CHAPTER V
DISCUSSION

In this chapter, the discussion of the research finding are divided into 6 part as follow:

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Part 1 Discussion of research methodology

1.1 Research design

The study was a cross-sectional analysis which aimed to determine the prevalence and factors that related with dementia among elderly people in Lampang province. This research design exposed the prevalence of dementiaamong elderly in Lampang province, prevalence of exposure, and description of the relationship between independent and dependent variables. However in time relation, it cannot find when the relationship between independent and dependent variables happen first. Moreover, it has limitation, because it can measure the subjects who still alive or stayed in thestudy area only (selection bias). But if we used other analytical study

design such as case control study design, wewill impossible to estimate prevalence of dementia. On the other hand, Cohort study design may take a long time to follow case of dementia. According to those limitations, the cross-sectional study design is the most suitable for this study.

1.2 Sample size

The subjects were 440 elderly people who were living in Lampang province. This study had 100% of response rate, because the researcher and assistantwerecollected the information by ourselves, and we were randomly reserved the subjects in case that we could not found the subjects in the study area.

1.3 Study subjects

The subjects of this current research were elderly people whose aged at least 60 years old and were living in Mueang district, Mae Phrik district, Mae Tha district, and Hang Chat district in Lampang province from August to November, 2013. To prevent the selection bias, the simple random sampling had used as a method to select the subjects. In addition, the stratified multi stage sampling was usedto filter the representatives of the whole population.

1.4 Research instrument

The research instrument of this study was the basic brain testing. The Mini-Mental Status Examination (MMSE) is the popular instrument that used in many studies.Therefore, the selected instrument in this study is MMSE Thai 2002 that is the combination of MMSE and IQCODE to screen the cognitive dementia. In addition, the modified IQCODE was used to screen for functional dementia. It is also a combination of MMSE and IQCODE.

The instrument had been modified to be fit with Thai elderly people, because it will be better if we detected the dementia patient in an early stage. The dementia in early stage is can be cured, and that can extended the patients' lives.As a result, early dementia detection for early diagnostic and treatment is important for elderly people. The research instrument in this study should bea high sensitivity instrument in detecting dementia, because it probably wrong detectedthe dementia in person who did not get the disease.

The estimated overall sensitivity and overall specificity of research instrument in this study was high in sensitivity (>96%). So, the combination of Mini-Mental Status Examination (MMSE Thai 2002) and the modified informant questionnaire on cognitive decline in the elderly (modified IQCODE) was a good instrument to detecting dementia for this study (115).

1.5 Data collection

The research assistants were trained about each question in the questionnaire before collecting data, because it was reduced information bias in the study. MMSE-Thai 2002 was used to collect data from elderly person by face to face. The whole process of detecting dementia was around 10 minutes per person. The modified IQCODE was used to interviewthe subjectsand took about 10 minutes also. The informantswere knew the screening test's result after completed the interviewed by the researcher or research assistants. Finally, the obtained data were then completed and analyzed.

1.6 Data analysis

After data collection finished, completed questionnaireswere coded in the computer and scored. The data were analyzed statistically by a SPSS program with the significance level set at 95%CI (a=0.05).Frequency, percentage, mean, and standard deviation were used to describe demographic characteristics of subject.Univariate analysis by unconditional logistic regression was used to describe the associationsbetween each factors of dementia among elderly people.The multivariate analysis by multiple logistic regression was used to describe the associated between factor of dementia among elderly people after adjusting for other variable in the model. The significance level set at 95%CI (a=0.05).

Part 2 Prevalence of dementia in Lampang province

The result of this study revealed the elderly people who has dementia by using Mini-Mental Status Examination (MMSE Thai 2002) was 23.2%, modified IQCODE (28%), and combination of two instrument (35.5%). The prevalence of

dementia in this study was higher than previous study in Maeprik district (15%), Second National Health Examination Survey 1996 (NHES 2) (3.3%), and Fourth National Health Examination Survey 2008 (NHES 4) (12.3) (12, 19, 20)

There was comparison between this study and the other studies in Asia for example, Moon-Doo Kim's study in (41) 2006-2009 conducted with 1,708 people who are 65 years old and above by using MMSE-KC as the screening tool and DSM-IV to diagnose the disease. The prevalence of dementia was found at 20.5% which was higher than Moon-Doo Kim's study at 8.1%.

The other study in South America such as Cássio's that was estimated prevalence of dementia. The study showed that dementia was diagnosed in 107 subjects. The estimate of dementia prevalence was at 12.9% (114); therefore, the prevalence of dementia in this study was higher than Cássio's study.

The Delphi consensus study was estimated that the number of dementia patient will be more than 24 million people around the world, and the number of new dementia patient will be more than 4 million people per year.Beyond that, the number of patient with dementia was expected to increase more than 81 million people in 2040 (3).

The prevalence of dementia in this study was different from the literature review becauseof structures of populations, study sample, research instrument, and education as the accuracy of the MMSE depends on a person's educational level and the context in each study was different.

When compared the prevalence of dementia from this study and previous study following screening test instrument for dementia, this study found the prevalence of dementia was higher than previous study. It means that the increasing number of dementia was true, so it was confirm by specialist doctor.

Part 3 Prevalence of dementia among exposure

Gender: This study found the higher prevalence of dementia in women (37.6%) than in men (30.7%) and it was similar to the study of Juncos-Rabadan et al. (51) that found the prevalence of cognitive impairment (CI) at 46.20%. The positive associations were found in age, gender, level of education, subjective memory

complaints, instrumental daily activity level, reading habits and frequency of leisure activity. In the logistic regression, modeled CI was associated with gender (49.12% in women, 39.66% in men). Afgin (52) was studied 944 Arabians who aged ≥ 65 years old in Wadi-Ara, northern Israel. The subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). The females ($p < 0.0001$) were significantly had more chance to be dementia. This may be because the women were lack of estrogen hormone as the estrogen is an important female sex's hormone and it helps to keep the brain cells healthy (119). In summary, the prevalence of dementia in women was more than men in this study.

Marital status: From the result, the marital status tended to associate with dementia ($p=0.02$). It corresponded with the study of Boonchai Nawamongkolwattana et al. (42) They were studied the prevalence and socioeconomic factors that related to cognitive impairment among elderly Thai people. The 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. Firstly, the Mini International Neuropsychiatric Structure Interview (M.I.N.I.) was used for screening a current depressive disorder. Secondly, 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-Thai2002). The one who aged over 60 and were widow, divorced, or separated with husbandhada greater risk of dementia for 1.75 times than the one who was currently got married.

It can be described that the association between the elderly personwho is single or separated and the risk of dementia is statistically significant, because elderly person who was married had more opportunity to do activities with their family and couple than the elderly were single or separated. This will increase the stresses and feeling down to the elderly people.

Work (after 60 years old): The occupation of the subjects was tended to associate with dementia ($p=0.04$).The result also corresponds with the study by Verghese et al. (77).They used prospective cohort with 469 subjects who were older than 75 years old and had resided in the community and did not have dementia at base

line. A median of follow-up period was 5.1 years.The dementia developed in 124 subjects (Alzheimer's disease in 61 subjects, vascular dementia in 30 subjects, mixed dementia in 25subjects, and other types of dementia in 8 subjects). Activities such as leisure activities, reading, playing board games, playing musical instruments, and dancing were tend to reduce risk of dementia.

According to the occupations of the subjects in this study were agriculturists, freelance and handmade workers, they used more than one skill for work for example, thinking, planning, or management. Therefore, the elders who still work in present can delaythe risk of dementia, because their brain and nervous system will activate many times during working.

Family: also tended to associate with dementia (p=0.008).

The findings were corresponded the studies in longitudinal clinic pathologic cohort study with up to 4 years of annual in-home follow-up. The population in the study consisted with the total of 792 elderly people, free 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 AD during the follow-up when compared with a person with a low degree of loneliness (63). It was due to they have many people their family and had opportunity to do activities more than the one who lived alone. A good relationship in the family likea good take care, the respect to elderly people, etc. These are important to support the mind working in elderly people.

Caregiver: was tended to associate with dementia (p=0.01).

This finding was corresponded to the study of Yaffe et al. (64) Participants were consisted of 2,509 well-functioning black and white elders. They enrolled in a prospective study. Cognitive function was measured by using the Modified Mini-Mental State Examination. The study found that the elder who not had a caregiver was associated with major cognitive decline when compared to the one who had the caregiver (OR = 1.22, 95% CI 0.94-1.58).

Otherwise, caregiver was important due to their cares to provide a good food or good nutrition, helped daily living that needed, and did activities together with

the elders. The enough cares from the caregiver has generally been associated with better quality of life and health, and reduced stresses of elderly people.

Income: was tended to be associate with dementia (p=0.02).

The study's finding was corresponded the study by Evan et al (54). They examined their subjects by using cohort study with an average of observation about 4.3 years. The subjects were in 65 years old range of age and living in the Western of Boston. The study revealed that lower socioeconomic status predicted risk of developing incident AD.

Elderly people who have high income might have better quality of lives due to they had more opportunities to eat good food, take supplement for good health, do a lot of social activities, and had more accessibility to Public Health Service. These things can decrease the risk of dementia.

Life crisis event: It was tended to associate with dementia (p=0.89, 0.86).

This finding of the present study was difference from the study of Ramitet al (56).There were 9,362 male participants of their study and they applied the information from the Israel Ischemic Heart disease (IIHD) to their study.They were asked whether the participants had experienced CFPD (paternal or maternal) or not. The result showed that theone who had CFPD during childhood was tended to get more risk of dementia.

The difference result might be come from the Ramit's study were focused on age during paternal or maternal death, but this present study did not measure age duringpaternal or maternal death. However, there was a similar result as this study found the associated of crisis reported child death (p=0.01) and dementia.

Stressful life events such as, the paternal or maternal death, and child death werea major depression of the elderly people. It can increase the risk of dementia, orthe primarily Alzheimer's disease. As we can see, the depressive mood is one of the sign of Alzheimer's disease (57, 58).

Alcohol consumption: It was trend to be associated with dementia (p=0.03)

The result showeda similar outcome with the study of Peters et al (67). They collected twenty-three studies.Their study was a longitudinal study among the subjects who aged ≥65 with primary outcomes of incident of dementia or cognitive decline. Meta-analyses suggested that small amounts of alcohol may be protective against dementia (70). Moreover, the study of Anestey et al. (68) was done through a systematic review, including meta-analyses of 15 prospective studies. The follow-ups ranged from two to eight years. Meta-analyses were conducted on samples of 14,646 participantswho got Alzheimer disease (AD), 10,225 participants who got vascular dementia (VaD), and 11,875 participants who got other 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 (72).

In conclusion, chronic alcohol abusedis causing the progressive of neurodegenerative disease whichis the result of dementia.

Smoking: It was trend to be associated with dementia (p=0.03).

The study was corresponded those in the study byPeters et al. (65), the systematic review and meta-analysis were carried out and twenty-eight publications were collected. The participants in this study were people who had ageof 65 years old and over. The reviews found a significantly increased risk of Alzheimer's disease in current smoking people and a likely but not significantly increased risk of vascular dementia, unspecified dementia, and cognitive declines. Juan et al. (67) also conducted a research with a two-year follow-up study among elderly people. A total of 2,820 participants were aged 60 years old and over, and they were from six communities in Chongqing. Dementia was diagnosed by MMSE (Mini-Mental State Examination) and DSM-III-R (Diagnostic and Statistical Manual of Mental Disorders). It was compared the non-smokers, current smokers. The findings showed that the current smokers had asignificantly 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). 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). An even higher risk of Alzheimer's disease showed in the heavy smoking group (RR = 3.03;

95% CI = 1.25-4.02). The study of Rusanen (68) carried out by using the cohort study.The subjects were consisted of 21,123 members of a health care system had participated in a survey between the year1978 and 1985. The study found that the one who had heavy smoking in midlife was associated with a greater than 100% inrisk of dementia, AD, and VaD.

Although, nicotine has plausible mechanisms for aiding cognitive function but will be effect in a shot while, if the exposure is discontinued. Smoking may also accelerate cerebral atrophy, perfusional decline, and white matter lesionsthat were caused dementia (120).

However, this current study's finding was found only the one who ever smoke is risk to be dementia when compared to the non-smokers which was agreed with the study of Aggarwal et al. (67). The relationship between smoking status and incident Alzheimer's disease (AD) was investigated in a random stratified sample of a biracial community in Chicago. Analyses are based on 1,064 people (all 1,134 people were evaluated). The study found that current smoking status was associated with increased risk of incident AD (OR = 3.4, 95% CI = 1.4-8.0) when compared with people who never smoked (67).

Hypertension: was trend to be associated with dementia (p=0.27).

This study'sfinding was different from the study by Ogunniyiet al (105) that were investigated the relationship between hypertension and dementia incidence in among the elderly people who aged 70 years old and above in Nigeria. The results presented that the subjects who had hypertension hada significant risk of dementia (OR = 1.52, 95% CI 1.01-2.30) (104).

The study's subjects who had hypertension and continually treatment with hypertensive drugs (99.5%) were tended to have a decreased risk of dementia. This finding was similar to the study by Peile et al (79). 1,294 of participants in the research hada hypertension (mean age 76.7 years).The result showed that each additional year of treatment there was a reduction in the risk of incident of dementia (hazard ratio [HR]=0.94, 95% CI, 0.89 to 0.99). The risk of dementia in the subjects with the age >12 of treatment was lower when compared with theone who never been treated hypertensive (NTH) (HR for dementia=0.40; 95% CI, 0.22 to 0.75, and for Alzheimer

disease HR=0.35; 95% CI, 0.16 to 0.78) It was similar to the normotensives. Nondemented subjects who had got five to twelve years of treatment had lower yearly CASI when compared with the never-treated hypertensive patients (NTH).

Dyslipidemia: was trend to be associated with dementia (p=0.18).

This study finding was contrasted from Moroney's (108) that used prospective longitudinal community-based study. The participants were 1,111 non-demented New Yorkers, aged 65 years old and above and the study were followed up for two and a half years. The lowest quartile was compared with the highest quartile of LDL cholesterol. The result showed that the highest quartile of LDL has 3.1 times of being dementia. (RR = 3.1, 95% CI 1.5-6.1).

The reason that we found the association between congenital disease and dementia is the subjects in this study may have a continually treatment by taking medicine for treatment the high blood pressure (99.5%), and high cholesterol (statins) (97.6%). This finding was similar to the study of Hajjr (80). It was a case-control and a retrospective cohort study of a community-based ambulatory primary care geriatric practice. After covariate adjustments, patients on statins were less likely to have dementia (OR = 0.23, 95% CI 0.1-0.56), Alzheimer's disease (OR = 0.37, 95% CI 0.19-0.74), and vascular dementia (OR = 0.25, 95% CI 0.08-0.85).

History of exposure to organic solvent: It was trend to be associated with dementia (p=0.002).

This finding was different from the study ofOlsen (97). His study was conducted to estimate the association between neuropsychiatric diseases that leading to the early retirement pensioning and exposure to organic solvents in the Danish wood industry.The case-control study was conducted to investigate whether history of organic solvent exposure is associated with increased risk of Alzheimer's disease or not.They found that the one who exposed with the organic solvents more than 4,000 hours would have a chance to be dementia more thanthe one who did not exposed with organic solvents (96). In addition, there was a study of Kukull (98) among 23,000 people who aged 60 years or more in Seattle, Washington. He found that the one who exposed the solvent for example, benzene and toluene, phenols and alcohols, ketones,

other solvents had more chance to get Alzheimer's disease (OR= 2.3, 95% CI 1.1-4.7) (97).

In addition, the subjects who had a continually hypertensiontreatment by taking hypertensive drugs (99.5%) will decrease risk of dementia. However, the study did not asked about how they prevent themselves from the exposure to organic solvents or how much of solvents that they ever exposed. Thus, there might be some participants that have been treated and prevented themselves from the solvents well. Yet, this prevention can reduce the risk of brain damaged.

Physical activities: It was revealed that there was a significant association ($p<0.001$) between the one who rarely, or never do exercise with dementia.

The study was corresponded to the study of Yaffe (64). The study's population was consisted of 2,509 people who aged at 70-79 years old. Their cognitive function was measured by using the Modified Mini-Mental State Examination. The results disclosed that the one who did weekly moderate or vigorous exercise were significantly had fewer brain declinewhen compared with the one who did not do any exercise (OR = 1.31, 95% CI 1.06-1.62).

The reason is that the exercise is essential for maintain good blood flows to the brain as well as to encourage new brain cells. Thus, this can be one way to protect the main risk of dementia such as stroke, or heart attract.

Food consumption: the one who were not a fish consumer were associated with dementia ($p=0.03$).

The finding was corresponded with the study ofAlbanese (95). The one-phase cross-sectional surveys were conducted withelders who aged at 65 years old and above in 11 catchment areas of 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) (94).

Fishes are the rich source of omega-3 that has antiinflammatory, antioxidant, antiatherogenic, antiamyloid, and neuroprotective properties, so the beneficial of fish consumption isto reduce the risk of dementia.

Moreover, the fat intake trend to associated with dementia (p=0.01, 0.008). This finding was different from the study of Luuchsinger (24). His subjects were 980 elderly people. The mean of ages were at 75.3 years old. The study was followed up the subjects for four years as a mean. Those in the highest quartile (1,870 kcals per day) had an increased risk of AD. Morris (92) was also studied the individuals with the apolipoprotein E epsilon4 allele. The hazard ratio of AD in the highest quartiles of calorie and fat intake was higher thanthe lowest quartiles (758 kcals per day).

Body mass index: It was revealed that there was a significant association between BMI and dementia (p=0.04).

The result is similar with the study of Fitzpatrick et al (110). The study was evaluatedthe associations between mid-life and late-life obesity and risk of dementia. Total elders who participated in this study were 2,798 people and they were aged from 65 years old up. The result found that the underweight persons (BMI <20) had an increased risk of dementia.

The reason that explains the result is that elders who were overweight usually eating too much fat and cholesterol, it may cause plaque-laden narrowed arteries. Blood flow to the brain were decreases, it can lead to the death of the brain. All of these conditions could contribute to dementia (112).

Part 4 Factors associated with dementia

The Multiple regression Analysis was done through 23 variables from age, marital status, education level, income, work after 60 year old, daily activity level, crisis following child death, caregiver, participating in elderly club, visiting neighborhood, participating in village traditions, religious activities, family member had history of dementia, living arrangement, alcohol consumption, smoke, exercise, doing housework, fat intake, fish intake, history of exposure to organic solvent, diabetes mellitus, and BMI.Multiple logistic regression analysis revealed sixvariables

that were statistically associated with dementia as follows: age > 80 years old, education level, levels of activities in daily living, rate of participating in village traditions, family's history of dementia, and diabetes.

The results from this study showed that hypertension and smoking were not associated with dementia. It is maybe becausethe subjects in this study follow inclusion criteria. They needed to have good consciousness, sighting, hearing, and communicating in Thai language. So, elders who had got complication from severity of hypertension such as stroke were excluded from this study. Therefore,this was a selection bias. Most of elders in this study were hypertension and also smoking as a result, the elder who only got hypertension or only smokingwere not found in this study. That is the reason why the study did not find significantly associated between hypertension and smoking with dementia.

Age: The elder who aged more than 80 years old was significantly associated with dementia (adjusted OR = 2.93, 95%CI 1.21-7.11) when compared with elders who agedfrom 60-69 years old (p=0.02).

The result also corresponds with the study by Moon-Doo Kim et al. (41) The prevalence and factors that correlated with dementia were explored by using 2006-2009 data of the National Early Dementia Detection Program (NEDDP). This program included all residents who were aged more than 65 years old and were receiving financial assistance. Multivariate logistic regression analysis showed that the age factors of 80 or older were statistically significantly associated with dementia.

The study presented that study subjects who had aged 80 to 84 years old would have more chance of being dementia than the one who had aged less than 80 years old.Otherwise, study subjects who had aged more 85 years old would have more chance of being dementia than the one who had aged less than 80 years old. Afgin et al. (52), done a research through Arab populationof 944 peoples who aged ≥ 65 years old in Wadi-Ara (an Arab community in northern Israel). The subjects were classified as cognitively normal, MCI, AD, or other based on neurological and cognitive examination (in Arabic). Their study revealed that age was significantly associated with minor fault in brain and AD. Boonchai Nawamongkolwattana et al. (42) studied 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-Thai2002). The factors associated with cognitive impairment in the elderly were age more than 80 years old which have to risk more than the ageing had 60-69 years.

The possible reason to explain was that the more ages that the elders had affected to body, brain, and nervous system changes. If the number of nerve cells in the brain typically decreased, thenerves may repair themselves more slowly and incompletely as a result. In addition, levels of the chemical substances that have functioned to send message in the brain are also changed. Most of them decreased, but some increased. Nerve cells may lose some of their receptors for messages and blood flow to the brain is decreased, because of these age-related changes and the brain may function slightly less well. (121).

The adding number of old people in Lampang province means that the community is changing into aging society. As we can see, this group of elderly people is risky to develop dementia in the future.

Education: elders who has no educationwas significantly associated with dementia (adjusted OR =2.24, 95%CI 1.23-4.09) when compared with elder who had education level in primary school.

The result corresponded with the study byMoon-Doo Kim et al (41). They were used 2006-2009 data of the National Early Dementia Detection Program (NEDDP) to explore the association of dementia and were conducted on Jeju Island. The program included 1,708 residents who were>65 years old and were receiving financial assistance. They found that the elders who never study in school had more chance at 2.078% (95% CI 1.145-3.771) to be dementia when compared with the elders who ever been to school. Afgin et al. (52), conducted a study among Arab populations of 944 people. They were aged at ≥ 65 years old and living in Wadi-Ara in northern Israel. Subjects were classified from cognitively normal, MCI, AD, or other

based on neurological, and cognitive examination (in Arabic). The revealed result showed that ages werea significant predictor and can increase the risk of MCI and AD.

So, people with higher level of education may have a greater brain reserve than people with lower level of education. This greater capacity may enable a more highly educated person to better manage the impairment caused by progressive neurodegeneration (123).

Daily activity level: elders who can do some of daily activity level or cannot do any of them were significantly associated with dementia (adjusted OR =5.83, 95%CI 1.42-24.02) when compared with elders who can do thedaily activity levelwell.

There is a corresponded result from the study by Nihon Hoigaku Zasshi (56). 800 Japanese who were road traffic victims were participated in the study. The 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.

The possible reason to explain is elder who had daily activity level at fair or poor level has greater chance to be stressed, isolated and depressed, and it may increases chances of dementia (98,113).

However, the present study was a cross-sectional analysis and was disadvantage in establishing what was happened first between factors of daily living activities and dementia. It is possible that elder can do daily living activities in fair or poor level because of the cause from dementia. In conclusion, future study should confirm the association between level of daily living activities and dementia by using other analytical study design.

Family member had history of dementia: elder who had a family member witha history of dementia was significantly associated with dementia (adjusted OR = 7.90, 95%CI 2.30-27.11) when compared with elder who did nothave a family member with a history of dementia (p=0.001).

The result of this study was correspondedthe study by The Canadian Study of Health and aging (62).They studied 258 cases that clinically diagnosed as probably to have AD.They concluded that the elder who had family history of dementia was significantly got higher chanceto be dementia.

The genetic effects are the possible cause of this finding as some report showed that 60-80% of AD is attributable togenetic effects (122).

Participating in village traditions: elderly who never participating in village traditions was significantly associated with dementia (adjusted OR = 7.17, 95%CI 1.57-32.71) when compared with elder who always participating in village traditions (p=0.01).

The result corresponds with the study by Scarmeas et al (59). A cohort study was conducted with a total of 1,772 non-demented subjects, aged 65 years or older, and living in northern Manhattan, New York. They were identified and followed longitudinally in a community-based cohort. The risk of dementia was decreased in subjects with high leisure activity. In the same way, the study of Karp et al (60) among 776 subjects, aged 75 years and above, and living in Stockholm, Sweden.The subjects were non-demented in first three years, and were followed up for three more years to detect incident of dementia cases. The subjects with high scores in all skills (mental, physical, and social) will have lower chance to be dementia at 0.53 times. The study by Crooks et al. (61) also found the similar result. The study findings suggested that larger social networks have a protective influence on cognitive function among elderly women. Thus, future studies should explore which aspects of social networks are associated with dementia risk and maintenance of cognitive health.

The participating in village traditions not only makes physical and mental activity more enjoyable, but also reduces stress level, loneliness, and depression which are common cause of Alzheimer disease.

According to the local and culture that we found in this study, many elders had activities together in local festival, religious ceremony or annual fair. Therefore, the encouraging to elders to join social activity regularly is another way to reduce the risk of dementia.

Diabetes mellitus: elderly who had diabetes mellitus was significantly associated with dementia (adjusted OR = 0.48, 95%CI 0.14-0.82) when compared with elder who did not have diabetes mellitus (18.5-23.9 kg/m2) (p=0.02).

The finding found the different result from the study of Abimbola et al (105). The study of Abimbola et al was sought the risk of developing AD in subjects with and without DM. They were used the data from Framingham Study Original cohort to examined 2,210participants who were not got dementia. The result found there were 17 patients who had dementia together with diabetes, and another 202 people had not got diabetes but had chance to be dementia. Moreover, the diabetes patients had more risk of dementia at 1.15 times when compared to the one who did not had. On the other hand, the study of Lu done through a systematic review and meta-analysis in a total of 61,830 people with aged of 65 years old or above. They were followed up 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's disease and vascular dementia comparing persons with DM to those without were 1.39 (CI, 1.16 to 1.66) and 2.38 (CI, 1.79 to 3.18), respectively. In conclusion, diabetes mellitus was a risk factor for dementia. Another research from across-sectional study of Plastino et al (49) was conducted among participants aged 50 and over in an urban community. The subjects were screened by using the Mini Mental State Examination (MMSE) and were examined by a series of neuropsychological tests when the screening shows positive result. The finding from the study found that the prevalence of dementia was significantly higher in diabetics than non-diabetics.

Elderly people who had diabetes mellitus might reduce risk behavior to control stage of disease by exercise, eating healthy food, reduce stress level, or continually got a treatment (48). The elders who had diabetes mellitus in this study had got a drugs treatment and high continually medicine (>97%), regularly go to see doctor follow their appointment, so they might control stage of disease by themselves. Therewith, they had more chance to know the information about dementia such as risk factor, and how to protect themselves from the diseasebythe public health personnel. So, these are things that will help to reducethe risk of dementia.

For Lampang province, the researcher was found person who got first diagnosis with diabetes mellitus separated by chronic disease group at 16,774 persons in year 2013 (35.3%)(125). Therefore, drugs treatment and continually medicine are benefit to control stage of diabetes mellitus and can be a reduction of risk of dementia in the future.

Part 5 Limitation of the study

1. MMSE Thai 2002 and the modified IQCODE were used as an alternative screening test for finding chance to be dementia in Thailand; however, dementia patients should havea specialist doctor such as neurology and psychiatrist to give them treatment.

2. MMSE Thai 2002 and the modified IQCODE are unclassified type of dementia which is the limitation of these screening tools.

3. This study used simple random sampling method without stratified the age before.

4. The incomes information of elders was on an elder's allowance. Some of information might loss the incomes data.

5. A cross-sectional study was disadvantage in some cases like modified factors. It cannot identify the rationality of the independent variables and dependent variables because the data from those variables were collected at the same time.