average	Average
	N	N	N	N
Immediate Memory				
Elderly dementia patients	33	4	-	-
Normal elderly people	22	6	6	3
Delayed Memory				
Elderly dementia patients	33	3	1	-
Normal elderly people	10	13	6	8
Total Memory				
Elderly dementia patients	35	2	-	-
Normal elderly people	19	9	4	5

The majority of elderly dementia patients were classified every composite score in the extremely low and the highest classification was in the delayed memory.

CHAPTER V
DISCUSSION, CONCLUSION AND RECOMMENDATION

The purpose of this study was to compare the memory function between the elderly dementia patient and the normal elderly people by using WMS-III Abbreviated. This research consisted of the two sample groups: 37 elderly dementia patients at out patient department Neurology's unit, Siriraj Hospital and 37 normal elderly people in the Suan Pak Community, Chatuchuk District. The instrument of this research was to examine the auditory and visual memory abilities of both sample groups.

Discussion

The subjects mostly were female, age range from 70 to 79 years and had primary school level. The composite scores of the elderly dementia patients were statistical significance lower than the normal people. The result consequently supported the hypothesis of this study as follow;

1.Comparison of subtests and composite scores between the elderly dementia patients and the normal elderly people shows statistical difference at .001. As appear in table 6, the mean of composite scores' were classified in the Extremely Low. This result was accepted the hypothesis and consistent with the study of Pinnakarn Srisarakorn(7). In pursuance with the study conducted by the Psychological Corporation and the study of Levy, the Alzheimer patients' performances are significantly worse than the normal people(8). From the study of Kramer with Alzheimer dementia, frontotemperal dementia , and semantic dementia concluded that three of this dementia's subtypes were significantly impaired on verbal memory whereas the Alzheimer dementia was also impaired on visual memory(42). Consistent with Guarch's study which suggested that the dementia performed immediate and

delayed verbal and visual memory, attention, and learning more deficit than the normal people(43). In addition, the dementia dysfunction is also involves language, abstract thought and other executive function(3, 23) which leads to the difficulty in learning, remembering and using long sentences in order to answering the question. The finding of these study relates to the explanation that the demented patients had the cognitive impairment and regression of intellectual gradually(23) while normal aging people appear to be slight deteriorate(43).

2. Considered with the demographic data, the normal elderly people were mostly graduated in the primary school level and had the age range between 70-79 years or in the middle old age as seen in table4. Therefore, the finding that the subtests done by the normal elderly people are low. Moreover the immediate memory and the total memory composite scores were in the Extremely Low level. It can be explained in detail that;

2.1 Age was associated with declining in the memory function. The study by Peterson and his colleagues found significant drops in memory performance due to the increasingly age (44). More over from Anderson's finding he suggested that in the fast recall that should be a measure of semantic memory did decline significant due to the increasing age(45). As mentioned before, increasing age caused the physical declination including in the nervous system. Frontal lobes and hippocampus seem to be correlated with age decline, the frontal lobes involved in the encoding and retrieval information while the hippocampus is critical for the formation of facts(12). The studies suggest that the frontal lobes and hippocampus function are particularly affected in the course of aging. Areas of the prefrontal cortex are less active in older than in younger adults and that these alterations have an impact on memory performance (46, 47). The coordination of neural activity in hippocampal, prefrontal, and parietal regions may be primarily related to an activation in medial parietal regions which leads to successful encoding requires(48). In memory system, the efficiency of encoding is subjected to the information processing speed(49). Compromised verbal memory performance on Logical Memory subtest may be at least partially influenced by the processing speed deficit(50). Another explanation is the declines in sensory functions. The study of Katia which investigate the aging effects in visual memory and concluded that the visual span decrease more advance

due to the increasing age(50). Moreover, photographic memory which is a strong visual imagery skills are more common in children and are usually lost by the end of adolescence(14). According to these sensory declination, Uttl suggested that the older adults will perform both visual and verbal memory tests better if the display size or loudness increased(51).

2.2 Attention span, the formation of normal memory begins with attention and normal perception of stimulus(52). During the collecting data, most subjects were well cooperated by paying good attention in listening to the stories and looking each pictures carefully. However, when finishing the session, most of them complained about the long stories and the details in each picture that is hard to remember. Some confessed that they had lost their concentration on the stories and the pictures after hearing 2 or 3 sentences. As Dean mentioned that to repeat the information immediately after its initial presentation requires attentional abilities (11) while Sriruen Kawkanwan said that decreasing of the attention span is normally found in the elder-age people(42), which can be explained that the declination of the sensory system can effect the attention span and memory. As the study of Johnson that investigated the difference of Logical Memory subtest between the dementia patients and the normal aging people the study concluded that this subtest reflect difficulty with attentional control rather than the memory(53).

2.3 For the in attention of detail, from the test of four scenes of Family Pictures I and II, most elderly people especially the primary educational level group, had the problems identifying some details in the pictures for example; grilling the barbecue or throwing the Frisbee pictures in the picnic scene, lawn mower picture in the yard scene, or pictures of passing the plate, pouring the salad dressing, holding a glass, and drinking in the meal scene. Some could not recognize the difference between the old and young family members. When asking the subject to explain more they often said that the man pushes something or the man just stands. In the meal scene, they could only generalize the answer that everyone in the picture was eating. After finished the session the researcher had pointed the missing item that the subject did not answered. Mostly, the subjects said that they can see the items but didn’t recognize and thought it was not important detail to remember. This example consequently, affects the scores of the subtests that make it low. From the study it had

found that the subjects could increase their memories if they are more familiar with the stimulus(15).

2.4 The educational level, most of the memory test and other cognitive function are impacted (54). Level of education has been associates with performance on neuropsychological measures. The studies of Mcdowd among healthy elderly individuals suggest that those with high levels of education tend to have better cognitive function and that this function is less likely to decline over time(9). In this study, there are 59.45% of the normal elderly people who completed the primary school and only 5.4% graduated in the bachelor degree. The mean of every subtest and composite scores seem to be increase according to the higher education. For instance, in the total memory composite score, the subjects who graduated in the primary school had 62.05 points, 68.08 points for the secondary school level, and 69.75 for the bachelor degree. In accordance with the studies of Pinnakarn Srisarakorn, Psychological Corcoration, Leibovici and Beatty concluded that the educational difference is one of the most important factors that could affect the memory function(7). In addition the Psychological corporation's study found that this factor effects stronger for Logical Memory than for Family Pictures and the study of Beatty which said that level of the education contributed greatly effect to the delayed memory (54). In addition, the studies conducted by Arvanitakis and his colleagues found that the low education elderly people showed greater impairment of memory and attentional function(57). The studies about the relationship between the memory capacity and the level of education explained that education is positively related to nutritional habits and health behaviors and may serve as a marker for better health resulting in superior cognitive performance. Moreover, the higher education seniors tend to have more cognitively stimulation activities e.g. reading a newspaper which leads to slow down the general cognitive declines(58). In addition, it is hypothesized that education results in increased synaptic connections in the brain, preventing loss overtime(45).

Conclusion

The objective in this study was to compare the memory function between the elderly dementia patient and the normal elderly people by using WMS-III Abbreviated. The sample group of this study was consisted of 37 elderly dementia patients and 37 normal elderly people. There were 14 males and 23 females in each group and the majority of age range is between 70-79 years old. Most of them completed the primary school.

The comparison of subtests and composite scores in WMS-III between the dementia patients and the normal people by using t-test found that each subtest and the composite scores were different at .001. Total memory composite score of the elderly dementia patients was 58.03 or classified in the extremely low range and for the normal elderly people the median score was 71.14, which drops in the borderline classification. In other word, there was bigger number of elderly dementia patients in Extremely Low level but none of them in the Low Average and Average level while from Borderline to Average level the amount of normal elderly people was bigger. The result of study is also compatible with the hypothesis on the view that the immediate memory, delayed memory, and total memory capacities of the dementia patients were lower than the normal elderly people.

Recommendation

Recommendation in using the test;

The results of this test enabled us to aware of the testing efficiency. To be able to maximize the use of this test, the following items should be observed; Firstly, the physical declination in the elderly people has lead this age group to have more difficulty in listening and seeing the test materials. The examiner should be certain that the subject is not deprived of these sensations before starting the session. Secondly, the Family Pictures subtests might cause some confusion in the instruction part and the generations of the family's member. As appear in the test's manual, the only instruction that can give to the examinee is "I would like you to remember as

much as you can about each scene" therefore, it cannot directly interpret to Thai language. Considered from the elderly people complained about unclear of instruction such as what and where he or she have to remember. Therefore, giving the clearer instruction i.e. "I would like you to remember who is in the pictures? What are they doing? And where do they stay in each picture?" would reduce these confusions. For the generation of the family members, they often transfer themselves in the scenes so one step generation was misplaced as the grandfather and grandmother will become the father and mother, while the mother and father from the instruction will be the son and daughter-in-law, and the son and daughter will be the niece or nephew. The researcher found that by asking the subject to identify the family members will reduce this mistake. Thirdly, sometimes the elderly people tend to avoid answering any items they are not certain. To prevent this problem the examiner should encourage and support them to reply even the answer they are not sure before scoring zero in any unit. Finally, this test requires the subject to auditory and visually remembers a lot of things which often lead to stress and anxiousness especially in the elderly people, so the administrator should create a good rapport and giving them occasionally the rest to make the subject feel more relax.

Recommendation for further study;

WMS-III Abbreviated is using the 4 most significant subtests from WMS-III and taking not more than one hour to finish, it helps the patient to have the opportunity to screen for the memory problem in a fast and reliable way. Expanding the study to other age groups or other neurological disorders will help this test to be beneficial to clinical, educational or research issue

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