

CHAPTER 4

FINDINGS AND DISCUSSION

The purposes of this study were to estimate the prevalence, characteristics, perceived impact, risk factors, representations, and coping procedures of insomnia among a sample of the Thai population in northern region. Results from the analyses of data are presented with demographic characteristics of the sample and analysis of each research question. The discussion part of each objective is presented in the last part.

Findings

Demographic description of the sample

A total of 602 Thai people living in communities in the northern region participated in this study. The age distribution ranged between 18 and 81 years with a mean age of 46.76 (SD = 14.13) years. Of the total population, 268 (44.5%) were males and 334 (55.5%) were females. In males, the age ranged between 18 and 81 years with a mean age of 48.78 (SD = 13.9), whereas in females, the age ranged between 18 and 79 years with a mean age of 45.14 (SD = 14.13). Stratification of age by the developmental stage indicated that the majority of the study participants were

in the late adulthood group (45%). Almost the entire study population (99.2%) were Buddhists. Most of the study participants (75%) were married and had formal education at the level of elementary school (65.3%). Nearly 80% of the subjects had some types of employment. About 23% of the study participants reported of a monthly household income was at least 3,000 Baht. Nearly half (45.8%) of them reported that their income was not adequate.

Physical health problems were common among the study population. Almost half of the study participants (49.2%) reported at least one physical health problem. The most commonly stated problem included complaints about cardiovascular system (28%), musculoskeletal system (26%), and gastrointestinal system (21.3%) (Table 2).

Table 2

Demographic Characteristics of the Study Sample (n=602)

Characteristics	n(%)
Age (years)	
Mean (\pm SD)	46.76 (\pm 14.13)
Range	18-81
Age category by stage of development	
Early adulthood (\leq 25 years)	43 (7.1)
Middle adulthood (26-40 years)	165 (27.4)
Late adulthood (41-59 years)	271 (45.0)
Older adulthood (60 and older)	123 (20.4)
Gender	
Female	334 (55.5)
Male	268 (44.5)
Religion	
Buddhism	597 (99.2)
Christianity	5 (0.8)
Marital Status	
Single	60 (10.0)
Married	468 (77.7)
Widowed	56 (9.3)
Divorced	18 (3.0)
Education	
No formal education	27 (4.5)
Elementary education	392 (65.3)
High-school or higher	181 (30.2)
Employment	
Student	11 (1.8)
Unemployed	121 (20.1)
Employed	470 (78.1)
Monthly household income	
\leq 3,000 Baht	138 (23.1)
$>$ 3,000 Baht	460 (76.9)
Perception of income adequacy	
Enough	325 (54.2)
Not enough	275 (45.8)

Table 2 (continued)

Characteristics	n(%)
Medical illnesses	
No	301 (50.0)
Yes	301 (50.0)
Cardiovascular	83 (28.0)
Musculoskeletal	77 (26.0)
Gastrointestinal	63 (21.3)
Neurological	34 (11.5)
Endocrine	29 (9.8)
Respiratory	19 (6.4)
Others	21 (7.1)

Note. ^a Multiple response possible

Analysis of research questions

Research question 1. What is the prevalence of acute and chronic insomnia among Thai people in the northern region?

Acute insomnia was defined as insomnia occurring within one month. Chronic insomnia was defined as the occurrence of any of the stated symptoms for more than one month. The prevalence of acute insomnia and chronic insomnia in this study was 0.7% and 14.6%, respectively. The prevalence of insomnia was 15.3% of the total participants.

Stratification of prevalence of insomnia by age groups indicated that individuals in the middle age group had the highest prevalence of insomnia (17.6%), followed by the older adulthood (16.3%) and the late adulthood (14.8%). The prevalence of insomnia was lowest among individuals in the age category of the early

adulthood (7.0%). Assessment of the prevalence of insomnia by gender suggested that the prevalence of insomnia was slightly higher among females (15.9%) relatively to males (14.6%). Stratification by gender and age indicated that older women (20.8%) and late adult men (16.4%) had the highest prevalence of insomnia (Table 3).

Table 3

Prevalence of Insomnia by Gender and Age Groups

Age groups	Men		Women		Total	
	n	P ^a (%)	n	P(%)	n	P(%)
All groups	268	39(14.6)	334	53(15.9)	602	92(15.3)
Early adulthood (≤ 25 yrs.)	12	0(0)	31	3(9.7)	43	3(7.0)
Middle adulthood (26-40 yrs.)	70	11(15.7)	95	18(18.9)	165	29(17.6)
Late adulthood (41-59 yrs.)	116	19(16.4)	155	21(13.5)	271	40(14.8)
Older adulthood (≥ 60 yrs.)	70	9(12.9)	53	11(20.8)	123	20(16.3)

Note. ^a Prevalence

Research question 2. What are the characteristics of insomnia among Thai people in the northern region?

The four commonly reported characteristics of insomnia in this study were DIS, DMS, EMA, and NRS. The most frequently reported complaint of insomnia was DMS (66.3%), followed by DIS (59.8%), NRS (45.7%) and EMA (31.5%).

DMS was predominant among late and older adulthood. DIS was prevalent in middle adulthood and EMA was frequently reported by older adulthood. NRS was predominant among middle and late adulthood. Approximately 35% of insomnia reported mixed type of DIS and DMS. DMS and NRS were frequently reported of mixed type of insomnia by older age group. Twelve percent had reported all characteristics of insomnia (Table 4).

Table 4

Characteristics of Insomnia by Age Groups (n=92)

Age groups	Characteristics of insomnia ^a							
	DIS	DMS	EMA	NRS	DIS and DMS	DMS and NRS	DIS, DMS, and NRS	DIS, DMS, NRS and EMA
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
All groups	55 (59.8)	61 (66.3)	29 (31.5)	42 (45.7)	32 (34.8)	28 (30.4)	16 (17.4)	11 (12.0)
Early adulthood (≤ 25 yrs. n = 3)	2 (66.7)	0 (0)	0 (0)	1 (33.3)	0 (0)	0 (0)	0 (0)	0 (0)
Middle adulthood (26-40 yrs. n = 29)	18 (62.1)	19 (65.5)	7 (24.1)	14 (48.3)	10 (34.5)	10 (34.5)	6 (20.7)	4 (13.8)
Late adulthood (41-59 yrs. n = 40)	23 (57.5)	28 (70.0)	14 (35.0)	19 (47.5)	15 (37.5)	12 (30.0)	8 (20.0)	5 (12.5)
Older adulthood (≥ 60 yrs. n = 20)	12 (60.0)	14 (70.0)	8 (40.0)	8 (40.0)	7 (35.0)	16 (80.0)	2 (10.0)	2 (10.0)

Note. DIS = difficulty initiating sleep, DMS = difficulty maintaining sleep, EMA = early morning awakening, NRS = non-restorative sleep

^aMultiple response possible

As for daytime impairments, fatigue was the most frequently reported of daytime impairment, while other daytime impairments were equally reported. Stratification by age groups suggested that daytime impairments were most frequent during the late adulthood, while individuals in the early adulthood less reported of daytime impairments. It is of clinical and scientific interest to note that physical symptoms such as dizziness, headache, and palpitation were reported by 41.3% of all insomniacs in all age groups (Table 5).

Table 5

Daytime Impairments in Insomniacs by Age Groups (n=92)

Daytime impairments ^a	Age groups				Total
	Early adulthood n(%)	Middle Adulthood n(%)	Late adulthood n(%)	Older adulthood n(%)	
Daytime fatigue	2(2.8)	25(35.2)	29(40.8)	15(21.1)	71(77.2)
Unrefreshed feeling	1(1.4)	21(30.4)	32(46.4)	15(21.7)	69(75.0)
Mood change	3(4.3)	21(30.4)	30(43.5)	15(21.7)	69(75.0)
Memory impairments	1(1.4)	18(26.1)	34(49.3)	16(23.2)	69(75.0)
Daytime sleepiness	2(3.0)	18(27.3)	31(47.0)	15(22.7)	66(71.7)
Work or academic impairments	0(0)	20(31.7)	29(46.0)	14(22.2)	63(68.5)

Note. Physical symptoms such as dizziness, palpitation, and headache = 38(41.3%)

^a Multiple responses possible

Research question 3. What are the risk factors for insomnia among Thai people in the northern region?

The univariate logistic regression and multivariate logistic regression were performed to examine the association between insomnia and each independent variable.

For predisposing factors, univariate logistic regression analyses revealed that marital status and perception of income adequacy were significant associated with insomnia ($p < .05$) (Table 6).

As for precipitating factors, two variables in sleep environments including sleep surfaces and noise were related to insomnia ($p < .01$) (Table 7). Medical illnesses, depression, anxiety, and stressful life events were also significantly associated with insomnia ($p < .001$) (Table 8).

With regards to perpetuating factors, the univariate logistic regression revealed that planning, rehearsing or problem solving in bed and dysfunctional beliefs and attitudes about sleep (DBAS) were significantly associated with insomnia ($p < 0.01$ and 0.001 , respectively) (Table 9).

Table 6

Univariate Logistic Regression Analysis for the Relationship between Demographic Characteristics and Insomnia

Variables	No. Non-insomniacs	No. Insomniacs	B	SE	Wald	Sig	Unadjusted OR	95%CI lower-upper
Age					2.941	.401		
Early adulthood	40	3					1.000	
Middle adulthood	136	29	1.045	.633	2.728	.099	2.843	.823-9.821
Late adulthood	231	40	.837	.623	1.805	.179	2.308	.681-7.821
Older adulthood	103	20	.951	.647	2.164	.141	2.589	.729-9.191
Gender								
Male	229	39					1.000	
Female	281	53	.102	.229	.199	.656	1.108	.707-1.735
Marital status					8.920	.030*		
Married	397	71					1.000	
Single	55	5	-.677	.485	1.950	.163	.508	.197-1.314
Widowed	47	9	.068	.386	.031	.860	1.071	.503-2.282
Divorced	11	7	1.269	.500	6.435	.011	3.558	1.335-9.486
Educational level					4.340	.114		
High school and higher	156	25					1.000	
Elementary school	333	59	.100	.258	.152	.041	2.627	1.039-6.644
No formal education	19	8	.966	.473	4.165	.041	1.106	.667-1.832
Occupation					2.611	.271		
Employed	403	67					1.000	
Students	10	1	-.508	1.06	.231	.631	.602	.076-4.776
Unemployed	97	24	.398	.263	2.278	.131	1.488	.888-2.494
Household income								
>3,000 baht/month	387	73					1.000	
≤3,000 baht/month	119	19	-.167	.278	.360	.549	.846	.491-1.460
Perception of income adequacy								
Enough	285	40					1.000	
Not enough	223	52	.508	.229	4.935	.026*	1.661	1.062-2.600

Note. * $p < .05$.

Table 7

Univariate Logistic Regression Analysis for the Relationship between Sleep Environments and Insomnia

Variables	No. Non-insomniacs	No. Insomniacs	B	SE	Wald	Sig	Unadjusted OR	95%CI lower-upper
Bed surfaces								
Comfort	486	81					1.000	
Uncomfort	24	11	1.012	.383	6.963	.008**	2.750	1.297-5.830
Bed partner								
Not disturb	424	74					1.000	
Disturb	86	18	.182	.288	.398	.528	1.199	.682-2.110
Light								
Not disturb	499	90					1.000	
Disturb	10	1	-.590	1.055	.313	.576	.555	.070-4.384
Odor								
Not disturb	474	84					1.000	
Disturb	36	8	.226	.408	.307	.580	1.254	.563-2.792
Ventilation								
Not disturb	466	79					1.000	
Disturb	44	12	.476	.348	1.870	.171	1.609	.814-3.180
Noise								
Not disturb	406	58					1.000	
Disturb	103	32	.777	.246	9.950	.001**	2.175	1.342-3.524
Insect								
Not disturb	395	68					1.000	
Disturb	115	23	.139	.263	.278	.598	1.149	.686-1.925

Note. ** $p < .01$.

Table 8

Univariate Logistic Regression Analysis for the Relationship between Medical Illnesses, Anxiety, Depression, and Stressful Life Events and Insomnia

Variables	No. Non-insomniacs	No. Insomniacs	B	SE	Wald	Sig	Unadjusted OR	95%CI lower-upper
Medical illnesses								
No	275	31					1.000	
Yes	235	61	.834	.238	12.303	<.001***	2.303	1.445-3.670
Anxiety								
No	465	57					1.000	
Yes	45	35	1.848	.266	48.432	<.001***	6.345	3.771-10.676
Depression								
No	488	71					1.000	
Yes	22	21	1.881	.331	32.403	<.001***	6.561	3.433-12.539
Stressful life events impact scores								
Low	257	26					1.000	
High	253	66	.947	.250	14.560	<.001***	2.579	1.586-4.192

Note. *** p < .001

Table 9

Univariate Logistic Regression Analysis for the Relationship between Maladaptive Sleep Habits, DBAS, and Insomnia

Variables	No. Non-insom-niacs	No. Inso-m-niacs	B	SE	Wald	Sig	Unad-justed OR	95%CI lower-upper
Irregular waketime								
No	494	87					1.000	
Yes	15	5	.638	.529	1.453	.228	1.893	.671-5.341
Irregular bedtime								
No	510	92					1.000	
Yes	0	0	-.257	.283	.825	.364	.774	.445-1.346
Excessive time in bed								
No	477	84					1.000	
Yes	33	8	.320	.412	.603	.437	1.377	.615-3.084
Waking activities in bed								
No	297	49					1.000	
Yes	213	43	.202	.227	.787	.375	1.224	.784-1.911
Planning								
No	197	20					1.000	
Yes	313	72	.818	.269	9.271	.002**	2.266	1.338-3.896
Alcohol								
No	399	69					1.000	
Yes	111	23	.181	.264	.471	.493	1.198	.715-2.009
Smoking								
No	419	70					1.000	
Yes	91	22	.370	.270	1.868	.172	1.447	.852-2.459
Caffeine								
No	393	64					1.000	
Yes	117	28	.385	.250	2.374	.123	1.470	.901-2.398
Daytime napping								
No	185	33					1.000	
Yes	325	59	.018	.236	.006	.941	1.018	.641-1.617
DBAS								
Low	265	27					1.000	
High	245	65	.947	.250	15.194	<.001***	2.604	1.609-4.213

Note. ** $p < .01$, *** $p < .001$

After completion the univariate logistic regression analysis, the variables were selected into the multivariate logistic regression. Hosmer and Lemeshow (1989) suggested that any variable that the univariate test had a p-value < 0.25 should be considered as a candidate for the multivariate model along with all variables that have been known of clinical importance. Use of a more traditional level (such as 0.05) often fails to identify variables known to be important. Therefore, a total of 16 variables with a p-value between 0.000 and 0.228 were included into the multivariate logistic analysis.

Notably, gender in the present study was not related to insomnia. However, female gender has been reported to be a risk factor for insomnia in several epidemiological studies. Therefore, gender was included into the model, although its significance was more than 0.25 and it was also aimed gender at a control variable in the analysis. Finally, the total 17 variables were entered simultaneously into a multivariate logistic regression, which was executed using the backward stepwise procedure. These variables included age, gender, marital status, educational level, perception of income adequacy, physical health problems, bed surfaces, noise, ventilation, anxiety, depression, stressful life events, irregular waking time, planning, rehearsing or problem solving in bed, smoking, caffeine consumption, and DBAS.

Results of multiple logistic regression revealed that five variables were statistically significant with insomnia. These variables were: “physical health problems”, “smoking”, “noise”, “anxiety”, and “depression”. From the classification table, all independent variables were found to predict insomnia with the power of prediction 86.9%. The fit of the model was measured using Goodness of fit chi-square, where a high p-value at 0.373 in this study indicated the fit of model.

The analysis demonstrated that study participants with at least one form of physical health problems were about twice as likely to report insomnia than those who reported of no physical health problems (OR = 1.90, CI = 1.13-3.22). Individuals in either “always” or “sometimes” smoking category were approximately two folds increased risk of insomnia compared to “never” or “rarely” smokers (OR = 1.86, CI = 1.02-3.36). Study participants who perceived their sleep environments as noisy were about two times more likely to have insomnia than those who perceived their sleep environments as quiet (OR = 1.86, CI = 1.09-3.20). Study participants who had anxiety were four times as likely to have insomnia relative to those without anxiety (OR = 4.11, CI = 2.16-7.82) while having depression increased the risk of insomnia by almost three folds (OR = 2.93, CI = 1.28-6.72) (Table 10).

The summary of the final logistic regression model predicting insomnia is provided in Figure 3.

$$\ln p_x/q_x = -3.44 + 0.64 (\text{medical illnesses}) + 0.62(\text{smoking}) \\ + 0.62 (\text{noise}) + 1.41 (\text{anxiety}) + 1.08 (\text{depression})$$

Figure 3. Logistic Regression Model Predicting Insomnia

To assess the discriminating ability of a logistic model, the receiver operating characteristic (ROC) curve was performed. In logistic regression, ROC curves are useful for determining the accuracy of a chosen model (Vermeulen, 1996). The area under the curve indicates how well the ability to discriminate between events (have insomnia) and nonevents (do not have insomnia) of the model. The closer the area is

to 1.0, the better the model is. Area under the curve of this study was 0.77 (SE = 0.03, CI = 0.78-0.83) (Appendix S). Therefore, the model was considered acceptance discrimination.

Table 10

Summary of Multivariate Logistic Regression Analysis for the Independent Variables and Insomnia

Variables	B	SE	Wald	Sig	Adjusted OR	95%CI lower-upper
Medical illnesses						
No					1.000	
Yes	.644	.267	5.804	.016*	1.904	1.128-3.215
Smoking						
No					1.000	
Yes	.618	.303	4.151	.042*	1.856	1.024-3.363
Noise						
Not disturb					1.000	
Disturb	.623	.276	5.086	.024*	1.864	1.085-3.201
Anxiety						
No					1.000	
Yes	1.413	.328	18.529	<.001**	4.110	2.160-7.822
Depression						
No					1.000	
Yes	1.076	.423	6.461	.011*	2.931	1.279-6.718

Note. Model Chi-Square 88.865, df =8, p < 0.001, -2 log likelihood = 416.425

* p < .05. ** p < .001.

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Research question 4. What are the perceived impacts of insomnia among Thai insomniacs in the northern region?

The perceived impacts of insomnia were classified into four dimensions: 1) physical and emotional, 2) working, 3) economic, and 4) family and social. Overall, the impact of insomnia was most frequently (68.5%) perceived on the working; the second most frequently (59.8%) affected domain was the physical and emotional. Only half of insomniacs perceived that insomnia had an impact on economic domain while only 32.6% of them agreed that insomnia affected the family and social domain (Table 11).

Table 11

Number and Percentage for Perceived Impacts of Insomnia (n = 92)

Perceived impacts of insomnia	Agree n(%)	Neither Agree nor Disagree N(%)	Disagree n(%)
Physical and emotional	55(59.8)	28(30.4)	9(9.8)
Working	63(68.5)	10(10.9)	19(20.6)
Economic	46(50.0)	5(5.4)	41(44.6)
Family and social	30(32.6)	25(27.2)	37(40.2)

Stratification by age groups indicated that in the adult group insomnia had an impact on physical and emotional impact was higher compared with older group (62.5% VS. 50%). Although both groups acknowledged that insomnia had impact on their working domain, the percentage of those with such perception was higher in the older group. In the older age group, a higher percentage of participants (55.0% vs. 48.6%) believed that insomnia had negative impact on their economic status. Both groups less conceded that insomnia had impacts on the family and social domain compared with the other domains (Table 12).

Table 12

Number and Percentage for Perceived Impacts of Insomnia by Age Groups (n = 92)

Perceived impacts of insomnia	Adult group			Older group		
	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Physical and emotional	45 (62.5)	19 (26.4)	8 (11.1)	10 (50.0)	9 (45.0)	1 (5.0)
Working	46 (63.9)	10 (13.9)	16 (22.2)	17 (85.0)	0 (0)	3 (15.0)
Economic	35 (48.6)	5 (6.9)	32 (44.5)	11 (55.0)	0 (0)	9 (45.0)
Family and social	23 (32.4)	20 (28.2)	28 (39.4)	7 (35.0)	5 (25.0)	8 (40.0)

Stratification by gender yielded that the negative impacts of insomnia on physical and emotional domain were equally perceived by men and women. Approximately 85% of male insomniacs perceived that insomnia had impact on their working domain, while slightly more than half of the female gender did. Female insomniacs perceived that insomnia had impacts on their economic domain whereas this perception was not shared by male insomniac (56.6% VS.41.0%). Both male and female insomniacs had less agreements that insomnia affected on family and social domain (Table 13).

Table 13

Number and Percentage for Perceived Impacts of Insomnia by Gender (n = 92)

Perceived impacts of insomnia	Male			Female		
	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
	n (%)	n (%)	n (%)	N (%)	n (%)	N (%)
Physical and emotional	25 (64.1)	11 (28.2)	3 (7.7)	30 (56.6)	17 (32.1)	6 (11.3)
Working	33 (84.6)	2 (5.1)	4 (10.3)	30 (56.6)	8 (15.1)	15 (28.3)
Economic	16 (41.0)	3 (7.7)	20 (51.3)	30 (56.6)	2 (3.8)	21 (39.6)
Family and social	12 (30.8)	13 (33.3)	14 (35.9)	18 (34.0)	12 (22.6)	23 (43.4)

Research question 5. What are insomnia representations among Thai insomniacs in the northern region?

Cognitive representations of insomnia were divided into five dimensions. Identity is a label or symptom related to insomnia. Insomniacs were asked whether they had the symptoms by yes or no answers. Then they were asked to rate whether or not these symptoms related to their insomnia. The majority of insomniacs (83.9%) reported that fatigue, and 80.9% stated that an unrefreshed feeling as the symptoms related to their insomnia, while absence of enthusiasm and loss of motivation were not viewed as symptoms related to insomnia (Table 14).

Table 14

Number and Percentage for Identity of Insomnia (n=92)

Symptoms	Yes but not related n(%)	Yes and related n(%)
Fatigue	14(16.1)	73(83.9)
Headache	28(31.5)	61(68.5)
Unrefreshed feeling	17(19.1)	72(80.9)
Dizziness	26(28.9)	64(71.1)
Neck strain	38(42.2)	52(57.8)
Daytime sleepiness	28(31.1)	62(68.9)
Unenthusiastic	48(53.3)	42(46.7)
Loss of motivation	25(57.8)	38(42.2)
Irritability	23(26.1)	65(73.9)

Stratification by age groups yielded that the symptoms within the identity domain were equally reported by the two age groups except for daytime sleepiness and irritability. In the adult group, the general agreement that daytime sleepiness (71.8% VS. 57.9%) and irritability (78.6% VS. 55.6%) were higher compared with the older group (Table 15)

Table 15

Number and Percentage for Identity of Insomnia by Age Groups (n=92)

Symptoms	Adult group		Older group	
	Yes but not related n(%)	Yes and related n(%)	Yes but not related n(%)	Yes and related n(%)
Fatigue	12(17.4)	57(82.6)	2(11.1)	16(88.9)
Headache	21(29.6)	50(70.4)	7(38.9)	11(61.1)
Unrefreshed feeling	14(20.0)	56(80.0)	3(15.8)	16(84.2)
Dizziness	21(29.6)	50(70.4)	5(26.3)	14(73.7)
Neck strain	29(40.8)	42(59.2)	9(47.4)	10(52.7)
Daytime sleepiness	20(28.2)	51(71.8)	8(42.1)	11(57.9)
Unenthusiastic	38(53.5)	33(46.5)	10(52.6)	9(47.4)
Loss of motivation	41(57.7)	30(42.3)	11(57.9)	8(42.1)
Irritability	15(21.4)	55(78.6)	8(44.4)	10(55.6)

Stratification by gender revealed that the equal percentages males and females had reported these symptoms related to insomnia. Male insomniacs had more often associated an unrefreshed feeling to insomnia compared with female insomniacs did (89.7% vs. 74.0%). In contrast, female insomniacs were more inclined to relate absence of enthusiasm to insomnia compared with male insomniacs (54.9% VS. 35.9%). Both genders perceived that loss of motivation was not related to their insomnia (Table 16).

Table 16

Number and Percentage for Identity of Insomnia by Gender (n=92)

Symptoms	Male		Female	
	Yes but not related n(%)	Yes and related n(%)	Yes but not related n(%)	Yes and related n(%)
Fatigue	7(18.9)	30(81.1)	7(14.0)	43(86.0)
Headache	11(28.2)	28(71.8)	17(34.0)	33(66.0)
Unrefreshed feeling	4(10.3)	35(89.7)	13(26.0)	37(74.0)
Dizziness	13(33.3)	26(66.7)	13(25.5)	38(74.5)
Neck strain	16(41.0)	23(59.0)	22(43.1)	29(56.9)
Daytime sleepiness	11(28.2)	28(71.8)	17(33.3)	34(66.7)
Unenthusiastic	25(64.1)	14(35.9)	23(45.1)	28(54.9)
Loss of motivation	24(61.5)	15(38.5)	28(54.9)	23(45.1)
Irritability	12(30.8)	27(69.2)	11(22.4)	38(77.6)

As for other dimensions of insomnia representations, time line was defined as whether or not the duration of insomnia was acute or chronic or cyclic in nature. Causes or etiology of insomnia were classified into psychological, physiological, environment, substance use, and own behavior factors. Consequences meant the negative impacts of insomnia whereas control or cure was defined as the perception of control over insomnia or whether or not insomnia can be cured. Emotional representations were the negative emotional responses to insomnia.

Approximately 41% of insomniacs agreed that their insomnia was chronic. Seventy three percent of them agreed that insomnia was in cyclic in nature. More than half of the insomniacs reported that their insomnia was caused by either psychological, environment factors, and/or own behaviors. About 50% of them linked physiological factors as causes of their insomnia. Interestingly substance use in general were less likely to view as a cause of insomnia. For consequences dimension and emotional representation, responses were equally distributed as either “agreed” or “neither agree nor disagree” on these dimensions where as about half of insomniacs (48.4%) perceived “neither agree nor disagree” on control dimension (Table 17).

Table 17

Number and Percentage for Timeline, Causes, Consequences, Control, and Emotional Representations (n = 92)

Dimensions	Agree n(%)	Neither agree nor Disagree n(%)	Disagree n(%)
Timeline			
acute/chronic	38(41.2)	27(29.4)	27(29.4)
cyclical	67(72.8)	22(23.9)	3(3.3)
Causes			
Psychological	55(61.1)	24(26.7)	11(12.2)
Physiological	45(50.6)	28(31.5)	16(18.0)
Environmental	61(67.8)	5(5.6)	24(26.7)
Substance use	32(41.0)	24(30.8)	22(28.2)
Own behaviors	61(67.8)	5(5.6)	24(26.7)
Consequences	38(41.3)	39(42.4)	15(16.3)
Control	37(40.7)	44(48.4)	10(11.0)
Emotional representations	35(38.0)	34(37.0)	23(25.0)

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Stratification of insomnia representations by age groups demonstrated that about 50.0% of the older group and 38.9% of the adult group had agreed that insomnia was chronic. Both groups agreed that duration of insomnia was cyclical. The majority in the two groups agreed that psychological, environmental, and own behavioral factors were insomnia causal factors. About 78% of individuals in the older group had indicated that their insomnia was caused by physiological factor, while only 43.7% of the adult group did. Almost half of the adult group (44.4%) viewed that substance use was a cause of insomnia while the older group did not. The distribution of “agree” and “neither agree nor disagree” responses to questions on the negative consequences, control and emotional responses to insomnia were equally distributed between the two age groups. (Table 18)

Table 18

Number and Percentage for Timeline, Causes, Consequences, Control, and Emotional Representations by Age Groups (n = 92)

Dimensions	Adult group			Older group		
	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Timeline						
acute/chronic	28 (38.9)	20 (27.8)	24 (33.3)	10 (50.0)	7 (35.0)	3 (15.0)
cyclical	51 (70.8)	19 (26.4)	2 (2.8)	16 (80.0)	3 (15.0)	1 (5.0)
Causes						
Psychological	42 (59.1)	20 (28.2)	9 (12.7)	13 (68.4)	4 (21.1)	2 (10.5)
Physiological	31 (43.7)	26 (36.6)	14 (19.7)	14 (77.8)	2 (11.1)	2 (11.1)
Environmental	52 (72.2)	6 (8.3)	14 (19.5)	12 (60.0)	1 (5.0)	7 (35.0)
Substance use	28 (44.4)	19 (30.2)	16 (25.4)	4 (26.7)	5 (33.3)	6 (40.0)
Own behaviors	49 (70.0)	3 (4.3)	18 (25.7)	12 (60.0)	2 (10.0)	6 (30.0)
Consequences	30 (41.7)	28 (38.9)	14 (19.4)	8 (40.0)	11 (55.0)	1 (5.0)
Control	26 (36.6)	36 (50.7)	9 (12.7)	11 (55.0)	8 (40.0)	1 (5.0)
Emotional representations	27 (37.5)	25 (34.7)	20 (27.8)	8 (40.0)	9 (45.0)	3 (15.0)

Stratification of representations of insomnia by gender, indicated that duration of their insomnia was chronic and cyclic in nature perceived by both genders. Psychological, physiological, environmental factors and self-induced behaviors were agreed as causes of insomnia. About 17.6% of male insomniacs had disagreed that substance use cause insomnia whereas it was about twofold higher (36.4%) in female insomniacs. As for consequences and emotional representations were equally distributed between the “neither agree nor disagree” and “agree” categories between men and women. Nearly half (46.2%) of male insomniacs agreed that insomniac can be controlled while 36.6% of female insomniacs did (Table 19).

Table 19

Number and Percentage for Timeline, Causes, Consequences, Control, and Emotional Representations by Gender (n = 92)

Dimensions	Male			Female		
	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
	n (%)	n (%)	N (%)	n (%)	n (%)	n (%)
Timeline						
acute/chronic	16 (41.0)	15 (38.5)	8 (20.5)	22 (41.5)	12 (22.6)	19 (35.8)
cyclical	30 (76.9)	9 (23.1)	0 (0)	37 (69.8)	13 (24.5)	3 (5.7)
Causes						
Psychological	25 (65.8)	10 (26.3)	3 (7.9)	30 (57.7)	14 (26.9)	8 (15.4)
Physiological	18 (48.6)	14 (37.8)	5 (13.5)	27 (51.9)	14 (26.9)	11 (21.2)
Environmental	29 (74.4)	4 (10.3)	6 (15.4)	35 (66.0)	3 (5.7)	15 (28.3)
Substance use	17 (50.0)	11 (32.4)	6 (17.6)	15 (34.1)	13 (29.5)	16 (36.4)
Own behaviors	28 (73.7)	2 (5.3)	8 (21.1)	33 (63.5)	3 (5.8)	16 (30.8)
Consequences	15 (38.5)	19 (48.7)	5 (12.8)	23 (43.4)	20 (37.7)	10 (18.9)
Control	18 (46.2)	17 (43.6)	4 (10.3)	19 (36.6)	27 (51.9)	6 (11.5)
Emotional representations	15 (37.5)	13 (32.5)	12 (30.0)	20 (37.7)	22 (41.5)	11 (20.8)

Research question 6. How do Thai insomniacs in the northern region cope with their insomnia?

The coping procedures of insomnia were determined from a 30-item questionnaire, describing methods used to alleviate insomnia symptoms. The total items were classified into nine categories (Appendix T).

Overall, most of insomniacs had used more than one strategy to cope with insomnia. The most frequent coping procedure was physical management as reported by 93.48% of the participants. Other frequent methods used to cope with insomnia were relaxation (91.3%) and self-forcing to fall asleep (85.4%). Consulting health care providers was reported by only 42.4 % of the participants (Table 20).

Table 20

Number and Percentage for Coping Procedures of Insomnia (n = 92)

Coping procedures	n(%)
Physical management	86 (93.5)
Relaxation	84 (91.3)
Self-forcing to fall asleep	82 (85.4)
Environmental management	75 (81.5)
Home remedies	74 (80.4)
Drug and substance use	69 (75.0)
Changing behaviors	50 (54.4)
Consulting healthcare providers	39 (42.4)
Others (e.g. counting number, talking with friends)	5 (5.4)

Stratification by age groups indicated that almost all coping procedures were equally used by the two groups, except for consultation with health care providers. Slightly more than half (55.0%) of the older group had reported that they had consulted health care providers while only 38.9% of the adult group did (Table 21).

Table 21

Number and Percentage for Coping Procedures of Insomnia by Age Groups (n = 92)

Coping procedures	Adult group	Older group
	n(%)	n(%)
Physical management	68(94.4)	18(90.0)
Relaxation	67(93.1)	17(85.0)
Self-forcing to fall asleep	63(87.5)	19(95.0)
Environmental management	59(81.9)	16(80.0)
Home remedies	57(79.2)	17(85.0)
Drug and substance use	53(73.6)	16(80.0)
Changing behaviors	40(55.6)	10(50.0)
Consulting healthcare providers	28(38.9)	11(55.0)
Others (e.g. counting number, talking with friends)	12(16.7)	1 (5.0)

Stratification by gender revealed that most of the coping procedures were equally reported by male and female insomniac, except for consultation with health care providers. Almost half (47.2%) of female insomniacs and 35.9% of male insomniacs reported that they had consulted with health care providers (Table 22)

Table 22

Number and Percentage for Coping Procedures of Insomnia by Gender (n = 92)

Coping procedures	Male	Female
	n(%)	n(%)
Physical management	37(94.9)	49(92.5)
Relaxation	34(87.2)	50(94.3)
Self-forcing to fall asleep	35(89.7)	47(88.7)
Environmental management	32(82.1)	43(81.1)
Home remedies	30(76.9)	44(83.0)
Drug and substance use	29(74.4)	40(75.5)
Changing behaviors	20(51.3)	30(56.6)
Consulting healthcare providers	14(35.9)	25(47.2)
Others (e.g. counting number, talking with friends)	6(15.4)	7(13.2)

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Discussion

Findings of this study are discussed in relation to the objectives of the research. This part provides the discussion of prevalence, characteristics, risk factors, perceived impacts, representations, and coping procedures with insomnia.

Prevalence of insomnia

Findings from this study indicated the point prevalence of insomnia, defined as insomnia occurring three nights or more per week with at least one daytime impairment for at least one month, was 15.3 % in this population. The prevalence of insomnia in this study is comparable with previous reports that utilized a similar definition for insomnia. The reported prevalence in these studies ranged from 11.2% to 20.8% (Kageyama et al., 1997; Leger et al., 2000; Pallesen et al., 2001; Rocha et al., 2002). However, Sukying and Nilachaigovit (1997) reported that the point prevalence of insomnia was about 30% among Thai population age 18 years and older, residing in Bangkok. The two times difference in the reported prevalence of insomnia between the present study and the report of Sukying and Nilachaigovit could be due to several factors.

Firstly, the definition of insomnia was different between the two studies. Sukying and Nilachaigovit defined insomnia based on the questions of the General Health Questionnaire, which excluded the condition of daytime impairment whereas this criterion was included in the definition of insomnia in the present study. The frequency of insomnia differed between the two studies. In the present study,

insomnia was defined based on a weekly basis for at least three nights per week whereas Sukying and Nilachaigovit defined insomnia on a continuous scale, ranging from not at all to much more than normal, within the past 2-3 weeks. When the eligibility criteria for classification into the insomnia category were set intentionally high in order to capture only insomniacs who required medical treatment, the prevalence was relative low. For instance, the younger age group who complained daytime impairments but did not have symptoms of insomnia for a minimum of three nights per week was not classified as insomniacs. Also, among the older age group who met the frequency criterion for insomnia was not classified as insomniacs because they did not complain of daytime impairments. The reported daytime impairment was not predominant among the older age group in this study because most of them (73%) were able to compensate for loss of night sleep by napping during the day. About 48% of the elderly in this study did not hold employment, while those who were employed had flexible schedules. Therefore, it is likely that they did not perceive nighttime sleep disturbances caused daytime impairments and thus, they were ineligible to be classified as insomniacs for the purpose of this study.

Secondly, the differences in the demographic characteristics of individuals who participated in this study and those who participated in Sukying and Nilachaigovit's study could account for the difference of the reported prevalence of insomnia. The majority of respondents in the present study were residing in rural areas, while those in the previous study were living in an urban setting. The differences in life-styles between urban and rural settings can potentially lead to changes in sleep behavior. The complicated and competitive life styles in urban settings can supposedly induce psychological stress. Moreover, noise and air

pollution and congested dwellings are more common problems in the city. These factors combined may increase the likelihood for insomnia among urban dwellers.

Thirdly, the prevalence of mental health problems was different between the two studies. In the present study, only 13.3% of the respondents met the criterion for having anxiety and 7.1% reported of experiencing depression whereas 49.2% of the respondents in the study of Sukying and Nilachaigovit reported of having at least one psychological health problem within the previous 2-3 months.

The combination of the stated reasons most likely has yielded the noticeable differences in the prevalence of insomnia between this study and the finding of the previous study in Thailand. However, the reported prevalence of insomnia in this study was comparable to and that of those studies that used a similar definition for insomnia.

Characteristics of insomnia

Results of this study demonstrated that difficulty maintaining sleep (DMS) and difficulty initiating sleep (DIS) were the two common characteristics of insomnia. Early morning awakening (EMA) and non-restorative sleep (NRS) were equally ranked as the third most commonly reported symptoms. The findings are consistent with previously reported results (Doi et al., 2000; Ohayon & Hong, 2002; Ohayon & Roth, 2001; Ohayon & Smirne, 2002). Among the study participants, DMS and EMA were the most frequent complaints in the older age category while DIS was common in the younger group. These findings are consistent with the findings of Kawada et al. (2003), Kim et al. and Pallesen et al.

Difficulty maintaining sleep was the most common characteristic of insomnia in this study. The possible explanation is that the majority of the sampled population was late adulthood or older adulthood (45% and 20.4%). Among the middle-aged and the aged people, trouble with maintaining sleep is predominant (Partinen & Hublin, 2000). The prevalence of difficulty maintaining sleep increases with advancing of age because of changes in the sleep structures as a consequence of the biology of aging. These changes include a decrease in slow wave sleep or deep sleep (stages 3 and 4), with a concomitant increase in light sleep (stage 2) and drowsiness (stage 1) (Morgan, 2000). Also during the second half of night cycle, frequency of awakening increases and duration of awakenings becomes prolonged (Espie, 1991). The stages 3 and 4 of the sleep cycle represent the deepest portion of sleep with having the highest auditory arousal threshold to stimuli (Bliwise, 1997). Older people relative to younger people are more easily disrupted by noise during stages 2 and 4, and during the REM portion of the sleep cycle (Zepelin, McDonald & Zammit, 1984 cited in Morgan). Therefore, the disruption of the sleep cycle becomes easier because of the biology of aging, leading to increase frequency of awakening episodes during the night.

Early morning awakening symptom was also predominant among the elderly in this study. It can be explained that because of the biology of aging, the circadian clock advances, which can lead to the advancing of sleep phase syndrome. In this case, then elderly should get sleepy early in the evening (8 p.m.-9 p.m.). If they go to bed early and have a normal sleep cycle for about eight hours, then they should be able to rise at 4 a.m. to 5 a.m. The early morning awakening persists among elderly, even if they retire to bed until late at night (Ancoli-Israel, 1997).

Difficulty initiating sleep was common among the younger study participants. This characteristic found in the younger group indicates that younger people have problem related to the early phase of the sleep cycle (Pallesen et al., 2001). This problem occurs when internal biological rhythm is delayed from the normal. One of the most common causes of this syndrome is an irregular sleep-wake cycle. Young people normally have irregular sleep schedules during the weekdays and weekends. They sleep late at night and wake up late in the morning, particularly during weekends, to catch up with their sleep needs; however, this can encourage the delay of the endogenous rhythm. If the endogenous temperature rhythm starts to decline late at night and starts to rise late in the morning, then it becomes difficult to fall asleep before 2 a.m. or 3 a.m. and consequently, hard to get up early in the morning (Lack, 1986).

The prevalence of all characteristics of insomnia in this study increased with age, except for the NRS, which slightly decreased among the elderly. This finding concurs with the previous report indicating that complaint about NRS was less common among the elderly relative to the younger population (Ohayon & Smirne, 2002). It can be explained that the elderly have the opportunity to compensate for loss of night sleep by napping during the day since they do not have the demands of work and family. Taking a short nap can maintain a good quality of wakefulness during the day (Uezu et al., 2000). The present data found that 73.2 % of the elderly versus 61.2% of the younger group took a nap during the day.

For mixed types of insomnia, the present study showed that DMS along with DIS were the two most frequently reported of symptoms. This result is in agreement with previous studies (Ohayon & Roth, 2001; Rocha et al., 2002). Overall, the

characteristics of insomnia in this study were similar to those found in the previous studies.

Risk factors for insomnia

Spielman and colleagues' conceptual framework of insomnia was used to determine the following risk factors: predisposing, precipitating, and perpetuating factors. A discussion of the results for each risk factor is presented below.

Predisposing factors. Five variables, age, gender, marital status, educational level, and perception of income adequacy, were selected for the multivariate analysis. However, none of these variables were significantly associated with insomnia after controlling for potential confounding variables. Marital status and perception of income adequacy were related to insomnia in the univariate analysis only. As for educational level, it showed no relationship with insomnia both in the univariate and multivariate analyses. Although age and gender were not statistically significantly associated with insomnia, a discussion of these variables is presented because of their clinical importance.

In the univariate analysis, divorced respondents were more likely to report insomnia than did the married ones but the effect of divorce status disappeared after controlling for other variables such as gender, age, physical problems, mental health problems, and stressful life events. This result is consistent with previously reported findings (Gislason et al., 1993; Kegeyama et al., 1997; Sukying & Nilachiagovit, 1997) indicating that other factors such as physical problems and mental health

problems potentially confounded the association between divorce and insomnia. The present data found physical health problems (61.1% VS. 28.3%) and anxiety (27.8% VS. 23.3%) were more common among people who had reported their marital status as divorced relative to those who were married. Divorce can lead to psychological health problem and poorer health by the following pathways. Divorce can cause depression by affecting emotional reactivity to secondary role changes (Aseltine & Kessler, 1993). In addition, being divorced leads to poorer health because of the possible increase in psychological stress (Goldman, Korenma & Weinstein, 1995) and this stress leads to engaging in unhealthy behaviors such as smoking and alcohol consumption (Cohen, Kessler & Gordon, 1995). Divorce is a stressful life event in itself. In general, divorced people experience stress from marital disruption. Financial problems also may be more common among divorced individuals because only one person carries the responsibility of supporting the family; furthermore, they are less likely to have continuous employment (Waldron, Weiss & Hughes, 1997). In contrast, married people have more emotional support and financial security. Also, they are more socially active (Ren, 1997). Moreover, event of divorce leads to considerable changes in many aspects of life (Mastekaasa, 1994 cited in Ren).

Therefore, mental and physical health problems which result from divorce can cause sleep disruption. However, causal-effect assumption in cross-sectional studies should be interpreted cautiously. The time sequence as to whether or not divorce caused insomnia, or whether insomnia preceded divorce was difficult to determine (Kiejna, Wojtyniak, Rymaszewska & Stokwiszewski, 2003).

Similar to previous studies, this study found that perception of income adequacy disappeared when other potential risk factors were controlled (Ohayon et

al., 1997; Pallensen et al., 2001; Sukying & Nilachiagovit, 1997). Thus, perception of income adequacy by itself may not directly contribute to insomnia, but other factors may account for this relationship. Sukying and Nilachaigovit found that people who had financial problems were more likely to have psychosocial problems than those who had higher income. Similarly, the present data found that people who perceived their income as inadequate relative those with the perception of income adequacy were more likely to have a higher score on depression (9.8% VS. 4.9%) and anxiety (17.1% VS. 10.2%). Perception of income inadequacy can lead to financial frustration, causing emotional distress that can disrupt the sleep process (Moffiitt, Kalucy, Kalucy, Baum & Cooke, 1991).

Age was not statistically significantly associated with insomnia in this study. This finding is contrary to that of several epidemiological studies of insomnia, reporting that insomnia becomes more prevalent with aging. (Doi et al., 2000; Ishigaoka et al., 1999; Kim et al., 2000; Klink et al., 1992; Leger et al., 2000; Ohayon, 1996; Ohayon & Hong, 2002; Ohayon & Roth, 2003; Sukying et al., 2003; Sukying & Nilachaigovit, 1997; Tachibana et al., 1998). On the other hand, Pallesen (2000) and Hajak (2001) both reported that aging had no relationship with insomnia. Notably, both studies also included daytime impairments in the definition of insomnia.

The main difference between the finding of this study and previous studies could stem from the definition of insomnia. The definition of insomnia in this study held "daytime impairment" as one criterion for insomnia. Yet, many previous studies excluded this criterion. It is important to note that the elderly respondents in this study might not have reported negative daytime impairments due to insomnia to the same extent as the younger subjects. The older subjects potentially had more

opportunities to compensate for lack of night sleep during the day by taking naps, since the demands of family or work were not an important factor for them. They also had fewer scheduled responsibilities resulting in less perception of negative daytime impairments (Hajak, 2001). Additionally, older people may adjust their expectations with respect to the quality of sleep, which is relevant to common changes of sleep patterns associated with the biology of aging (Pallesen et al., 2001). Consequently, the elderly might not perceive daytime impairments as a problem and thus, express less frustration. In this study, the elderly reported less daytime impairments when compared to other adults in the middle and late adulthood age category (Table 5). It can be explained that most of the older study participants did not have jobs and those with employment worked on a limited basis. Moreover, the data also revealed that the elderly napped more frequently than the younger subjects. It was found that 73.2% of the elderly took naps, while 56% - 64% of other age groups did. Consequently, the elderly were less likely to feel that their daytime functioning was affected by insomnia. If impairment of daytime functioning was not reported then study participants were not classified as insomniacs.

It is not surprising that age was not found to be a risk factor for insomnia. Chronological age may not explain the high prevalence of insomnia when other factors, particularly chronic diseases, are considered (Bliwise, 2000). Sutton et al. (2001) and Katz et al. (1998) found that age was not related to insomnia after controlling for physical problems and stressful life events. Consequently, age per se may not independently lead to the presence of complaint of insomnia (Bixler et al., 2002). The present study found that those who were elderly and reported of having insomnia compared to non-insomniacs elderly, tended to have more health problems

(75% VS. 68%) and higher scores on perceived impact of stressful life events (75% VS. 42.7%). It is known that illnesses are age-related thus physical health problems are more prevalent among the aging population (Fichten et al., 2000). Stressful life events, particularly losses are more frequent during the later part of life. These events may contribute to insomnia rather than age itself, per se (Bliwise, 1997).

Insomnia was more prevalent in females than in males; however, the observed difference did not reach the level of statistical significance. This result is not consistent with that of several studies (Bixler et al., 2002, Chevalier et al., 1999; Hajak, 2001; Ishigaoka et al., 1999; Leger et al., 2000; Li et al., 2002; Ohayon, 1996; Ohayon & Roth, 2001; Pallesen et al., 2001; Sukying et al., 2003; Sutton et al., 2001), which reported that female gender was a risk factor for insomnia.

The absence of the relationship between female gender and insomnia in this study can be explained by no difference in the potential factors associated with insomnia between men and women who participated in this study. Results from the present study suggested that prevalence of mental health problems, particularly depression and stressful life events, were similar between the two genders. About 7.8% of women and 6.3% of men interviewed reported of having depression. As for stressful life events, there was not much different proportion of women (55.7%) and men (49.6%) reported of experiencing life events.

The equal prevalence about perception of stressful events among men and women who participated in this study partially can be explained by their marital status. In this study, the majority of women were married and only 17% had reported their marital status as either widowed or divorced. In general, divorced or widowed women are at greater risk for experiencing stressful life events and insomnia.

Therefore, it may be that women in this study were able to share the burden of stressful events with their life partners and thus, they were experiencing less stress and fewer episodes of insomnia.

The association between female gender and insomnia reported in previous studies might have been confounded by factors such as anxiety and depression. These two psychological conditions are more prevalent among women (Owens & Matthew, 1998). Factors such as menopausal status and stressful life events also may confound the association between female gender and insomnia. Discomfort associated with menstruation or menopause can disturb sleep (Anderson & Falestiny, 2000). In addition women who perceive more stressful life events tend to complain more about disruption of the sleep pattern (Shaver & Zenk, 2000).

Other variables in the predisposing factors that were not related to insomnia were educational level, monthly household income, and occupation. These variables showed mixed results. The association that have been reported in previous studies should be considered with caution since other factors such as age or gender may modify the association (Ohayon, 2002).

Precipitating factors. Six variables related to insomnia in the univariate analysis were medical illnesses, anxiety, depression, noise, bed surfaces, and stressful life events. However, only four variables remained statistically significant in the multivariate analysis. These variables were physical health problems, anxiety, depression, and noise.

Health problems were positively associated with insomnia in this study. People who had health problems were about twice as likely to report insomnia as

those who were healthy. This result is consistent with findings of others in the field (Bixler et al., 2002; Gislason & Almqvist, 1987; Hohagen et al., 1993; Katz et al., 1998; Kuppermann et al., 1995; Mellinger et al., 1985; Pallensen et al., 2001; Sukying et al., 2003; Sukying & Nilachaigovit, 1997; Sutton et al., 2001), which documented that health problems were risks factor for insomnia.

Systematic medical diseases lead to insomnia by several mechanisms. Firstly, diseases can cause neurologic disturbances, which in turn may cause sleep disturbances by affecting the sleep-wake system of the central nervous system (Chokroverty, 1999). Secondly, insomnia may be a side effect of medications (Gislason & Almqvist, 1987). Thirdly, state of illness usually triggers an emotional response, although it becomes difficult to differentiate worry, anxiety, and depression from the impact of the disease itself (Espie, 1991). It is known that emotional arousal can cause insomnia. Fourthly, people with health problems may take medications that can interfere with the sleep pattern and thus causing learned insomnia. This type of insomnia is developed because of the repeated association between sleeplessness and bedroom clues. Moreover, excessive time in bed in order to feel well-rested can alter the circadian rhythm, which in turn leads to insomnia (Spielman, Yang & Glovinsky, 2000).

In this study, the univariate analysis indicated that headache, migraine and dizziness were associated with insomnia, while cardiovascular, musculoskeletal, endocrine and gastrointestinal systems were not statistically significant. People with tension headache frequently experience a disruption in their sleep pattern, which shortens sleep duration, decreases sleep efficiency, reduces sleep onset latency but awakened more easily during the night. Moreover, tension headache increases body

movement during the sleep cycle, and markedly reduces the slow wave sleep (Jennum & Jensen, 2002). Results from the present study suggested that other disorders were not associated with insomnia since they were either managed by use of prescription or the severity of the disease itself was not too serious.

Respondents who expressed of having anxiety were four times more likely to complain about insomnia relative to subjects without such symptoms. Also, study participants with depression were three folds more likely to complain about insomnia. This study as well as other studies supports that the prevalence of insomnia is higher among individuals with psychological health problems relative to those without such these conditions (Cirignotta et al., 1991; Frisoni et al., 1992; Mellinger et al., 1985; Sukying et al., 2003; Weyere & Dilling, 1991).

From the exploring of effect modifier of age, the magnitude of depression and anxiety on insomnia differed between the adult group and the elderly. The significant difference in the reported relative effect or odds ratios of depression and anxiety between the two groups may be due to the effect modification of the third variable, age. The association of the two risk factors, anxiety and depression, to insomnia is stronger among the elderly than younger people (Appendix R). It is possible that the higher odd ratios of anxiety and depression on insomnia among older people are due to the interaction of mental health problems with physical health problems. It is important to note that changes in mental health status are not the only factor causing insomnia in an aging population. Physical health problems and disabilities can both lead to insomnia. Under some circumstances, psychiatric problems along with somatic symptoms may interact to cause serious sleep disruption (Morgan, 2001).

Possible mechanisms are addressed for the association between psychiatric disorders and insomnia. Psychiatric disorders disrupt sleep by decreasing homeostatic sleep drive, dysregulating of circadian rhythm, and increasing REM pressure (Stepanski, 2002). In addition, symptoms of depression significantly correlate with hyperarousal throughout NREM sleep in insomnia and with poorer subjective sleep quality (Morin, Rodrigue & Ivers, 2003). Moreover, patients with mood disorders may exaggerate their sleep disturbances because of infinite dissatisfaction with sleep and cognitive bias or somatic focus. However, their disturbances of sleep duration and continuity may not be of the same degree in physiological sense relative to the perceived magnitude due to the individuals' level of distress or impairment (Nowell, 2002).

Psychiatric problems were found to be very powerful factors in the occurrence of insomnia (Soldatos, 1994). However, given the cross-sectional nature of the study, it is difficult to draw a causal association between insomnia and psychiatric health problems. The time sequence of event/psychiatric problems and outcome/insomnia can not be determined because of the study design. Also, insomnia can be a residual symptom of a previous mental disorder; if so, then individuals with insomnia may be at a higher risk for relapse (Ohayon & Roth, 2003). A longitudinal study monitoring the onset and temporal course of these two variables can clarify the causal effect association (Morin, 1993).

Perception of disturbed noise was found to be significantly related to insomnia both in the univariate and the multivariate analysis. Respondents with perception of disturbing noises from either neighborhoods or homes were about twice as likely to report insomnia relative to those who did not. The most frequently reported sources

of noise were: people's conversation during the night, dogs barking, and noises from motor vehicles. People residing near main roads were particularly cognizant of noise level from motor vehicles. Noise interferes with the sleep process by delaying the onset of sleep, returning to sleep, premature awakening (Pollack, 1993), increasing body movements, increasing duration of wakefulness and stage 1, but decreasing duration of delta sleep and REM sleep (Roehrs et al., 2000).

This result can be compared with the study among the Thai elderly. Ramsiri (2000) reported that more than half of subjects reported that noise disturbed their sleep during the night. However, the data were only descriptive analyses. As a result, it did not identify the association between noise and insomnia. Additionally, the finding of this study is consistent with that of previous studies (Kageyama et al. 1997; Li et al., 2002; Mant & Eyland, 1988; Nivison & Endresen, 1992), that revealed that noisy sleep environments, neighborhoods, households, or traffic were related to insomnia symptoms.

The finding of this study did not show the relationship between sleep surfaces and insomnia after controlling for other confounding factors. This suggested that sleep surfaces did not directly contribute to insomnia. The data found that people who complained that their sleep surfaces were not comfortable tended to have more health problems than those who did not complain (60% VS. 49.4%). Uncomfortable conditions resulted from illnesses, perhaps contributed to insomnia rather than bed surfaces. It was found that sleep surfaces that were too hard might cause discomfort in people with arthritis. On the contrary, if it was too soft, it may disrupt sleep in those with low back pain (Morin, 1993).

The association between sleep surfaces and insomnia should be interpreted cautiously. The presence of the association in most previous studies was found among hospitalized patients; for example, unfamiliar beds and uncomfortable beds were found to lead to sleep disruptions in patients after surgery (Closs, 1992; Simpson et al., 1996). It is known that illnesses or medical conditions directly lead to sleep disruption. Therefore, sleep surfaces, per se, may not cause insomnia.

Stressful life events were found to be statistically significantly associated with insomnia in the univariate analysis, but lost significance in the multivariate analysis. The result contradicts some of the previously published findings (Kageyama et al., 1997; Kawada et al. 2003; Vollrath et al., 1989) indicating stressful life events causes insomnia. However, it concurs with the findings of Bazargan (1996) reporting that stressful life events were not significantly associated with insomnia in the multivariate analysis because of variance shared by depression/anxiety and number of chronic illnesses.

For this study, it is likely that stressful life events may not have been a direct cause of insomnia. Stressful life events may lead to insomnia through the pathway of physical and emotional disorders. The present data found that people with higher scores of impact of stressful life events also had higher depression scores (11.6% VS. 2.1%) and anxiety scores (19.7% VS. 6.0%). In addition, they reported more health problems (53.3% VS. 46.3%) compared with those who had lower scores of impact of stressful life events. Stressful life events have been reported to be correlated with depressed mood in various types of population such as among the elderly living in the communities (Chong et al., 2001), among patients diagnosed with major depressive episodes (Mitchell, Parker, Gladstone, Wilhelm & Austin, 2003), and among healthy

free-living adult subjects (Kessler, 1997).

Stressful life events can cause physical problems and psychiatric diseases through the integration of environmental, psychological, and biological responses to stress measurement. This mechanism which is explained by Cohen et al. (1995) suggested that when people are faced with environmental demands (stressors or life events), they evaluate whether the demands are determined as a potential threat. Moreover, they also evaluate whether their adaptive abilities to cope with the demands are adequate. If they perceive that demands are threatening and their coping capacities insufficient, then they view themselves as under stress. As a result, perceived stress is presumed to cause negative emotional responses. If extreme, these emotional states may directly lead to the onset of affective psychiatric disorders such as anxiety and depression. They may trigger behavioral coping responses, which can lead to poor health behaviors such as smoking and alcohol consumption. Furthermore, extreme stress can stimulate physiological responses such as increase in heart rate and blood pressure and elevation of catecholamine levels. Both behavioral and physiological arousal put people under risk for psychiatric and physical illness. Consequently, physical and psychological health problems, which are results of having stressful life events, lead to insomnia rather than stressful life event itself.

Perpetuating factors. Five variables were included in the multivariate analysis: irregular awakening, planning, rehearsing or problem solving in bed, smoking, consuming caffeine, and holding dysfunctional beliefs and attitudes about sleep (DBAS). The variable smoking remained as the only statistically significant risk factor for insomnia.

Smoking was not a significant risk factor of insomnia in univariate analysis; however, it was significantly associated with insomnia after controlling for other potential risk factors. The relationship between smoking and insomnia supports the anticipated pharmacological effects of nicotine. Nicotine provokes arousal and increases alertness by cholinergic pathway. As a result, heart rate, blood pressure, and catecholamine concentrations are increased (Zarcone, 2000). In addition, smoking also increases the frequency of alpha activity of the brain and also produces more high-amplitude beta activities indicating an arousal condition (Shiromani, 1993). Both of these pathways can cause sleep difficulties. This result is consistent with that of previous studies (Phillip & Danner, 1995; Sukying et al., 2003; Sutton et al., 2001; Wetter & Young, 1994), indicating that smoking was a risk factor for insomnia.

In this study, it was found that people who reported of either “sometimes” or “always” planning, rehearsing or problems solving in bed were more likely to experience insomnia than those who were free from such thoughts. However, this variable lost its significance after controlling for other variables. This suggested that planning, rehearsing or problem solving in bed did not contribute to insomnia but rather other variables were accounted for the observed association. There is evidence that bed time cognitive activities was higher among insomniacs with generalized anxiety disorder (GAD) relative to insomniacs without GAD (Gendron, Blais & Morin, 1998 cite in Wicklow & Espie, 2000). People with concerns were more inclined to have mental involvement with night time thoughts in terms of rehearsal, thoughts of family, work, and physical sensations (Watts, Coyle & East, 1994). The present data also found that study participants in the categories of “sometimes” or

“always” planning, rehearsing or problem solving in bed had higher scores on the anxiety level than those who did not (16.4% vs. 7.8%). It is likely that anxiety plays a role in the association between planning, rehearsing or problem solving and insomnia. The characteristics of people with GAD are excessive worries and anxiety and difficulties in controlling annoyance (Bostrom, & Schwecke, 1999). Therefore, they may be occupied with uncontrolled thoughts at bedtime, which lead to sleep difficulties.

Another interesting variable in perpetuating factors is the dysfunctional beliefs and attitudes about sleep (DBAS). The higher scores of DBAS were found in insomniacs more than non-insomniacs. Higher DBAS scores are associated with more erroneous beliefs and attitudes about sleep. However, after controlling for other variables, DBAS was not statistically significantly associated with insomnia. It indicated that DBAS by itself might not contribute to insomnia. Faulty beliefs and attitudes about sleep produce emotional distress and autonomic arousal that lead to disruption of the sleep cycle (Morin, 1993). Arousal is the result of sympathetic nervous system activation. Therefore, it puts people into an anxious state (Harvey, 2002). From this mechanism, it is likely that DBAS causes insomnia via anxious state pathway. The present data revealed that people with high score of DBAS also had high scores on anxiety compared with people with low scores of DBAS (19.4% VS. 6.8%). Additional pathways also should be considered. People who have dysfunctional beliefs and attitudes about sleep are likely to adopt maladaptive sleep habits (Harvey, 2002; Morin, 1993); for example, the belief of trying to “catch up for sleep loss” can lead to maladaptive sleep habits such as remaining in bed beyond the usual rising time or taking daytime naps (Edinger & Wohlgemuth, 2001). These

maladaptive behaviors have been known to cause insomnia. Therefore, DBAS itself does not contribute to insomnia, but rather anxious state pathway and maladaptive sleep habits are account for the association.

The other two variables, irregular waketime and caffeine consumption were not significantly associated with insomnia. The distribution of these variables was similar among individuals with insomnia and those without. Six percent of insomniacs had irregular waking, while 2.9% of non-insomniacs did. As for caffeine consumption, 30.4% of non-insomniacs had “sometimes” or “always” drinking caffeine, whereas 22.9% of insomniacs did. The absence of association between caffeine and insomnia can also be explained by developing tolerance to sleep-disturbing effect of coffee (Colton, Gosselin & Smit, 1967 cited in Janson et al., 1995).

In summary, the risk factors of insomnia identified in this study are comparable to previous reports. These factors are relevant to the conceptual framework of insomnia by Spielman and colleagues. Notably, the cross-sectional design of the study in which risk factors and outcome, insomnia, were studied at one point in time, prevents the conclusion of a causal effect between the identified risk factors and insomnia.

Perceived impacts of insomnia. The four domains of perceived impacts of insomnia were physical and emotional, working, economic, and family and social domains. The significant impacts of insomnia on physical, emotional and working domains were perceived equally across the two age groups and genders. On the other

hand, it was generally less agreed that insomnia had relatively impacts on economic and family and social domains.

With regards to physical and emotional domain, insomniacs in this study reported of fatigue, less physically well, and irritability after a poor night sleep. These results are in agreement with previous studies (Kales et al. 1984; Kupperman et al., 1995; Roth & Ancoli-Israel, 1999; Zammit et al., 1999), indicating that insomniacs feel physically and mentally poorer relative to non-insomniacs. Insomniacs in this study also reported that they had minor accidents such as falling or cutting their fingers, after a poor night sleep. Only a few insomniacs reported of potentially serious accidents such as motorcycle accident because of drowsiness. However, others have reported that among insomniacs particularly, chronic insomniacs, major accidents such as automobile accident are caused by sleepiness or fatigue (Balter & Uhlenhuth, 1992; Ohayon & Smirne, 2002).

It is likely that loss of sleep that results from insomnia can lead to chronic fatigue and increased risk of falls and accidents (Foley et al., 1995). Fatigue is a very common symptom of daytime impairments (Dement & Pelayo, 1997). Moreover, the cumulative sleep deprivation that may be a result of chronic insomnia should produce daytime sleepiness (Bonnet & Arand, 2003). In addition, perceived impacts on physical and emotional domain such as elevation in sleepiness and fatigue may be secondary symptoms of the physical and psychological problems that insomniacs had (Roth & Ancoli-Israel, 1999). The present data also demonstrated that the prevalence of medical illnesses (66.3% VS. 47.1%), depression (22.8% VS. 4.3%) and anxiety (38.0% VS. 8.8%) was more common among insomniacs relative to non-insomniacs.

For mood disturbances, individuals with severe and chronic conditions of insomnia were more likely to feel distress about their insomnia for a long period of time. In general, insomniacs do not worry about their sleep disturbances, particularly if it is transient in nature; however, if faced with nightly insomnia, then they experience mood disturbance such as irritability, tension, and helplessness (Morin, 1993).

Among the older group of insomniacs, the agreement that insomnia affected on physical and emotional domain was lower relative to the younger age group. This may due to the fact that aging people may perceive that impairments of physical and emotional functions are consequences of the biology of aging and therefore, their responses were influenced by their beliefs about the bio-physiological changes of the aging process.

The consensus that insomnia had a relatively more significant impacts on working domain was stronger in the older age group than the younger group. Working domain in this study was defined as having difficulties on concentrating to complete daily works or activities. It was found previously that insomniacs had poorer attention span and lower concentration ability and had difficulties with remembering things (Roth & Ancoli-Israel, 1999; Zammit et al., 1999). Difficulties with cognitive functions among older insomniacs may be a result of decreased mental restoration caused from poor sleeping habits. Adequate opportunity to obtain sleep is vital for maintenance of the cognitive functions (Cricco et al., 2001). Impairments of cognitive functions could have been a likely reason for the aging insomniacs to reason for having difficulties with accomplishing tasks. They may also attribute the cognitive difficulties that are the results from the bio-physiological changes of aging

to the impacts of insomnia. In addition, difficulties with concentration and work performance are also related to the highly distressed about sleep disturbance, decreased total sleep time, and increased wake time period at night (Alapin et al., 2000).

Gender differences were observed on the perception of the impacts of insomnia on physical and emotional domains and working domain. In general, male insomniacs were more inclined to report that insomnia had influenced their physical and emotional states and work performance. Those men who reported insomnia could have more disrupted sleep than women who reported insomnia (Cricco et al., 2001). Disrupted sleep can interfere with physical, emotional status as well as work performance, which may lead to perceive impacts of insomnia by men. In addition, employment status may also explain the observed differences between male and female insomniacs. Male participants in this study were holding jobs outside their homes; while females were housewives. The more flexible job schedule and work environment for women could have been permissible factors for them to nap during the daytime. Therefore, women may have not perceived the impacts of insomnia to the same extent as men.

With regards to economic domain, insomniacs perceived that insomnia had negative impacts on this domain, but its effect was not as extensive as the effect on the working domain and physical and emotional domain. It can be explained that many insomniacs in this study did not seek help; thus, they did not spend their money on treatment, medications and other devices that potentially can facilitate sleep. The reason of not seek help is that they did not think they had a problem and felt that it was too trivial to discuss with a health care professional (Ancoli-Israel & Roth, 1999).

Some of insomniacs in this study reported that they spent money on sleep inducing drugs such as over-the-counter medications that were purchased from drug stores and prescription hypnotics at relatively low cost from health centers. The older age group relative to the younger one was more cognizant about the relative impacts of insomnia on their economic status. This perception can be the consequence of no or lower employment among the older insomniacs. About 50% of older insomniacs were unemployed whereas only 15% of younger insomniacs were. Furthermore, similar inferences about the observed high agreement on the impacts of insomnia on economic domain among females can be concluded.

Only one third of insomniacs agreed that insomnia had impact on their family and social life. It is possible that insomnia may have been viewed as one unpleasant component of the daily life rather a health problem. Consequently, thoughts and perceptions were adjusted accordingly, which could have lessened the severity of impacts of insomnia on family and social life and therefore, it did not contribute a burden in term of costs of treatment and family dependency.

In conclusion, findings of this study suggest that the majority of insomniacs had the general perception that insomnia affected the physical and emotional function and working domains of their lives; whereas, the perception of impacts on economic and family and social domains was shared by a lower number of insomniacs.

Representations of insomnia

This study is a pioneer report examining the representations of insomnia in Thai insomniacs using the common sense model by Leventhal and colleagues.

Representations of insomnia are a set of thought or ideas people perceive about their insomnia. The construct of insomnia representations is obtained from direct experiences and information of insomnia available in the society. Since insomnia can be acute, chronic or cyclical in nature, insomniacs in this study reported that they had previously encountered with insomnia or have been affected by insomnia for a long duration of time. The cumulative experience is an important source of constructing representations of insomnia along with information from media such as health education programs, booklets, and articles in the books or newspapers, communication with family members, neighbors, and knowledge given by health care professionals. However, when compared with other severe diseases; for example, heart diseases, hypertension, and cancer, insomnia seems to be of less concern and limited information is available to the society. Therefore, a picture of insomnia may not be salient for Thais. Moreover, knowledge that is available in certain culture and tradition shape how people think, feel, perceive, and socially represent of health and illness (Jovchelovitch & Gervais, 1998). In Asian culture, sleep is viewed as a wasteful time behavior. Therefore, people may not pay adequate attention to sleep problems.

Insomnia is viewed by insomniacs in five domains of cognitive representations, identity, time line, consequences, cure or control, and causes. Parallel with cognitive representations is emotional representation. The identity of insomnia is a label or symptoms related to insomnia. Fatigue was the most frequently reported symptom related to their insomnia. Fatigue was a very common symptom of daytime impairment of insomnia (Dement & Pelayo, 1997). It is due to the fact that loss of sleep resulted from insomnia caused fatigue (Foley et al., 1995).

It is interesting to note that among the older age group the agreement of symptoms related to insomnia, i.e. daytime sleepiness, was lower relative to the younger age group. The possible explanation is that since the older insomniacs did not hold a restrict job schedule they had more time opportunities to compensate for loss of sleep by daytime napping. Napping can maintain a good quality of wakefulness during the day (Uezu et al., 2000), which can create the perception that daytime sleepiness was less related to insomnia.

The number of reported symptoms was higher among females. It is possible that women had elevated sensitivity to bodily discomfort and higher levels of chronic distress and perceived poorer health (Ladwig, Marten-Mittag, Formanek & Dammann, 2000). Moreover, women may be more likely to perceive symptoms than men because of higher rates of existing symptoms in addition to higher symptoms cognition (Mechanic, 1978 cited in Wyke, Hunt & Ford, 1998).

With regards to time line attribute, insomniacs tended to think that their insomnia was a cyclical and chronic condition more than an acute condition. When considered risk factors for insomnia in this study, almost all risk factors were classified into precipitating factors. Precipitating factors can occur several times during the human life, leading to repeated or cyclical episodes of insomnia; if these factors occur for a long period of time, the outcome would be chronic insomnia symptoms.

The consensus that insomnia was a chronic condition was higher among the older insomniacs relative to the younger ones. The combination of sleep disruption caused by changes in sleep structure because of the advancing age (Bliwise, 1997)

and the higher prevalence of chronic illnesses and drug side effects (Hirshkowitz et al., 1997) may lead to chronic symptoms of insomnia in this group.

As for causes of insomnia, it is interesting to note that causal beliefs about insomnia can be developed from obtaining general information through communication with their family members and friends. In this study, insomniacs agreed that psychological, environmental and own behavioral factors were causes of insomnia. These findings are in partial agreement with the findings of the study, of characteristics presented at the clinic (Manhendran, 2001). In that study, about 94.1% of insomniacs had reported that psychological problems were a causal factor of insomnia. Similarly, results from the present study confirm findings of others that reported that concerns or distress about family, work, and relationship with friends lead to have insomnia (Kageyama et al., 1997). Moreover, Lichstein and Rosenthal (1980) found that insomniacs perceived that cognition arousal such as thinking or concerns can delay sleep onset.

The older insomniac had a higher agreement that physiological factors especially aging and psychological factors caused insomnia. The development of symptoms during the later part of life might have created the general assumption among the older age group that insomnia was the result of the aging process (Gump et al., 2001). Moreover, the older insomniacs may adjust their expectation about sleep quality as common changes of sleep patterns associated with the biology of aging (Pallesen et al.). Among the elderly, the worry state of mind seemed to be the most central factor for insomnia. They were often unable to turn off intrusive thoughts at bedtime that led them to have sleep difficulties (Pallesen et al., 2002). A higher proportion of males relative to females conceded that psychological factors caused

insomnia. It is likely because of job and family responsibilities more men were in worry state of mind which had led them to view psychological factors was a cause of insomnia.

For substances use causing insomnia, some of insomniacs could not make decision whether or not alcohol and smoking caused insomnia. They reported that they had direct experiences or obtained information from friends that drinking alcohol helped with falling asleep. Alcohol in a small amount leads to ease of initiating sleep, but in a large amount it disrupts the sleep process (Zarcone, 2000). For smoking, it was found that people reported that smoking reduced anxiousness. Before going to bed, they had cigarette helping them to sleep (Collier, Skitt & Cutts, 2003). In the older age group, a lesser agreement on the causal association between substance use and insomnia was observed. It is possible that due to the long duration of smoking and alcohol consumption but only the manifestation of insomnia occurring during the latter part of life, the link between substance use and insomnia was perceived to a lesser degree in this age group.

A similar perception was observed among female insomniacs in this study. The prevalence of tobacco and alcohol use was lower among female insomniacs in this study. As mentioned in the common sense model, the direct experiences construct the representations of insomnia. Therefore, because of less direct experiences, substance use may not have been an obvious cause of insomnia among females.

The agreement that own behaviors are causal factors of insomnia was lower among older insomniacs compared with younger insomniacs. It is due to the fact that symptoms that are perceived as caused by aging or more likely to occur with

advancing age may be seen as less related to health habits (Keller, H. Leventhal, Prohaska & E. A. Leventhal, 1989). Insomnia may be seen as a symptom related to aging process since some people may firstly develop insomnia when they are aged; consequently, they are not likely to view that own behaviors cause insomnia.

Older insomniacs agreed that insomnia could be cured or controlled. The possible explanation is the use of hypnotics was more common among the older age group compared with younger one. The older insomniacs were more likely to hold the belief about the efficacy of hypnotics in controlling insomnia. While, among the younger group drugs were less or never utilized. They did not have obvious ideas whether or not hypnotics can cure insomnia. It is likely that the majority of them perceived that insomnia was cyclical in nature; with the absence of the symptoms, the perception of controlling insomnia could have been strengthened. Male insomniacs compared with females perceived that their insomnia can be cured or controlled. Perception of control is related to the psychological distress (Fowers, 1994). It is possible that men were less distressed about insomnia relative to women.

The results demonstrated that the majority of insomniacs had neutral ideas on emotional responses to insomnia. It can be explained that insomniacs perceived that the duration of insomnia was cyclical; insomnia did not cause serious consequences and can be cured or controlled. Therefore, these may not have a great effect on their emotion. In addition, it was suggested that for minor medical conditions, little or no emotional response may occur (Barsevick, Whitmen & Walker, 2001).

Overall, insomniacs in this study viewed that fatigue, unrefreshed feeling, irritability, and dizziness were side effects of their insomnia. They perceived that insomnia was a chronic condition and cyclical in nature. Psychological,

environmental, and own behavior factors were the important contributing factors to insomnia. However, consequences, control and negative emotional responses to insomnia were not clearly defined by insomniacs.

Coping procedures of insomnia

Coping procedures of insomnia are the set of strategies that insomniacs used to alleviate their symptoms of insomnia. According to the common sense model by Leventhal and colleagues, representations of insomnia guide the development of action plans for managing insomnia. This study also supports this statement. Overall, insomniacs perceived that their insomnia was not a serious health problem. They viewed that insomnia as a chronic condition and cyclical in nature. With respect to the negative consequences, controllability of insomnia and negative emotional responses to insomnia, the understanding was ambiguous. Consequently, most of coping procedures were started with trying simple methods such as changing a sleep position, relaxation or home remedies whereas the complex of methods such as changing behaviors and consulting health care professionals were less frequently used.

The coping procedures used by insomniacs in this study were classified into nine categories. Physical management category was the most frequently used. Physical management included changing a sleep position, getting up from bed to do other activities then getting back to bed when sleepy, and taking nap during the day. Most insomniacs in this study reported that changing a sleep position was an easier way to do when they could not sleep. Furthermore, they expected that if they changed

their sleep position, it probably help them to feel more comfortable and help them to sleep.

This result is consistent with the study in the Thai elderly by Ramsiri (2000), which reported that changing a sleeping position was the most frequently used by older insomniacs. Getting out of bed and returning to bed when sleepy was also frequently used. Insomniacs reported that lying down in bed made sleeping more difficult. Not forcing to fall asleep and returning to bed only if sleepy helps to establish or strengthen the association between sleep and sleeping clues such as bed time or bed room (Bootzin, Esstein & Wood, 1991).

Napping during the day was another way used to cope with sleep disturbance at night. Napping is generally a behavior occurring when the amount of nocturnal sleep is not sufficient relative to the individual's biological sleep need (Dinges, 1993). Moreover, taking a short nap can maintain a good quality of wakefulness during the day (Uezu et al., 2000). Insomniacs reported that taking naps during the day helped them to feel that their sleep can be compensated and they felt refreshing after napping. Furthermore, many of them had free time to naps because they did not have a regular job schedule.

Relaxation ranked the second coping methods for managing insomnia. The relaxation techniques in this study included trying to make the minds free from worries, reading books, listening to the radio, watching television, massage, praying and meditation before bedtime. Reading or watching in bed is an attempted to break up a sleep pattern of lying in bed with frustrated thoughts (Hauri, 1993). There is evidence that people with routine activities before bedtime such as reading or watching television reported less complaints of insomnia than those without activities

(Hoffman, 2003). Listening to the music before bedtime can facilitate sleep by decreasing the frustration and dreads associated with insomnia. Music increases the level of sleepiness, decreases sleep onset latency, and decreases number of nighttime awakenings (Johnson, 2003). Meditation and praying are usually a bedtime ritual for Buddhists. Physiological changes during meditation are a particular electroencephalographic pattern characterized as a relaxed state and a slowed heart rate (Canter, 2003). Therefore, the state of relaxation facilitates sleep. In addition, praying is a bedtime routine that may promote sleep by relaxing people or establish a pleasant feeling at bedtime (Dement & Pelayo, 1997; Floyd, 1999).

Results of this study are in line with two previous studies, one conducted in a western culture (Ancoli-Israel & Roth, 1999) and the other among population with eastern cultural values (Ramsiri, 2000). Notably, younger insomniacs employed relaxation technique more than older insomniacs did. It can be explained that relaxations techniques reported by the study participants in this study included reading books, watching television and listening to the radio, which are activities frequently used by young people before bedtime.

The present study indicated that self-forcing to fall asleep was frequently reported. This result is in parallel with the findings of Ramsiri (2000) in aging people and Kales et al. (1984) in general population. Older people used this method more frequently than did younger adults. It is possible that getting out of bed was thought to lead to further difficulties with falling sleeping. Another reason for stay in bed and self-forcing to fall back to sleep, was the lack of ideas about activities during the night. The underlying belief of insomniacs who try hard to fall asleep is that if they

keep trying hard to sleep, sleep eventually will come. Many insomniacs prefer to stay in bed because they think that at least they are getting some rest (Morin, 1993).

Insomniacs reported that sleep environments such as ventilation, light, and noise affected their sleep. They managed their environments to facilitate their sleep by turning on fans or air conditionings, opening windows, turning off lights, and changing room for sleeping. These conditions lead to a sense of comfort while sleeping during the night.

Home remedies were among the popular methods employed by insomniacs. In this study, insomniacs drank warm water, milk, ovaltine, and herbal tea before bedtime in order to facilitate sleep. This result is in line with the finding of Ohayon and Hong (2002) that reported that herbal preparation was the most frequent method used to improve sleep quality or quantity. Milk and other dairy products promote sleep because they contain L-tryptophan, a natural amino acid, which is a precursor of the neurotransmitter serotonin and the concentration of serotonin is increased during the sleep cycle (Morin, 1993).

Two third of insomniacs in this study had taken prescribed drugs or over-the-counter and other substances to help them with sleep. Insomniacs used hypnotics that were prescribed by doctors from hospitals or clinics and health personnels from health centers in villages. Most of drugs were used for a short period of time. Over-the-counter drugs such as antihistamine were used to a certain degree and with the expectation that side effects of the drugs made them feel sleepy. Use of hypnotics and over-the-counter drugs has been reported in other studies (Kawada et al., 2003; Rocha et al., 2002; Tachibana et al., 1998).

It is interesting that alcohol was used in order to decrease sleep onset latency. Insomniacs reported that alcohol made them fall asleep easily. This result is consistent with a previous report by Ancoli-Israel and Roth (1999), which indicated that up to 28% of insomniacs, had used alcohol to help them fall asleep. Alcohol is a central nervous system depressant. Consuming alcohol near bedtime can accelerate sleep onset latency and deepen sleep during the first period of night (Morin, 1993). Although, overall alcohol disrupts sleep continuity, many insomniacs are not aware of this point because of the immediate effect of alcohol. Some insomniacs smoked when they could not sleep. The result is consistent with the report by Wetter and Dilling (1994) that people smoked when they could not sleep because it made them to feel relaxed.

Older insomniacs reported more frequent use of prescriptions such as hypnotics and over-the-counter medications than did younger insomniacs. The higher prevalence of medication use to overcome insomnia may be explained by more severe symptoms of insomnia. The frequency of sleepless nights and difficulties with falling sleep was higher among the older groups than the younger one. In addition, dissatisfaction with sleep quality and overall poorer health status could have been additional reasons for use of medications by the older age group (Seppala, Hyppa, Impivaara, Knuts & Sourander, 1997).

It is interesting to note that causal beliefs that are one of attributes of representations are likely to influence coping procedures. It was found that aging people in this study had lower agreements that substance use caused insomnia which may have let them to employ alcohol and cigarettes to facilitate falling sleep.

Half of insomniacs reported that they change their behaviors by exercise,

keeping regular sleep schedules, and avoiding caffeine or other stimulants near bedtime in order to help them to better sleep. Exercise, particularly later in the day, can increase the depth of sleep (increase stages 3 and 4 of sleep) and total sleep time (Youngstedt, O'Connor & Dishman, 1997). Moreover, exercise during daytime relieves stress and can make people feel more tired at bedtime (Edwards, 2003). Keeping a regular bedtime and wake time promotes optimal sleep propensity and consolidation due to sleeping in the range of circadian promotion of sleep. It also promotes a proper circadian timekeeping by regularly exposure to environmental and indoor light (Stepanski & Wyatt, 2003). For caffeine, it has its peak effect in plasma within one hour of consumption and it is eliminated between 3 to 7 hours after consumption (Curatolo & Robertson, 1983 cited in Morin, 1993). Consequently, avoiding caffeine near bedtime can facilitate sleep because caffeine has a stimulating effect that leads to sleep difficulty.

Consulting healthcare professionals about insomnia was the least frequently reported coping procedure. Most studies in the field revealed the similar findings in that only a few of insomniacs had ever consulted a doctor or other healthcare providers (Ancoli-Israel & Roth, 1999; Hajak, 2001; Kageyama et al., 1997; Kawada et al., 2003; Ohayon & Hong, 2002; Ohayon & Smirne, 2002). Some insomniacs reported that insomnia was a part of their lives and it did not cause trouble for them at all. In general, visit to specialists such as psychiatrists or sleep expert was not common among insomniacs. Reluctance to seek medical advice can be the reflections of ignoring insomnia symptoms and feeling of uneasiness about use of hypnotics that likely leads to dependence (Estivill, 2002). Also, it could be that insomnia is not well recognized and that if insomniacs cannot identify causes for their sleep disturbances,

they may be reluctant to seek treatment (Hajak, 2001). In addition, people often do not perceive that insomnia as an illness and thus paid less attention to sleep problems (Ohayon & Shapiro, 2002). Consulting with health care professionals often occurs when insomniacs perceive that their symptoms have become more severe or unresponsive to self-treatment or it can occur simultaneously with self-treatment (Burman, 1996).

In this study, female insomniacs had consulted with health care professionals more than males. The higher consultation rate among women may be due to the fact that once symptoms are recognized, women in general have higher propensity to seek medical consult because of more willingness to admit illness and seek help. Medical utilization increases with increasing symptom reporting; the gender gap in symptom reporting was associated with low social class status, high levels of chronic distress and poor self-assessed health explained (Ladwig et al., 2000). A study conducted among Bangkoknians found that female gender reported more health problems and used more health services than men which was linked to the greater perceived psychological distress (Fuller, Edwards, Sermsri & Vorakitphokathorn, 1993). In addition, women may have more time flexibility to visit the doctors. Because men in general are the heads of the households, they hold the responsibilities of keeping salary based jobs, which restricts their time schedules to visit doctors (Gijsbersvan Wijk, Huisman & Kolk, 1999).

For the aging insomniacs the frequency of consultation with health care was higher than the younger ones. The higher prevalence of insomnia in the aging population can be the result of compromising health status (McCrae et al., 2003). In this study, the older insomniacs reported of more frequent and longer duration of

episodes of insomnia. Moreover, they had a variety of disorders that were related to the bio-physiological aging process; the higher prevalence of insomnia could have been a consequence of these health problems. Because of poorer health status and more frequent visits to health centers to their villages or nearby villages, older insomniacs also discussed their insomnia with health care providers and sought medical care. Also, since the proximity of the residences to the health centers was not a limiting factor, the older insomniacs were able to visit the health centers by themselves.

It is interesting that some of respondents used other methods such as talking with their friends about their worries. They reported that they felt more relieve after talking with friends. They had fewer worries that made them sleep easier. Only one respondent who believed in a spiritual belief reported that they asked from their respected spiritual belief to help them sleep well.

In conclusion, insomniacs in this study used many coping procedures to manage their symptoms of insomnia. More than one method was employed and varied from person to person. It is interesting to note that simple methods were more frequently used than complex ones. It is possible insomniacs in this study may not view insomnia is a serious health problem. Physical management was the most frequently used while consulting health care professionals was less employed.