CHAPTER 4

RESULTS AND DISCUSSION

Results

This descriptive research explored the cognitive status and related factors among 170 elders aged 65 years old and older, living in Amphur Natawee, Songkhla province, Thailand.

The findings are presented in three parts followed by tables and descriptions.

1. Demographic data

2. Cognitive status of the subjects

3. The relationship between selected factors and cognitive status

Subjects' demographic data

Table 1 shows that the majority of the subjects aged between 65-75 years old were female, Buddhist, and married. More than 70% had formal education and lived in rural areas. Among those with formal education, 52.9 % had completed 4 years of school, and 2.9 % had 7 years of school. Almost half had incomes above 1,000 baht/month. Sixty percent reported chronic illness. Thirty-two point nine percent had full scores of IADL, 68.8 % had no depression.

Table 1

Numbers and percentages of subjects regarding demographic variables (N = 170)

Demographic variables	N	Percent
Gender		
Male	64	37.6
Female	106	62.4
Age		
65 – 75 years	113	66.5
76 and over	57	33.5
$\bar{X}$ = 73.68 , SD = 7.22 , Max = 97 , Min = 65		
Religion		
Buddhism	152	89.4
Others	18	10.6
Marital status		
Married	105	61.8
Single	65	38.2
Education		
No formal education	43	25.3
Formal education	127	74.7
Location of residence		
Rural	124	72.9
Urban	46	27.1
Income		
1000 baht/mo or less	78	45.9
More than 1000	92	54.1
$\bar{X}$ = 3,272.94, SD = 3,837.16, Max = 20,000, Min = 50		
Instrumental daily living activity		
Score less than 9	56	67.1
Score 9 or above	114	32.9
$\bar{X}$ = 8.31, SD = 1.33, Max = 9, Min = 3		
Depression		
Yes	53	31.2
No	117	68.8
$\bar{X}$ = 4.95, SD = 2.90, Max = 13, Min = 0		
Chronic illness		
Yes	102	60.0
No	68	40.0

Cognitive status score among the elderly

According to table 2, the subjects' cognitive scores ranged from 9-19 with a mean (SD) of 16.94 (2.05) and skewness of 1.20. This distribution indicated that majority of the subjects' had high score. The variation of cognitive score was narrow (CV=.12). Forty-five subjects (26.5%) had full cognitive scores. Eighty-seven point one percent of subjects had cognitive scores of 15 and over, indicating normal cognitive status. Twelve point nine percent scored lower than 15, indicating cognitive decline.

Table 2

Numbers and percentages of subjects regarding cognitive status level (N = 170)

Cognitive status scores	N	Percent
Cognitive decline (0-14 score)	22	12.9
Normal (15-19 score)	148	87.1

$\overline{X}$ = 16.94 , SD = 2.05 , Max = 19 , Min = 9, CV = 0.12, Skewness = -1.20

3. The relationship between selected factors and cognitive status

Table 3 presents the associations of the selected variables with cognitive status and crude odds ratios of each selected variable for low cognitive status. At the significance level of .05, income, depression, marital status, and instrumental activity of daily living were associated with cognitive status. At a 95% confidence interval,

subjects with incomes more than 1,000 baht/month were at 0.35 times the risk of cognitive impairment of those with incomes at or less than 1,000 baht. The subjects with depression were at 4.6 times greater risk of cognitive status than those without depression. Those who were married had 0.3 times the risk of cognitive impairment of those unmarried, and subjects with an IADL score of less than 9 were at 9.5 times greater risk of cognitive decline than those with an IADL score of 9. The results indicated that 4 factors - income of 1,000 baht/month or lower, not being married, depression, and an IADL score less than 9 - were significantly associated with poor cognitive status.

Gender, age, residential area, and education were not significantly associated with cognitive status in this study. However, there is a likelihood of the association of these 5 variables with cognitive status. There were more cases with cognitive decline among females than males (15.1% versus 9.4%), more decline in those with chronic illness than those without (13.7% versus 11.8%), more in those aged 75 and over than those younger than 75 (19.3% versus 9.7%), and more among those without formal education than those with formal education (21.4% vs 10.2%).

Table 3 Crude odds ratios of selected factors related to cognitive impairment among the elderly

Variable	case n=22(%)	control n=148(%)	crude odds ratio	95% CI	chi-square
Gender					
Male	6(9.4)	58(90.6)	.582	(0.22-1.57)	1.16[NS]
Female	16(15.1)	90(84.9)	1		
Residential area					
Urban	19(15.3)	105(84.7)	2.597	(0.73-9.22)	2.31[NS]
Rural	3(6.5)	43(93.5)	1		
Chronic illness					
Yes	14(13.7)	88(86.3)	1.193	(0.47-3.02)	0.14[NS]
No	8(11.8)	60(88.2)	1		
Income					
1000 or over	7(7.5)	86(92.5)	.336	(0.13-0.87)	5.34[*]
Less than1000	15(19.5)	62(80.5)	1		
Depression					
Yes	18(19.8)	73(80.2)	4.623	(1.49-14.32)	8.31[**]
no	4(5.1)	75(94.9)	1		
Age					
Over 75	11(19.3)	46(80.7)	2.217	(0.90-5.48)	3.08[NS]
65-75	11(9.7)	102(90.3)	1		
Marital status					
Spouse	8(7.6)	97(92.4)	.300	(0.12-0.76)	6.90[*]
No spouse	14(21.5)	51(78.5)	1		
Education					
No formal education	9(21.4)	33(78.6)	2.413	(0.95-6.14)	3.57[NS]

Formal education	13(10.2)	115(89.8)	1		
Instrumental activity of daily living					
Score less than 9	17(43.6)	39(69.6)	9.503	(3.29-27.49)	22.48**
Score of 9	5(4.4)	109(95.6)	1		

*p <.05, **p<.01, NS=Not significance

Discussion

This study investigated cognitive status in elders and the relationship between selected variables and cognitive status. The discussion included the subjects' demographic data, levels of cognitive status, and factors related to cognitive status.

Demographic characteristies

The subjects aged between 65-97 years old, with more females than males, and the majority were married. These demographic characteristics are congruent with studies by Charoenwong, 2001, and Putpim, 2002, which reported that most elderly subjects were married and were predominately females. In addition, since Buddhism is the principal religion for most Thais (Putpim, 2002), most subjects were Buddhists, though the study was conducted in a Southern province where there is a sizable Muslim population. The ratio of informal and formal education among this elderly group was similar to the studies by Pattarakantakul, (2002); Sapinun, (2002); and Seetamanotch, (2003), who reported that about 65 - 83.5% of their elderly subjects had formal education. More subjects lived in rural areas, represented the fact that the majority of elders of the country live in rural areas (Chuprapawan, 2000). Sixty per cent of aging people, in other words, most, had chronic illnesses, congruent with previous studies by Pattarakantakul (2002) and Seetamanotch (2003), who found the average income of subjects was 3,273 baht/month, and 45.9 % earned less than 1,000 baht/month. This finding is similar to Pokakul, (1998) who reported 57.7% of

elders had incomes greater than 1,000 baht/month. The overall demographic characteristics of subjects are similar to the elderly population in which the majority are Buddhists, female, married, living in rural areas, had an average income less than 1,000 baht/month, and finished primary school (Chooprapavan, 1999; Jitapunkul, 1998).

Level of Cognitive status

As expected, the majority of the subjects had normal cognitive status; only 12.9 % had CMTS below 15, indicating cognitive decline. The findings are congruent with Taboonpong, Chailangka, Baltip and Assanangkornchai (2003) who used CMTS to measure cognitive status and (87.1%) found 15 % of 400 subjects had cognitive impairment. Jitapunkul, Phoolcahroen, Kunanusont and Suriyawongpaisal (2001), who used CMTS to measure cognitive status, reported 16.5% of cognitive impairment among 4,048 elders aged 60 and older. In fact, this study should have a higher prevalence of cognitive impairment since the subjects were aged 65 and over, whereas Taboonpong, Chailangka, Baltip and Assanangkornchai (2003) included elders aged 60 and over as their subjects. Prevalence of cognitive impairment in other countries varies. Callahan, Hendrie and Tierney (1996) reported 15.7 % cognitive impairment among 3,954 elders aged 60 and over in Indianapolis, USA. Frisoni, Fratiglioni, Fastbom, Viitanen and Winblad (1999) also found 15.7 % cognitive impairment among 1,435 elders aged 75-95 years in the urban district of Kungsholmen, Stockholm, Sweden. Alonso Serra, Conde, De Andino and Mendoza (1995) found 18.5% cognitive impairment among 1,890 elders in their study conducted in Puerto Rico. Koga, et al., (2002) found 18.1 % cognitive impairment among 254 elders aged 60-91 years living in the rural village of Sefuri, Saga, Japan.

Worrall and Moulton (1993) reported 9.3% cognitive impairment among elders. Di Carlo, Baldereschi, Amaducci, Maggi, Grigoletto, Scarlato and Inzitari (2000) found 10.7% cognitive impairment among 3,425 elderly Italians aged 65-84 years. The prevalence of cognitive impairment reported by these studies ranged from 9.3 % to 18.5 %. The mean age of the subjects, the instruments used in measuring cognitive status, and other demographic factors, as well as health factors, might contribute to the prevalence of cognitive impairment.

Factors related to cognitive status

Bivariate analysis revealed that income, depression, marital status, and instrumental activity of daily living were significantly associated with cognitive status.

A Chula IADL score under 9 indicated a 9.5 times greater likelihood of cognitive impairment. The results of this study were congruent with previous studies (Fillenbaum, Hughes, Heymen, George and Blazer, 1988; Lindsay, Laurin, Verreault, Hebert, Helliwell, Hill and McDowell, 2002; Tabert, Albert, Camacho, Peltoon, Liu, Stern and Devanand, 2002; Taboonpong, Chailangka, Baltip and Assanangkornchai, 2003). Moritz, Kasl and Berkman (1995) found limitations in activities of daily living were about 2.5 times greater in respondents who had scored four or more SPMSQ errors compared with those who scored zero to one SPMSQ errors. Grener, Snowdon and Schmitt (1996) found that progression from low normal cognitive status at first assessment to impaired cognitive status at second assessment was associated with loss of independence in activities of daily living. Aguero-Torres, Fratiglioni, Guo, Viitanen, Strauss and Winblad (1998) also found cognitive impairment associated with the development of decline in activities of daily living. The cross-sectional

design used in this study limited a demonstration of a causal relationship between IADL and cognitive status. Instrumental activity of daily living could be a risk factor as well as a consequence of cognitive decline. However, exercise and regular physical activity have been found to be protective against cognitive impairment (Lindsay, Laurin, Verreault, Hebert, Helliwell, Hill and McDowell, 2002). This may imply that the more physical activities elders perform, the more activities of their brains which maintain normal cognitive status (Stern, Hesdorffer, Sano & Mayeux, 1990 cited in Tabert, 2002; http://www instruct.nmu.edu/communications/hkahn /COGNITIVE%AND%20AGING/CD%20460%20LECTURES/IADL'%20LECTUR , 2003). Further prospective and intervention studies are needed to confirm whether low physical activity results in cognitive decline.

Association of higher income with lower risk of cognitive impairment in this study was congruent with the work of Bassuk, Wypij, & Berkman Pochanapan, et al., (2000). Pochanapan, et al., (1995) found high income had association as well as high education, social interaction, professional occupation, and quality of life may contribute towards low cognitive impairment.

In this study, being married reduced the risk of cognitive impairment, supporting the association of being single with low cognitive status in previous studies (Dufouil, Fuhrer, Dartigues & Alperovitch, 1996). It has been explained that married people had more social support, a network of relationships, and were more actively engaged in physical and social activities found to have a protective effect against cognitive decline (Moritz, Kasl and Berkman, 1995).

Depression was associated with cognitive impairment. The prevalence

of depression among elders is high (Sririchai et al., 1996), which could possibly lead to significant problems among the elderly. A high prevalence of depression may have resulted from physical degeneration leading to limited social activities. Moreover, retirement had an effect on elderly living by themselves. The association between depression and cognitive status in this study was congruent with previous studies (Devanand et al., 1996; Dufouil, Fuher, Dartigues and Alerrvitch, 1996; Tubmanee, 1998; Yaff, Blackwell, Gore, Sands, Reus and Browner, 1999; Wilson et al., 2002). It is believed that depression and cognitive decline were associated with neuronal degeneration in the brain, resulting in high levels of cortisol. This led to neuronal death, and the formation of the apolipoprotein E4allele that are risk factors for cognitive decline and depression (Yaff, Blackwell, Gore, Sands, Reus and Browner, 1999; Pararas-Carayannis, 2000).

Gender, age, location of residence, and education were factors not significantly associated with cognitive status in this study.

Education was not significantly associated with cognitive status in this study, which is congruent with the investigation by Frisoni, Fratiglioni, Fastbom, Viitanen, and Winblad (1999). However, many studies found that education was associated with cognitive status (Crum, Anthony, Bassett and Folstein, 1993; Dartigues, Gagnon, Letenneur, Barberger-Gateau, Commenges, Evaldre et al, 1992; Koga, et al., 2002; Plassman, Welsh, Helms, Brandt, Page and Breitner, 1995). It has been explained that education and environment during early years can increase brain reserve. However, the effect of education on cognitive status has been debated, as the association of education with cognitive status could be confound by socioeconomic status.

It has been known that as people get older, they are likely to have cognitive decline due to decreased neurons and neurotransimintion, more and more neurons die (Flier et al., 2002). The lack of association of age with cognitive level in this study might have resulted from the small variation in ages among the subjects. There were only 22 cases with cognitive impairment, a number which is probably too small to yield statistical significance. Although age was not significantly associated with cognitive impairment in this study, a higher percentage of subjects with cognitive impairment were found in the older group.

Location of residence: Even though location of residence was not associated with cognitive status, in this study, it was found that those living in urban areas had a higher percentage of cognitive impairment than those in rural areas. This was not congruent with Suntranu et al. (1989), who found that elders who lived in urban areas had better cognitive status than those who lived in rural areas, due to the fact that elders in rural areas lived separately from their children. Moritz, Kasl and

Berkman (1995) found that social isolation and lack of participation among elders were associated with cognitive impairment. Jitapunkul and Lailert (1996) found that residential area was associated with cognitive impairment. The elderly in Bangkok had the highest cognitive status, followed by Singburi, and Klong Toey slum, respectively. Differences in cognitive status of elderly in various regions might be resulted from cultural differences, opportunity to access news and information, life style, psychosocial, and effects of social class or socioeconomic status (Jitapunkul, & Lailert, 1996; Jitapunkul, Phoolcharoen, Kunausont, & Suriyawongpaisal, 2001). In this study, however, residential area was not associated with cognitive status. The way

of life of the elderly in Natawee district, either in the rural or in urban areas, were quite similar. They were in an agricultural setting and lived closely with their childs. To explain these findings, further investigations are required.

Gender: In comparison to men, a greater number of women with cognitive impairment has been reported by many studies (Dufouil, Fuhrer, Dartigues and Alperovitch, 1996; Tubmanee, 1998). Longer life expectancy and more prescription of drugs affecting cognitive status in women could lead to the association of being female and low cognitive status (Olafsdottir, Marcusson, & Skoog, 2001). This study also presents a higher proportion of cognitive impairment among females, although it was not statistically significant, probably due to the small sample size. However, many studies reported no association between gender and cognitive impairment. (Devanand et al., 1996; Gale, Martyn & Cooper, 1996; Frisoni, Fratiglioni, Fastbom, Viitanen & Winblad, 1999; Lindsay et al., 2002; Gungsanarung, & Kogchapunddee, 1991; Tubmanee, 1998).

Chronic illness is common among elders (Vanhanen, 1998). Many of these illnesses, such as hypertension, diabetes mellitus, cerebrovascular accident, and chronic heart failure, can worsen cognitive status (Gale, Martyn & Cooper, 1996; Johasson, 1994; Vanhanen, 1998; Zuccala et al., 1997). Sixty percent of the subjects in this study had chronic illnesses. The proportion of cognitive impaired cases in those with chronic illness and those without chronic illness was not much different in number and statistically was not significant. This finding is in contrast to the above studies, but congruent with the studies by Pajak, Kawalec, Pomykalska, Topor-Madry, Orlowiejska-Gillert and Szczudlik, (1998), Posner, Tang, Luchsinger,

Lantigua, Stern and Mayeux, (2002) who found no associations of hypertension, diabetes mellitus, cerebrovascular accident, and heart disease with cognitive status. Probably the condition or the stage of chronic illness among the subjects in this study were not advanced enough to affect vascular walls in organs, including the brain.

Limitation of this study

1. The subjects included in the study represented elders aged over 65 years old who were able to communicate. With the criteria of communication, cases with severe cognitive impairment were not included since they would have problems with communication.

2. The cross-sectional design used in this study prohibited the establishment of causal relationships of IADL and depression with cognitive status.

3. With such a limited number of subjects, particularly the cognitive impaired cases, possible associations of age, gender, chronic illness, education, and residential area with cognitive status were not statistically detected.