

## CHAPTER 2

### REVIEW OF LITERATURE

The literature review includes the topics of definition of insomnia, types and characteristics of insomnia, prevalence of insomnia, risk factors for insomnia based on the work of Spielman and colleagues (predisposing, precipitating, and perpetuating factors), and perceived impact of insomnia. The concept of commonsense model of illness representations by Leventhal and colleagues and the review of representations and coping procedures of insomnia are also presented.

#### *Definitions of insomnia*

Three diagnostic criteria for insomnia are reported, the Diagnostic and Statistical Manual of Mental Disorders or DSM-IV (American Psychiatric Association, 1994), the International Classification of Sleep Disorders or ICSD (American Sleep Disorders Association, 1997), and the International Classification of Diseases or ICD-10 (World Health Organization [WHO], 1992).

According to the DSM-IV criteria, insomnia is “a complaint of difficulty initiating or maintaining of sleep or of non-restorative sleep that lasts for at least one month and causes clinically significant distress or impairment in social, occupational, or other important areas of functioning” (p. 553). The ICD-10 criteria state that

the complaint of insomnia must be presented at least three times per week for at least one month. This criterion is missing in the DSM-IV but it is presented in the DSM-III-R (American Psychiatric Association, 1987). As in the DSM-IV, the ICD-10 criteria also emphasize daytime impairments resulting from poor sleep. The ICSD criteria provide the most comprehensive classification system. However, it is not suitable for use to identify all types of insomnia regardless of etiology because it uses clinical information to classify insomnia rather than a simple definition. The DSM-IV and ICD-10 provide a simpler definition that is helpful in community surveys (Kageyama et al., 1997).

Epidemiological studies of insomnia do not regularly use the definition of insomnia based on the current diagnostic classification system. Insomnia has been defined differently by many researchers in their survey studies. According to Hauri and Esther (1990), insomnia was defined as the inability to obtain the adequate sleep that people need for optimal performing and well-being. Moreover, insomnia was not a disease but rather a symptom. More specifically, many sleep researchers defined insomnia as one or more of the following symptoms: difficulty initiating sleep, difficulty staying asleep or awakening too early (Ancoli-Israel & Roth, 1999; Angst, Vollrath, Koch & Dobler-Mikola, 1989; Ford & Kamerow, 1989; Ishigaoka et al., 1999; Kim et al., 2000; Klink et al., 1992; Martikainen et al., 2003; Tachibana, Izumi, Honda & Takemoto, 1998; Weyerer & Dilling, 1991). In addition, another component of insomnia, not feeling fresh after waking up in the morning, was also found in the literature (American Psychiatric Association, 1994; National Heart, Lung and Blood Institute Working Group on Insomnia, 1999).

Although these studies used similar definitions of insomnia, the time frame of

the occurrence of insomnia and the frequency of insomnia were varied. Some studies restricted the time to insomnia that had occurred in the last month (Angst et al., 1989; Doi et al. 2000, Kim et al., 2000; Tachibana et al; 1998), while some included that occurring only in the past seven days (Weyerer & Dilling, 1991). Other studies identified time frames of more than one month or used a broad term “in the past” (Ishigaoka et al., 1999; Klink et al., 1992; Martikainen et al., 2003). Moreover, among these studies, the frequency of insomnia symptoms was indicated by the respondent’s perception of it ranging from “rarely” to “always” but some studies specified analysis from weekly basis such as “at least three nights per week”. It is interesting that some studies focused on a definition of insomnia that included the subjective report of satisfaction of sleep (Ohayon, 1996; Ohayon & Smirne, 2002).

The definition of insomnia that considers its frequency and the effect on daytime impairments has come to the attention of researchers recently. Most studies defined insomnia using the DSM-IV or claimed that their definition was compatible with the DSM-IV. The definition among these studies included insomnia characterized by difficulty initiating sleep, maintaining sleep, early morning awakening or non-restorative sleep occurring in the past month at least one or more nights per week (Kageyama et al., 1997; Kawada, Yosiaki, Yasuo & Suzuki, 2003) or at least three nights per week (Hajak, 2001; Leger, Guilleminault, Dreyfus, Delahaye & Paillard, 2000; Ohayon & Roth, 2001; Rocha, Guerra & Lima-Costa, 2002). These symptoms must cause one or more daytime dysfunctions in terms of lethargy, dozing or napping, inefficient working or tardiness (Kageyama et al.) or any level of daytime distress (Rocha et al.).

In summary, the definition of insomnia in each study is different. Many of

these studies have used the informal criteria for defining insomnia that normally do not include the effect of daytime impairments. Recently, a study using diagnostic criteria has been documented and these criteria are more stringent. This difference in definition has led to differing reports of insomnia across the studies.

In this study, the definition of insomnia is based on the diagnostic criteria in that it designates a frequency rate for insomnia of at least three nights per week in the last month and includes the daytime dysfunction resulting from poor sleep. Insomnia in this study is defined as subjective complaints of one or more of the following symptoms: difficulty initiating sleep, difficulty maintaining sleep, early morning awakening and non-restorative sleep. These disturbances have to occur at least three nights per week for at least one month and are sufficiently severe to result in at least one daytime impairment such as mood change, daytime fatigue, daytime sleepiness, and difficulty concentrating or accomplishing work or academic performance.

#### *Types of insomnia*

Types of insomnia can be classified by duration and severity. As for duration, the Consensus Conference on drugs and insomnia classified insomnia into transient, short term, and chronic insomnia. Transient insomnia lasts for several days; short-term insomnia lasts one to three weeks; and chronic insomnia lasts more than three weeks (Consensus Conference, 1984). This is somewhat different from the criteria set up by the International Classification of Sleep Disorder (American Sleep Disorders Association, 1997), which classifies acute insomnia as that occurring within 6 months; subacute insomnia as that occurring within 6 to 12 months, and chronic

insomnia as that which has been presented for at least 12 months.

From the standpoint of severity criteria, insomnia can be divided into mild, moderate, and severe insomnia. Mild insomnia refers to the complaint of an insufficient amount of sleep or not feeling rested almost nightly accompanied by little or no evidence of daytime impairments. Moderate insomnia is defined as the complaint of sleep problems almost nightly accompanied by mild to moderate impairments related to feelings of restlessness, irritability, anxiety, and daytime fatigue. Severe insomnia describes a nightly complaint of an insufficient and unrestful sleep with severe impairments of social or occupational functioning (American Sleep Disorders Association, 1997).

#### *Characteristics of insomnia*

According to the American Psychiatric Association (1994), insomnia can be classified by four characteristics: difficulty initiating sleep (DIS), difficulty maintaining sleep (DMS) or disrupted sleep (DS), early morning awakening (EMA), and non-restorative sleep (NRS). Symptoms of insomnia based on the DSM-IV criteria are further explained by researchers in a sleep field as follows.

DIS is a complaint of delayed sleep onset latency that is longer than 30 minutes and identified by the respondents as a major problem. DMS or DS is the occurrence of nocturnal awakenings with difficulty returning to sleep. EMA is a complaint of waking up at least one and half hours earlier than the desired wake-up time with difficulty resuming sleep. NRS means sleep of normal duration but related to complaints of feeling tired at awakening or feeling unrested after nocturnal sleep

(Ohayon, Caulet, Priest & Guilleminault, 1997; Ohayon, Zulley, Guilleminault, Smirne & Priest, 2001).

These characteristics of insomnia are not mutually exclusive. Individuals may have two or more characteristics (Bearpark, 1994). Several epidemiological studies of insomnia in adult population have revealed that DMS was the most prevalent complaint of all insomnia characteristics followed by DIS and EMA (Kawada et al., 2003, Kim et al., 2000; Ohayon & Hong, 2002; Ohayon & Roth, 2001; Rocha et al., 2002). Trouble falling asleep seems to be common among younger adults whereas trouble staying asleep or early morning awakening is more prevalent among middle-aged and elderly people (Partinen & Hublin, 2000).

#### *Prevalence of insomnia*

Epidemiological studies of insomnia have been carried out in various population types. To be comparable with the present study, studies undertaken in community settings and cross-sectional in design are reviewed. The prevalence of insomnia is reviewed according to three main categories: the prevalence of insomnia that is based on reports of DIS, DMS, EMA, or NRS regardless of the duration or consequences of insomnia, the prevalence of insomnia using diagnostic criteria (DSM-IV or ICD-10) that designates frequency of occurrence and daytime impairments, and the prevalence of insomnia determined by dissatisfaction with sleep quality or quantity.



*Prevalence of insomnia without defining duration and consequences*

Insomnia symptoms include, in most studies without restrictive criteria, difficulty initiating sleep, difficulty maintaining sleep, and early morning awakening. Some studies include non-restorative sleep in the definition of insomnia. The prevalence of insomnia is presented according to how insomnia is assessed: without restrictive criteria, based on frequency, and based on severity.

*Without restrictive criteria.* The epidemiological studies of insomnia without restrictive criteria assessed insomnia symptoms based on yes or no answers. These were earlier studies of insomnia in the United States. A study of 1,006 subjects aged 18 years and over in the Los Angeles area found that the prevalence of current insomnia was 32.2%. DMS was the most prevalent complaint followed by DIS and EMA, respectively (Bixler, Kales, Soldatos, Kales & Healey, 1979). Another subsequent study of 2,101 American respondents aged 18 years and older found that 33.9% of the sample had symptoms of insomnia (Klink et al., 1992). Recently, a self-reported telephone interview, which included 10,702 Canadian respondents, indicated that 24% of the sample reported insomnia symptoms. Insomnia was assessed by asking simple questions regarding whether the respondents regularly had trouble going to sleep or staying asleep (Sutton et al., 2001). Another study in Poland, the researcher assessed insomnia by having respondents answer “yes” on the following questions: suffering from insomnia, having trouble with sleeping, and waking unrested. The findings indicated that 23.7% of the sample suffered from insomnia

and women more frequently complained of insomnia than did men (28.1% VS. 18.1%) (Kiejna, Wojtyniak, Rymaszewska & Stokwiszewski, 2003).

*Using frequency of insomnia symptoms.* Frequency of insomnia symptoms can be categorized according to two main types of answers. They are the subjective assessment of the frequency of symptoms with answers such as “never” to “always” and the assessment of frequency from a weekly basis with answers such as “never” to “more than five nights per week”.

The subjective assessment of frequency of insomnia has been utilized in several epidemiological studies. The four or five point scales were used to determine the frequency of symptoms with answers such as “never”, “sometimes”, “frequently”, and “very frequently”; “frequently” and “very frequently” were the cut-off to classify people as having insomnia symptoms. The prevalence of insomnia in these studies (in Japan, China, Australia, and Thailand) ranged from 12% to 30% (Kim et al., 2000; Li, Wing, Ho & Fong, 2002; Olson, 1996; Sukying & Nilchaigovit, 1997).

The assessment of frequency of insomnia from a weekly basis using three nights per week in the past month to conclude the presence of insomnia was found in the previous studies (Doi et al., 2000; Ohayon & Roth, 2001). DMS was the prevalent complaint reported by 16.2% to 18% of the sample, followed by DIS, which was reported by 8.6% to 10.1% of the sample. In the study of Ohayon and Roth (2001), EMA and NRS were reported by 10.9% and 8.9% of the total sample, respectively.



*Using severity of insomnia.* The quantifiers of this criterion used the terms mild, moderate, and severe insomnia. With these marking, moderate and severe were considered as having insomnia. The prevalence of insomnia reported by these studies was found to be between 6.9% and 18.7% of the total participants (Bixler, Vgontzuas, Lin, Vela-Bueno & Kales, 2002; Gislason & Almqvist, 1987).

#### *Prevalence of insomnia using the diagnostic criteria*

Epidemiological studies of insomnia have been recently carried out using the diagnostic criteria of insomnia. These studies included frequency of symptoms occurring in the past month at least three nights per week accompanied by daytime dysfunction such as daytime fatigue, daytime sleepiness, and inefficiency in working. The DSM-IV criteria were mostly cited in these studies. The prevalence of insomnia was found to be between 4% and 20.8% of the sample (Hajak, 2001; Kageyama et al., 1997; Kawada et al., 2003; Leger et al., 2000; Ohayon & Hong, 2002; Pallesen et al., 2001; Rocha et al., 2002).

#### *Prevalence of insomnia determined by dissatisfaction with sleep quality or quantity*

The prevalence of insomnia defined by dissatisfaction with sleep was found in some studies. In France, Ohayon (1996) conducted a survey study of 5,622 subjects and found that 20.1% of the population complained of dissatisfaction with sleep quality or quantity. In another study of 4,972 non-institutionalized subjects in the United Kingdom, Ohayon, Caulet, Priest et al. (1997) defined sleep dissatisfaction

when subjects reported of rather, quite, or completely unsatisfied with their sleep. The results showed that 8.7% of the total sample reported having one or more symptoms of insomnia and being dissatisfied with sleep. Similarly, in a study of 1,722 French-speaking people in Canada, dissatisfaction with sleep quality was defined as being dissatisfied with sleep or using sleep-enhancing medications. The finding was that 17.8% of the entire sample reported being dissatisfied with quality of sleep (Ohayon, Caulet, Guilleminault, 1997). Recently, Ohayon and Smirne (2002) found in their survey of insomnia in the Italian population that sleep dissatisfaction was reported by 10.1% of the total sample.

To summarize, most of the studies are cross-sectional and the prevalence varies from study to study. The main reason for the difference in the prevalence of insomnia across the studies is the use of different definition for insomnia. Generally, studies that employ the diagnostic criteria to define insomnia reveal a lower prevalence than those use of the informal criteria. It is due to the fact that the diagnostic criteria has a more stringent standard for the definition of insomnia by including daytime impairments resulting from poor night's sleep. Other important factors are methodological issues such as sampling techniques and sample size, data collection (face to face interview, telephone interview or questionnaires), and instruments used. It is also interesting to note that cultural differences may affect self-reporting of insomnia complaints, thereby leading to different prevalence of insomnia.

The summary of the prevalence studies of insomnia mentioned above is presented in Table 1.

Table 1

*Summary of Prevalence Studies of Insomnia across the World*

Authors	Year	Place	N	Age ≥	Prevalence of insomnia (%)
<i>Insomnia without restrictive criteria</i>					
Bixler et al.	1979	Los Angles, USA	1006	18	Total:32.2, DMS:22.9, DIS:14.4 , EMA:13.8
Klink et al.	1992	Tucson, USA	2101	18	33.9
Sutton et al.	2001	Canada	10702	18	24
Kiejna et al.	2003	Poland	47924	15	Total:23.7, Men:18.1, Women: 28.1
<i>Insomnia using frequency</i>					
Olson	1996	Newcastle, Australia	535	16	Men:17.3, Women:24.9
Sukying & Nilachaigovit	1997	Bangkok, Thailand	826	18	30
Kim et al.	2000	Japan	3030	20	Total:21.4, DMS:15, DIS:8.3, EMA:8
Li et al.	2002	Hong Kong	9851	18	Total:11.9, DMS:6.9, DIS:4.5, EMA:4.0
Doi et al.	2000	Japan	2800	20	Men: DMS:8.6, DIS:12.9 Women:DMS:16.2, DIS:12.6
Ohayon & Roth	2001	European countries	24600	18	DMS:18, DIS:10, EMA:10.9, NRS:8.9
Ohayon & Hong	2002	Korea	3719	15	Total:17, DMS:11.5, DIS:4.0, EMA:1.8, NRS:4.7
<i>Insomnia using severity</i>					
Gislason & Almqvist	1987	Uppsala, Sweden	3161	18	DMS:7.5, DIS:6.9
Bixler et al.	2002	Pennsylvania, USA	1741	20	7.5

Table 1 (continued)

Authors	Year	Place	N	Age ≥	Prevalence of insomnia (%)
<i>Insomnia using diagnostic criteria</i>					
Kageyama et al.	1997	Japan	3600	20	11.2
Leger et al.	2000	France	12778	18	19
Pallesen et al.	2001	Norway	2001	18	11.7
Hajak	2001	Germany	1913	18	4
Rocha et al.	2002	Brazil	1221	18	Total:20.8, DMS:15.8, DIS:12.9,EMA:9.7
Kawada et al.	2003	Japan	648	20	8.8
<i>Dissatisfaction with sleep</i>					
Ohayon	1996	France	5622	15	Men:15.6, Women:24.4
Ohayon et al.	1997	United Kingdom	4972	15	Men:6.8, Women:10.6
Ohayon et al.	1997	Montreal, Canada	1722	15	Men:8.7, Women:13.2
Ohayon & Smirne	2002	Italy	3970	15	6

*Risk factors for insomnia*

The risk factors for insomnia are reviewed following the conceptual model of insomnia that was originally proposed by Spielman and colleagues (Spielman, 1986; Spielman & Glovinsky, 1991; Spielman & Glovinsky, 1997) and which was further explained by many sleep researchers such as Morin (1993), Walsh et al. (1994), and Zorick and Walsh (2000). In this model, insomnia is conceptualized as the result of predisposing factors, precipitating factors, and perpetuating factors.

*Predisposing factors*

Predisposing factors are conditions preceding the onset of insomnia that lower the threshold for triggering insomnia (Spielman, 1986). The specific variables in predisposing factors are not well documented or well understood (Sateia, 2002). The construct of arousability is an important feature of insomnia. It is noted that insomniacs are more physiologically aroused than good sleepers both during the day and at night. Their cognitive patterns are obsessive, worrisome, hypervigilant and anxiety-prone (Morin, 1993).

Predisposing factors also include sociodemographic characteristics such as age (Walsh et al., 1994), gender (Morin, 1993), and marital status. The people who are divorced, separated or widowed and are in low socioeconomic status have experienced insomnia more than other groups (Ford & Kamerow, 1989; Ohayon, 1996).

*Age.* Normative aged-related sleep changes in aging people are the increasing of stage 1 and decreasing of stages 3 and 4 or slow wave sleep. Stage 1 sleep, in older adults, typically occupies a higher proportion of total sleep time when compared to middle-aged people. Stages 3 and 4 represent the deepest and soundest of sleep that have the highest auditory arousal threshold to stimuli (Bliwise, 1997). Another change of the sleep structure in older people is increasing wakefulness combined with sleep or sleep fragmentation that may be secondary to medical illnesses, side effects of drugs, and other sleep disorders (Hirshkowitz, Moore & Minhoto, 1997).

These normative changes lead older people to have more sleep disturbances. Several epidemiological studies of insomnia in aging community dwellers have been of interest by many researchers in sleep field. These studies have revealed consistent findings that insomnia increases with advancing age. Gislason, Reynisdottir, Kristbjarnarson and Benediktsdottir (1993) conducted a cross-sectional study on 8,000 older subjects and found that 37% and 30% of older men and women, respectively complained of difficulty maintaining sleep, followed by early morning awakening and difficulty initiating sleep. Similarly, a survey of 876 older Swedish subjects showed that the most prevalent of sleep complaints was difficulty maintaining sleep, reported by 43.5% of subjects, while slightly more than 30% of subjects had early morning awakening or difficulty falling asleep (Mallon & Hetta, 1997). In a study of 40,111 Thai older people, insomnia was determined if the respondents reported often or always having DIS, DMS or EMA. The overall prevalence of insomnia was 46.3% of the sample (Sukyng et al., 2003).

Age has been shown to be an important risk factor for insomnia in many studies. Older age was a predictor of long-term insomnia in a study of 6,277 new



outpatients visiting general hospitals in Japan (Ishigaoka et al., 1999). In the Thai population, it has been found that older age was still related to insomnia symptoms after controlling for other potential risk factors (Sukying & Nilchaigovit, 1997). Similarly, Doi et al. (2000) found that male older adults were almost three times more likely than other age groups to have difficulty maintaining sleep. The meta-analysis of age-related changes in sleep demonstrated that waking frequency and duration of waking increased with age (Floyd, Medler, Ager & Janisse, 2000).

Although a number of studies have supported that insomnia is more prevalent among older adults, caution should be used in concluding that insomnia is routinely secondary to physiological sleep changes in aging people. Fichten, Libman, Bailes and Alapin (2000) suggested that there were confounding factors to be considered in determining the relationship between insomnia and age.

The first point is that illnesses and medication use are age-related. Chronic diseases such as heart disease, stroke, arthritis, certain types of cancer, most sleep disorders and nocturnal urination are all age-related, and neurological diseases such as Alzheimer's disease and Parkinson's disease are highly prevalent among this population (Bliwise, 1997). Epidemiological studies of insomnia have demonstrated that insomnia did not generally show aged-related increases after controlling for health problems (Foley et al., 1995). Secondly, the age ranges of older adults in the insomnia studies were widely varied. The vast age range and other comorbidities may contribute to the high prevalence in this group. Thirdly, almost all studies reflected the prevalence rather than the incidence. Thus, the data may show only chronicity of sleep complaints rather than the rate of new cases of insomnia. Lastly, there were diverse and inconsistent definitions of insomnia in each study. These differences in

definition of insomnia may have led to a false picture of insomnia complaints.

Another point to consider is that psychological problems play an important role in the relationship of insomnia and aging. In the later period of life, stressful life events such as loss of spouse or best friends, retirement, and financial strain may contribute to sleep disturbances (Bliwise, 1997). Morin and Gramling (1989) found that differences in sleep patterns between poor and good older sleepers were partially accounted for by higher levels of depression and anxiety. This suggested that insomnia was not merely the result of aging but rather the psychological problems among this group.

From the literature review then, it can be noted that the problems of staying asleep are more prevalent in the elderly population. However, in order to provide more definite conclusions, it is important to consider other confounding factors such as health problems, drug treatment, psychological problems and stressful life events. These factors are related to both insomnia and aging. Moreover, study design, age ranges, and definitions of insomnia used in the study should be given careful consideration since these issues may lead to a false prevalence of insomnia in aging people.

*Gender.* A number of epidemiological studies have revealed consistent results showing that women reported insomnia symptoms more than did men in the community dwelling population (Chevalier et al., 1999; Klink et al., 1992; Kuppermann et al., 1995; Leger et al., 2000; Ohayon, 1996; Ohayon & Roth, 2001; Rocha et al., 2002; Sutton et al., 2001), in the elderly (Frisoni et al., 1992; Mallon & Hetta, 1997), and in the institutionalized population (Hatoum, Kania, Kong, Wong &

Mendelson, 1998; Ishigaoka et al., 1999). Interestingly, among these studies, difficulty maintaining sleep was predominant among women (Mallon & Hetta, 1997; Pallesen et al., 2001), while some studies showed that women reported difficulties both in initiating and maintaining sleep (Doi et al., 2000; Ohayon & Roth). Martikainen et al. (2003) noted that women more frequently complained of difficulty initiating and maintaining sleep, and of early awakening than did men. Also, women were approximately two times more likely than men to report insomnia (Bixler et al., 2002). In addition, women were more likely than men to use sleeping pills (Gislason et al., 1993; Mellon & Hetta; Quera-Salva, Orluc, Goldenberg & Guilleminault, 1991).

The high prevalence of insomnia in women, however, can be explained by various confounding factors such as the menstrual cycle, menopause, and psychological distress. Women in the period of premenstrual and menstruating weeks reported more awakening at night with difficulty going back to sleep. Sleep problems were associated with uncomfortable symptoms during these periods such as tender breasts, bloating, cramping, and headache (Anderson & Falestiny, 2000). In the menopausal period, hot flashes and sweats are the main factors disrupting sleep (Shaver & Zenk, 2000). However, the relationship between insomnia and menopausal status may also be accounted for by other factors such as the aging process and depression (Clark, Flowers, Boots & Shetter, 1995).

Another interesting point is that the menopausal transition is a time of experiencing stressful life events. Many midlife women are faced with changing of jobs, coping with the loss of children leaving home, caring for aging parents or young children, and adapting to the death or divorce of their spouses. The stressful events in

this period of life may account for the occurrence of insomnia among mid-life women (Shaver & Zenk, 2000).

In summary, women appear to have more insomnia than men; however, other factors such as menstrual cycle, menopausal symptoms, and stressful life events may be confounding factors, particularly in middle-aged women. Moreover, aging and depression may also account for the relationship between insomnia and the female gender.

*Marital status.* Epidemiological studies that investigated the relationship between marital status and insomnia found that insomnia was preponderant in widowed, divorced or separated people. Sutton et al. (2001) found that people who were widowed were almost two times more likely than those who were married to report insomnia symptoms. Difficulties initiating and maintaining sleep were found in widowed people more than married or single people (Ohayon & Roth, 2001). Widowed men had higher prevalence of difficulty maintaining sleep while unmarried men had difficulty initiating sleep. Widowed females had both types of sleep difficulties (Doi et al., 2000). However, after controlling for other confounding factors, marital status was no longer related to insomnia. It can be explained that other factors such as physical and mental health problems and age may have accounted for this association (Sukying & Nilachaigovit, 1997).

In conclusion, there are consistent results showing that being separated, widowed or divorced are related to insomnia symptoms. Many studies indicate that this relationship is predominant in the female gender. However, marital status may not be an independent risk factor for insomnia. Other factors such as physical health

problems and mental problems may account for the association.

*Socioeconomic status.* The association between insomnia and income, educational level, and employment has been documented. The findings demonstrated that the prevalence of insomnia was high among individuals with low socioeconomic status. People with lower incomes frequently complained of insomnia (Ohayon, 1996; Sutton et al., 2001) as did those with less education (Katzs & Mchorney, 1998; Rocha et al., 2002). People with low socioeconomic status determined by low education and income were almost two times more likely than those with higher socioeconomic status to report insomnia (Sutton et al.). Pallesen et al. (2001) found that delayed sleep onset latency, early morning awakening, and dissatisfaction with sleep were associated with low socioeconomic status.

A study in the working population also showed that women who were not living with a spouse and had less education had more complaints of insomnia than other groups (Kuppermann et al., 1995). In addition, individuals who were unemployed were usually more likely than workers to report insomnia (Doi et al., 2001; Hajak, 2001; Kim et al., 2000; Ohayon & Roth, 2001).

Socioeconomic factors are great risks for insomnia since these factors may increase the life stress or risks for poor sleep hygiene leading to insomnia (Kim et al., 2000). Furthermore, people who had low incomes and pensions may worry about their financial status resulting in difficulty initiating sleep (Moffitt, Kalucy, Kalucy, Baum & Cooke, 1991). Unemployment might also lead to irregular sleep schedules that can disrupt the sleep process (Ford & Kamerow, 1989). However, this relationship may be fictitious. Indeed, after controlling for other variables,

socioeconomic status was no longer associated with insomnia (Sukying & Nilachaigovit, 1997). This suggested that other variables such as age better explained the relationship between socioeconomic status and insomnia (Ohayon, 2002).

In short, people with low socioeconomic status may be vulnerable to insomnia because of the high prevalence of health problems and mental problems among this group. Moreover, maladaptive sleep habits, stressful life events, and worry, which result from having low socioeconomic status may lead to insomnia. Therefore, to definitely conclude the association, other confounding factors should be controlled in the analysis.

#### *Precipitating factors*

Precipitating factors are related to the onset of insomnia (Spielman, 1986). It is assumed that these factors will cause insomnia in an individual who has a predisposing factor to poor sleep. It is noted that insomnia frequently occurs with the occurrence of a specific change in a person's life (Walsh et al., 1994). Stress from life events is an important precipitating factor leading to transient or short-term insomnia (Roehrs, Zorick & Roth, 2000). Besides stressful life events, an individual's psychological problems, particularly anxiety and depression, increase susceptibility to sleep disturbances (Morin, 1993; Spielman & Glovinsky, 1997). In addition, chronic physical illnesses and medical conditions causing discomfort are associated with insomnia (Klink et al., 1992; Sutton et al., 2001), and environmental factors associated with sleep such as noise, light, temperature, bed partners, and sleep surfaces can also disrupt sleep (Morin).



*Stressful life events.* Typically, transient and short-term insomnia are related to a stressful event. Stressful life events can be negative situations such as the death of loved ones or positive situations such as a marriage proposal, graduation, and job promotion (Roehrs et al., 2000). Notably, both negative and positive aspects of life events require adaptive or coping behaviors (Homle & Rahe, 1967) or indirectly cause changes in lifestyle and increase the level of daily hassle (Lazarus & Folkman, 1984 cited in Kageyama et al., 1997). Moreover, these life events produce cognitive arousal that can delay onset of sleep and disrupt sleep maintenance (Walsh et al., 1994).

An earlier study of life events and insomnia by Healey et al. (1981) was carried out on 31 chronic insomniacs and 31 good sleepers and found that stressful life events were related to the onset of insomnia. Seventy percent of insomniacs reported that they had stressful life events preceding the occurrence of insomnia. Insomniacs experienced significantly more undesirable events, particularly events related to losses, than did good sleepers. The stressful life events in this study included life changing events relating to work, school, moves, finances, dating, marriage, family and social life, legal matters, and illnesses, accidents or deaths. In a subsequent study, most of the insomniacs had experienced stressful life events near the onset of insomnia. The events that were most reported were problems with personal relationships, loss situations, changes in education or work status, and health problems (Kales et al., 1984).

Among Japanese workers, those experiencing stressful life events were about three times more likely to have insomnia than those who were faced with less stressful life events. The events in this study were both negative and positive events including

moving away from home, getting married or giving birth, obtaining or losing a job, changing jobs, having serious diseases or injury, and death in the family (Kageyama et al., 1997). In adult Japanese women, those who reported having major life events within the previous six months were four times more likely than those who did not to have insomnia (Kawada et al., 2003). Similarly, a study in Germany indicated that severe insomniacs reported their sleep problems had started in relation to health problems, problems with work, family or relatives, and the death of relatives (Hajak, 2001). In the Thai population, life events, particularly losing a spouse and increasing debt were associated with insomnia symptoms (Sukyong & Nilchaigovit, 1997).

Vollrath, Wicki and Angst (1989) conducted a longitudinal study on the association between stressful life events and insomnia in Swiss young adults which revealed that the insomniacs with occasional insomnia and repeated brief insomnia manifested a high score on the life-events inventory. Stressful life events remained significantly related to insomnia when depressives were excluded from the analysis; however, among life event categories, only the interpersonal relationship category was found to be significantly related to insomnia.

In contrast, some studies failed to identify the relationship between life events and insomnia. Bazargan (1996), in her study of 998 African-American elderly, found that the greater numbers of stressful life events, the more complaints of sleep disturbances. However, stressful life events lost significance in the multivariate regression analysis because of the variance shared by the number of chronic illnesses, depression, and anxiety.

In conclusion, there is evidence that stressful life events are related to acute insomnia. Generally, the insomniacs have experienced stressful life events, especially

loss of some kind, before the onset of insomnia. However, stressful life events may not be an independent risk for insomnia. There are some confounding factors that may account for the association between life events and insomnia such as physiological and psychological health problems, especially in the elderly.

*Medical illnesses.* Various medical illnesses disrupt the sleep process and simultaneously sleep disturbances may have an adverse effect on the course of illnesses. The mechanisms of medical disorders affecting sleep include: 1) indirect effects on the hypnogenic neurons in the diencephalon and brain stem, 2) indirect effects on the respiratory neurons in the brain stem by metabolic disturbances such as electrolyte imbalance or ketosis, 3) adverse effects from drugs used to treat illnesses, 4) long term immobilization resulting from medical illnesses which affects sleep organization and sleep structures, 5) disturbances of circadian rhythm, and 6) effects on respiratory mechanism causing respiratory sleep disorders (Chokroverty, 1999).

In these instances, insomnia may be secondary to various medical disorders. It is noted that neurological diseases such as Alzheimer's, Parkinson's and Huntington diseases, respiratory disease, particularly asthma and COPD, cardiac disease such as congestive heart failure and ischemic heart disease, rheumatological disorders, endocrinological disorders especially, hyperthyroidism and Cushing's disease, and end-stage renal disease all disrupt the sleep process (Stepanski, 2002). Furthermore, conditions causing discomfort such as pain, fever, pruritus, paresthesias, diarrhea, and coughing as well as side effects of medications such as corticosteroids, beta-blockers, respiratory stimulants, antidepressants, immunosuppression and phenytoin lead to insomnia (Mitler, Poceta, Menn & Erman, 1991).

Chokroverty (1999) extensively explains sleep disturbances in patients with chronic illnesses as follows. Patients with bronchial asthma often wake up at night because of dyspnea, wheezing, and cough. A reduction of sleep efficiency, delaying of sleep onset, increasing awakenings, and frequent arousal are found in people with chronic obstructive pulmonary diseases (COPD). Moreover, drugs use in patients with COPD, particularly methylxanthines interferes with sleep by increasing nocturnal cough resulting from accumulated bronchial secretion. Angina pain may awake patients with ischemic heart disease leading to frequent awakenings and reduced sleep efficiency. Sleep disturbance patterns in patients with gastrointestinal problems are frequent awakenings and difficulty initiating sleep resulting from a nocturnal pain or burning pain from gastroesophageal reflux. As for, disorders of the endocrine system such as thyroidism and Cushing 's disease leading to stimulation of the CNS can cause insomnia (Sateia, 2002).

Epidemiological studies have demonstrated that insomnia is prevalent in people with medical illnesses. The study of 3,201 Swedish men by Gislason and Almqvist (1987) regarding somatic diseases and sleep complaints indicated that participants who had systematic hypertension, bronchial asthma, diabetes, low back pain and had been treated with theophylline complained of insomnia more often than those who did not have these conditions. Likewise, the study of risk factors associated with insomnia in the American population showed that people who had arthritis, cardiovascular disease, gastrointestinal disorders and respiratory disorders such as COPD and asthma were more likely to report insomnia than did healthy people. The odds ratios varied from 1.1 to 1.5.

Among the institutionalized population, a study in 1,100 subjects enrolled in

four clinics revealed that comorbid conditions, particularly circulatory system diseases, were prevalent among insomniacs (Hatoum et al., 1998). Recently, an epidemiological study in the Canadian population living in communities indicated that chronic physical health problems such as allergies, circulatory, respiratory, digestive and rheumatic diseases, diabetes, and migraines were related to insomnia with the odds ratios ranging from 1.03 to 1.61. A longitudinal study in Germany also yielded the same result; chronic somatic disorders were significantly associated with moderate and severe insomnia (Hohagen et al., 1993). Similarly, Pallesen et al. (2001) found that having physical symptoms or illnesses was associated with difficulty initiating and maintaining sleep and early morning awakening. In a study in Thailand, having a history of chronic illnesses was related to insomnia (Sukying & Nilchaigovit, 1997). However, the authors did not identify which specific conditions or diseases were associated with insomnia.

The medical condition, particularly pain was also found to be a strong factor to predict insomnia. People with pain were twice as likely than others to report insomnia symptoms (Sutton et al., 2001) and pain was a strong factor contributing to trouble getting to sleep (Moffitt et al., 1991) and early morning awakening (Klink et al., 1992). In a self-defeating cycle, pain can result in poor sleep and poor sleep can worsen the subjective experience of pain (Moffitt et al.).

Obviously, there are consistent results indicating that physical health problems and medical conditions causing discomfort lead to insomnia. Various organ system diseases can disrupt sleep, and pain is the most common and most powerful factor among medical conditions causing insomnia. Moreover, side effects of drug use for diseases can also cause insomnia.

*Psychological health problems.* Numerous studies have demonstrated that psychiatric conditions are strongly related to insomnia. The DSM-IV includes symptoms of insomnia as the diagnostic criteria for several disorders including depression, anxiety, and posttraumatic stress (American Psychiatric Association, 1994). The mechanism that produces insomnia among psychiatric patients is unknown and might vary from person to person. There may be a direct relationship between insomnia and psychiatric disorders such as CNS dysregulation causing insomnia in depressive patients. Moreover, mental health problems may indirectly cause insomnia; for example, personality disorders lead to a chaotic lifestyle with erratic sleep-wake schedules (Stepanski, 2002). Psychiatric conditions are highly prevalent among insomniacs and psychopathology is indeed a very powerful risk factor for the occurrence of insomnia. It may not only be primary in the etiology of chronic insomnia but also may be secondary to other causative factors of sleep disturbances (Soldatos, 1994). The prevalence of the specific psychopathological dimension of depression and anxiety is high among insomniacs. This is supported by many epidemiological studies in varied types of the population.

In a survey study among a community Italian population, Cirignotta, Mondini, Zucconi, Lenzi and Lungaresi (1985) found that insomniacs complained of anxiety and depression more than did non-insomniacs. Similarly, a study of subjects living in the continental United States showed that insomniacs had a high score on both anxiety and depression scales (Mellinger, Balter & Uhlenhuth, 1985). A study in the German population indicated that depression and anxiety showed a trend of association with insomnia until the age of 59. Beyond this age the prevalence of depression and anxiety decreased. Among psychiatric respondents, there was an approximately five



times higher rate of moderate or severe insomnia than in those without any health problems (Weyerer & Dilling, 1991).

The patterns of insomnia found in depressive patients were frequently awakening, early morning awakening and non-restorative sleep (VanMoffaert, 1994). A survey study among community-dwelling elder people in Italy showed that psychic variables, such as anxiety, depression and somatization, were more strongly associated with difficulty initiating sleep, early morning awakening and not feeling rested in the morning. Depression showed a significant association with all symptoms of insomnia with odds ratios varying from 2.42 to 4.16. In the same study, anxiety showed a significant association with difficulty initiating sleep, early morning awakening, and not feeling rested in the morning in the univariate statistics with odds ratios ranging from 2.87 to 3.63. After controlling for other confounding factors, anxiety was still significantly associated with difficulty initiating sleep (Frisoni et al., 1992).

Likewise, Bazargan (1996) reported that depression and anxiety were risk factors for insomnia. Furthermore Hohagen et al. (1993) found that severe insomnia had a high correlation with all psychiatric diagnoses. Recent research indicated that emotional or psychological problems were risk factors for difficult initiating and maintaining sleep, early morning awakening, and dissatisfaction with sleep (Pallesen et al., 2001). The etiology of sleep disturbances in depressed patients can be explained in terms of decreasing homeostatic sleep drive, circadian dysregulation, and increasing REM pressure. However, these causes remain controversial and await consensus (Stepanski, 2002).

Sleep disturbances have long been established as a major symptom of many

psychiatric disorders. Thus, sleep may not simply be a marker of psychiatric disorders but rather be a fundamental factor in the pathogenesis of psychiatric diseases (Billiard, Partinen, Roth & Shapiro, 1994). A recent epidemiological study suggested that insomnia might be an early marker or a contributing factor to psychiatric diseases (Walsh et al., 1994). In a one year longitudinal study on 7,954 subjects in an American population, Ford and Kamerow (1989) found that the risk of developing new major depression was much higher in those who had insomnia compared to those without, with a very high odds ratio of 39.8. Another longitudinal study in young adults revealed that persons with a baseline history of insomnia was four times more likely than those with no insomnia to develop depression (Breslau, Roth, Rosenthal & Andreski, 1996).

In brief, psychological problems, particularly depression and anxiety consistently reveal a strong relationship to insomnia. Conversely, insomnia is also a marker for depression. However, most of the studies are cross-sectional, so it is difficult to identify the causal relationship between insomnia and psychological problems.

*Sleep environments.* The sleep environments including such factors as noise, light, temperature, and sleep surfaces can cause insomnia. Individuals have different levels of sensitivity in responding to these factors. Some people can adjust to almost any sleep environment while others often develop transient insomnia in strange surroundings (Morin, 1993).

Noise seems an obvious cause of transient insomnia but it is hard to identify particular complaints (Roehrs et al., 2000). Noise is an unwanted sound that is a

pollutant of the industrial world (Pollak, 1993). It can delay sleep onset and disrupt the sleep process such as delay the return to sleep or premature awakening (Morin, 1993). Intermittent noises have greater effects than continuous ones (Pollak). Mant and Eyland (1988) noted that up to 28% of the older population reported that a noisy house or neighborhood disrupted their sleep. The components of disturbed sleep were difficulty falling asleep and early morning awakening. A study of noise and sleep disruptions among Japanese women in urban areas found that those who lived near areas with heavy nighttime traffic were three times more likely than those who lived near areas with less nighttime traffic to report insomnia (Kageyama et al., 1997). Among community-dwellers in China, those who had noisy sleep environments were about two times more likely than those who lived in silent sleep environments to have insomnia (Li et al., 2002). Among industrial workers, environmental noise at night was related to difficulty initiating sleep (Tachibana et al., 1998). Exposure to noise at night may lower serum cortisol levels after awakening and lead to subjective reports of lower sleep quality and mood (Wayne et al., 2003 cited in Kawada et al., 2003).

Excessive light conditions can also cause trouble with sleeping for almost everyone and this factor alone may exacerbate the already high prevalence of insomnia in night workers who try to sleep by day (Morin, 1993). Kageyama et al. (1997) found that the insomniacs reported too much light in their bedrooms more than did the non-insomniacs. However, there were very few studies, however, there were very few studies on sleep parameters as relating to insomnia symptoms among community dwellers.

Temperature is another environmental factor disrupting sleep. Like noise, there are marked individual differences in sensitivity to temperature variations and in

one's optimal sleeping temperature (Roehrs et al., 2000). Under conditions of cold or heat, the quality and quantity of sleep are disturbed. When the temperature gets very low or very high, both REM and slow wave sleep become poorer, but REM sleep is more affected. In the heat, people move around in bed more frequently, which causes them to wake up at night (Satinoff, 1993). The results from a laboratory study showed that the greatest disruption of sleep occurs at 21 degrees Celsius manifested by a significantly increased amount of wakefulness and stage 1 sleep and decreased amounts of stage 2 and REM sleep. At a high temperature of 37 degrees Celsius, the amount of REM sleep is decreased but not to the extent to that at colder temperatures. It is concluded, therefore, that cold proves to be more disruptive to sleep than heat (Haskell, Palca, Walker, Berger & Heller, 1981). Insomniacs reported that they were three times more likely to feel too hot or too cool in their bedroom than did non-insomniacs (Kageyama et al., 1997)

In terms of sleep surfaces, a firm mattress is preferred by most people. However, a mattress that is too hard may cause sleep difficulties in those with arthritis, whereas one that is too soft may be problematic for patients with low back pain (Morin, 1993). Hard surfaces tend to increase mobility and decrease the depth of sleep as well as decrease the subjective estimates of sleep quality (Suckling et al., 1957 cited in Bader & Engdal, 2000).

Studies of bed firmness and sleep quality are rare and most studies related to bed surfaces and sleep disturbances are found in hospitalized patients. Patients after surgery noted that plastic bedding caused them to wake up at night (Closs, 1992). The unfamiliar bed of the hospital was also reported as causing sleep disturbances in patients after cardiac surgery (Simpson, Lee & Cameron, 1996).

In short, sleep environments are crucial precipitating factors for insomnia. Too much noise and light as well as temperature extremes can lead to insomnia. Unfortunately, very few studies have been done regarding these factors among community dwellers. Most studies have been conducted in hospitalized people, which it should be caution that report of insomnia symptoms may result from the illnesses rather than a sleep surface itself.

### *Perpetuating factors*

Perpetuating factors are conditions sustaining insomnia (Spielman & Glovinsky, 1997). They play an important role in understanding the development of acute or short-term insomnia into chronic insomnia. Normally, most people can resume normal sleep when precipitating factors have been reduced in intensity or when the sleeper has adjusted to them. However, some people continue to have insomnia because of perpetuating factors, particularly maladaptive sleep habits (Walsh et al., 1994). The underlying mechanism of this relationship can be explained in terms of coping behaviors and psychological functions. That is, the fear of not sleeping becomes sufficient to cause behavior changes such as going to bed earlier, waking in bed or doing other activities in bed and these behaviors actually perpetuate insomnia (Bearpark, 1994). Another important factor is dysfunctional beliefs and attitudes about sleep. Misconception or amplification of the negative consequences of sleep problems and unrealistic expectation of sleep play a role in sustaining insomnia symptoms (Morin, 1993).

*Maladaptive sleep habits.* Insomnia is perpetuated by behaviors that are inconsistent with good sleep, such as excessive time in bed, irregular sleep-wake schedules, habitual use of bed time and bedroom for waking activities such as reading, watching television, and listening to the radio, and daytime napping (Spielman & Glovinsky, 1991; Walsh et al., 1994). Moreover, activities, such as using bedtime to solve problems, and to rehearse events of the day, eventually associate bedtime with frustration and sleeplessness. These various stimuli then lead to a conditioned arousal that may activate physiological, cognitive or emotional aspects, all of which are sleep incompatible (Morin, 1993; Spielman & Glovinsky).

It is found that the insomniacs spend excessive time in bed. They do so by going to bed earlier and arising too late in the morning because they think it can increase the opportunity to get more sleep. Furthermore, they perceive that remaining in bed while awake for a long time is restful and that it will help strengthen the immune system. Awakening during the night establishes a habit that does not facilitate bed and bedroom as cues for sleepiness and sleep. When the bedroom or the bed and bedtime are repeatedly paired with sleep-incompatible habits, these stimuli gradually lose their ability to link between the circumstance of sleep and sleepiness (Bearpark, 1994; Morin, 1993; Perlis, Giles, Mendelson, Bootzin & Wyatt, 1997; Spielman & Glovinsky, 1997).

A study of sleep habits and insomnia in the outpatients' section of general hospitals in Japan indicated that the insomniacs went to bed earlier and awake later in the morning than subjects without long term insomnia. They spent a longer time in bed than did good sleepers (Ishigaoka et al., 1999). In the elderly, women complained more than men did of difficulty initiating sleep. Women went to bed at the same time



as men, but their waking time was later though women rated their total sleep time as shorter than did men. This finding indicated that women spent more time awake in bed (Mallon & Hetta, 1997). It appears that the longer we stay in bed, the more shallow and fragmented our sleep becomes (less delta sleep and more stage 1) (Hauri, 1993).

An irregular sleep schedule can also lead to insomnia. Kageyama et al. (1997) reported that people who had irregular bedtimes and waking times were about three times more likely than those who had regular sleep schedules to report symptoms of insomnia. Relatively, regular sleep hours help the circadian rhythm, whereas widely fluctuating sleep hours are disruptive (Hauri, 1993).

Presleep cognitive activities such as planning for tomorrow, rehearsing events and problem solving in bed are more prevalent among the insomniacs. A study of insomniac behavior revealed that the insomniacs were significantly more likely to relate bedtime thoughts regarding getting enough sleep, health, death, work and personal problems (Kales et al., 1984). Similarly, the insomniacs were two times more likely than the non-insomniacs to be preoccupied with thoughts about planning for the next day's work. Their anxiety regarding sleep disruption was almost ten times more than that of the non-insomniacs (Kageyama et al., 1997).

Like previous studies, Wicklow and Espie (2000) found that rehearsing, planning and problem solving before bedtime were modestly correlated with sleep onset latency measuring by actigraph. However, the authors noted that the longer people were awake in bed the more rehearsal and planning appeared. The other study by Van Egeren, Haynes, Franzen and Hamiltonet (1983) also found that pre-sleep activity correlated well with sleep onset latency.

The mechanism of pre-sleep cognition on sleep problems was explained by Harvey (2002), in his work on developing a new cognitive model of the maintenance of insomnia. It was found that insomniacs experienced excessive cognitive activity during pre-sleep period and the cognitive activity will trigger autonomic arousal and emotional distress that can lead to difficulty sleeping.

Lifestyle related to unhealthy sleep such as caffeine and alcohol consumption as well as smoking is also included in maladaptive sleep habits and thus leading to disruption of the sleep process. Caffeine is a methylxanthine that stimulates the central nervous system. It is an adenosine antagonist at the adenosine receptor site in the brain. Adenosine is active in the central nervous system and has been shown to inhibit neuronal firing (Roehrs, 1993).

Caffeine is found in foods, drinks and various kinds of over-the-counter drugs such as anorectic, allergy, and cold remedies (Morin, 1993). The concentration of caffeine varies in different types of drinks. An average cup of coffee contains 100 milligrams of caffeine and a brewed cup of coffee contains 200 milligrams of caffeine while cola drinks contain between 50 and 75 milligrams depending on the type (Zarcone, 2000).

Because of its stimulating action, studies on the effect of caffeine on sleep have been conducted. A relationship between caffeine and insomnia has been found in an experimental study and also a cross-sectional study. Bonnet and Arand (1992) conducted an experimental study in healthy males aged between 18 and 30 years old by administering 400 milligrams of caffeine to the subjects three times a day for seven days. Sleep parameters were measured by polysomnography. The results showed that acute caffeine administration increased sleep onset latency, awakenings and brief

arousal. It also decreased total sleep time and stages 2 and 4 of sleep. On the final caffeine administration night, the degree of sleep disturbance was decreased but stage 4 of sleep was still significantly reduced in comparison to baseline. A cross-sectional study by Cirignotta et al. (1985) also demonstrated coffee consumption being related to insomnia symptoms but the researchers did not identify which characteristics of insomnia were disrupted. Similarly, a study among industrial workers in Japan indicated that consumption of caffeinated beverages in the evenings and night was significantly associated with difficulty falling asleep and frequent sleep disruptions (Tachibana et al., 1998). However, some studies failed to identify a relationship between insomnia and caffeine (Janson et al., 1995, Kageyama et al., 1997; Mallon & Hetta, 1997). This might be explained by noting that caffeine sensitivity is varied across individuals (Riedel, 2000). Insomniacs are often much more sensitive to caffeine or other mild stimulants such as tea or chocolate than normal sleepers (Hauri, 1991).

Another substance causing insomnia is alcohol. Alcohol is commonly self-prescribed to initiate sleep; however, in large quantities, it creates sleep maintenance difficulties from sweating and headache (Zarcone, 2000). The pharmacology of alcohol is a net sympathetic arousal state even in moderately heavy drinking. The increase of catecholamine secretion after consuming alcohol before bedtime leads to frequent awakenings during the night. It was found that alcohol consumption was significantly higher in those with insomnia (Ford & Kamerow, 1989). Likewise, study of insomnia in Japanese workers revealed that frequent consumption of alcoholic beverages was significantly associated with early morning awakening (Tachibana et al., 1998).

Cigarette smoking is another lifestyle habit related to insomnia symptoms. Nicotine has the same effect as the cholinergic mechanism, which is to produce arousal that disrupts sleep (Zarcone, 2000). Smoking increases alpha and beta electroencephalographic activity, both of which are indicators of arousal. Smokers who consume about one pack per day typically have difficulty falling asleep (Shiromani, 1993). Nicotine at low blood concentration has the effect of mild sedation and relaxation but at higher blood concentrations, it has an effect on the cholinergic mechanism, producing arousal; for example, it increases the heart rate, blood pressure, and catecholamine concentration. These symptoms are associated with problems of initiating and sustaining sleep (Morin, 1993; Zacorne).

The association between smoking and insomnia have been documented. One study demonstrated that a current smoking habit was related to infrequent, frequent and very frequent difficulty getting to sleep in males with odds ratios ranging from 1.4 to 2.32. For females, smoking was associated with frequent and very frequent difficulty getting to sleep with odds ratios ranging from 1.01 to 1.88. Moreover, both male and female smokers were more likely to have very frequent non-restorative sleep than non-smokers with odds ratios ranging from 1.24 to 2.61. However, smoking was not associated with difficulty in sleep maintenance in this study (Wetter & Young, 1994).

Another study conducted by Phillips and Danner (1995) found that smoking had a negative effect on initiating and staying asleep. Similarly, among young adults in three European countries, Janson et al. (1995) noted that, after controlling for other variables, smoking was positively related to difficulty initiating sleep and sleep latency but negatively associated with nocturnal awakenings. Gislason et al. (1993)

found that smokers reported sleep onset 20 minutes later than non-smokers. Similarly, Sutton et al. (2001) also found that past or current smoking was related to insomnia symptoms, but the researchers did not identify which characteristics of insomnia were affected. The causal pathway of insomnia symptoms and smoking may operate in the opposite direction. In other words, people who had insomnia may attempt to cope with the problem by smoking, and yet smoking causes sleep disturbances (Wetter & Young, 1994).

Daytime napping is another of the factors sustaining insomnia. Napping refers to a shorter duration of sleep than habitual sleep taken by an individual. Normally, in human beings, the duration of a nap is approximately less than four hours and most often it is taken sometime during the day. Moreover, napping is a behavior occurring when the amount of sleep obtained is reduced relative to the individual's biological sleep need (Dinges, 1993). Studies of relationship between napping and nighttime sleep parameters such as sleep onset latency, number of awakenings through the night, and sleep duration have been conducted in the community-based population, but the results are inconsistent.

Some of the studies found that a daytime napping interferes with nighttime sleep, particularly sleep onset latency and difficulty maintaining sleep. Floyd (1995) conducted a study in older adults living in a community and the results demonstrated that nappers reported more nighttime awakenings and took an average of 14 more minutes to fall asleep than non-nappers. The author also suggested that if nap duration exceeds 50 minutes, it may affect sleep latency and nighttime awakenings. Among people over 75 years old, Frisoni, DeLeo, Rozzini, and Trabucchi (1996) reported that daytime napping was positively correlated with early morning

awakening and not feeling rested in the morning. After other variables were controlled, not feeling rested in the morning was still related to napping while early morning awakening lost its significance. Interestingly, it was found that taking short naps related to the maintenance of a good quality of wakefulness (Uezu et al., 2000).

On the other hand, some studies indicated that napping was not associated with symptoms of insomnia. Metz and Bunnell (1990) conducted a study in the elderly regarding sleep parameters and napping parameters (prevalence, frequency and regularity of napping). The results showed that 61% of subjects reported taking naps with an average frequency of 4.8 times per week and with a duration of 51.3 to 67.5 minutes. However, napping was not statistically associated with sleep variables such as sleep onset and number of awakenings. The only significant relationship between napping and sleep parameters was found in hypnotic-users. Hypnotic-users who had greater regularity and frequency of napping reported more awakenings and perceived sleep as a problem more than did non-users. The authors concluded that although napping and sleep were not correlated, a trend was found toward correlation between difficulty initiating and maintaining sleep and duration of napping.

A survey study of daytime napping, nocturnal sleep and 24-hour sleep-wake patterns measured by self-report and polysomnography in healthy older people and young adults indicated that older subjects reported a greater mean number of naps over two weeks than younger subjects while there was no difference in the mean duration of daytime naps. The aging subjects reported experiencing insomnia symptoms more than did younger subjects. However, more or less frequent nappers did not differ on self-reported sleep measures (Buysse et al., 1992). Similarly, Pilcher, Michalowski and Carrigan (2001) conducted a study in healthy young and



middle-aged adults divided into three groups: a no nap group, a short nap group (nap duration less than 20 minutes) and a long nap group. The results revealed no significant differences across the napping groups for any sleep parameters in young and middle-aged adults. In this study, 76% of young adults and 72% of middle-aged adults reported taking a nap at least one time per week and the average duration of the nap was 17.71 minutes in young adults and 15.55 minutes in middle-aged adults.

Overall, most of the studies are of cross-sectional design; therefore, it is difficult to make a causal relationship between napping and insomnia symptoms. However, there is a trend that longer naps may affect difficulty initiating and maintaining sleep. There is also a limitation for generalizing for people with insomnia because most the studies focus on subjects without sleep complaints (Riedel, 2000).

*Dysfunctional beliefs and attitudes about sleep.* These factors play a major role in chronic insomnia; however, they have received little research attention (Morin, Blais & Savard, 2002). Dysfunctional beliefs and attitudes about sleep, particularly concerns about daytime impairments such as fatigue, mood disturbances, and performance impairments sustain insomnia symptoms. The perception of negative consequences, whether a correct understanding or an over interpretation, reminds an individual to think about how miserable their sleep is. Over time, the sense of helplessness becomes stronger and insomniacs begin to have the idea that their symptoms cannot be controlled. Inevitably, a cycle of emotional upset, more cognitive arousal, and further sleep disturbances will occur (Morin, 1993).

According to Morin (1993), dysfunctional beliefs and attitudes about sleep have various characteristics. The first characteristic is faulty appraisal of sleep disturbances. If an individual evaluates disturbed sleep as being a result of loss of personal control, this problem becomes more severe. This interpretation may lead to performance anxiety and learned helplessness and may intensify the problem (Spielman & Anderson, 1999). A study of dysfunctional beliefs and attitudes about sleep in the elderly showed that elder insomniacs worried more than did non-insomniacs about losing control and about the unpredictability of their sleep. They were also more hopeless and helpless than good sleepers because they viewed their insomnia as getting worse all the time and felt that no one could help them, thus they felt insomnia could ruin their ability to enjoy life (Morin, Stone, Trinkle, Mercer & Remsberg, 1993).

Another feature of dysfunctional beliefs and attitudes about sleep is misattribution of daytime impairments to poor sleep. Insomniacs tend to think that daytime dysfunction such as fatigue, mood changes, lowered energy, and performance impairments are the result of their poor sleep. Concern about daytime impairments can then sustain insomnia symptoms. In one study, the evidence showed that older insomniacs held strong beliefs that sleep disturbance might be harmful to their physical and mental health (Morin et al., 1993). In another, it was found that worry about daytime impairments may pressure insomniacs to work harder, bring work home and feel threatened in general; these then increase stress and lead to sleep disruption (Spielman, Nunes & Glovinsky, 1996).

Unrealistic expectations regarding sleep requirements is another important aspect of dysfunctional beliefs. Insomniacs tend to hold strong beliefs about their

own needs. Self-imposing such a rigid standard increases performance anxiety and interferes with sleep during the night. Although the reality is that sleep needs vary across individuals (Morin et al., 2002), the expectation that they need eight hours of sleep in order to function well during the day and remain healthy is common among insomniacs. When they fail to obtain this number, concerns about daytime functioning and health become a major source of worry and preoccupation (Harvey, 2002). A study of sleep patterns in the elderly revealed that there were larger discrepancies between the sleep-diary parameters and the desired sleep parameters among the poor sleep group. This data may indicate that sleep expectations, such as eight hours of uninterrupted sleep, may lead to emotional arousal and further sleep disruption (Morin & Gramling, 1989).

Dysfunctional beliefs and attitudes about sleep may lead to sleep-related anxiety and thereby disrupt the sleep process. The belief that poor sleep is uncontrollable may sustain sleep-related performance anxiety. The belief that one should try to catch up for lost sleep may lead to a self-defeating compensatory practice such as staying in bed beyond the rising time and daytime napping (Edinger & Wohlgemuth, 2001). Lichstein and Rosenthal (1980) conducted a study of perception of cognitive and somatic determinants of sleep disturbances. The results revealed that insomnia sufferers rated that cognitive arousal was more troubling than somatic arousal. Similarly, a study of presleep cognitions in young insomniacs showed that cognitions concerning negative sleep-related content such as thoughts about not falling asleep were related to report of longer sleep onset latency (Van Egeren et al., 1983).

These cognitive factors are classified as perpetuating factors since they

develop in response to the experience of coping with sleep difficulties. Once they have this experience, some people become fixated on their sleep and spend their daytime hours worry about how well they will sleep that night. By anticipating sleep difficulty, the tension is increased along with arousal delaying sleep (Stepanski, 2002).

### *Perceived impacts of insomnia*

The perceived impacts of insomnia have been reported in various studies of insomnia. Insomniacs have reported the impacts of their insomnia in terms of physical and emotional, family life and social, working, and economic dimensions.

Insomniacs reported that insomnia impaired their physical health and, more seriously, caused them to have accidents. Overall on the self-rated health scale, very few insomniacs rated their physical health as good. They had less energy, tardiness (Kageyama et al., 1997; Kuppermann et al., 1995), limited physical activity, and bodily pain (Zammit et al., 1999). Individuals with insomnia reported that they felt sleepy during the day (Ohayon & Hong, 2002). Zammit et al. also found that poorer concentration, memory, attention, reasoning, and problem solving were reported by insomniacs. The study of daytime characteristics of insomnia revealed that feeling tired in the morning was reported by about 70% of both occasional and chronic insomniacs. Interestingly, about one fourth of respondents with occasional and chronic insomnia reported that they felt drowsy when driving. Five percent of chronic insomniacs reported having had automobile accidents due to sleepiness (Roth & Ancoli-Israel, 1999). Those with chronic insomnia were almost three times more

likely than non-insomniacs to have automobile accidents related to fatigue (Costa E Silva, Chase, Sartorius & Roth, 1996).

Insomnia also has impact on psychological health. The study carried out among Korean population found that, after a poor night's sleep, insomniacs complained that they felt depressed or anxious (Ohayon & Hong, 2002). Other emotional difficulties and mental health problems were frequently reported by people with insomnia symptoms (Zammit et al., 1999)

As for work performance, a survey of daytime impairments resulting from insomnia among American population found that insomniacs rated poorer on their abilities to complete tasks (Roth & Ancoli-Israel, 1999). Additionally, among working population in telecommunications firm, those who had insomnia felt less satisfied on the job, had lower job performance, and increased absenteeism (Kuppermann et al., 1995). Importantly, insomniacs were prone to have errors in work (Kageyama et al., 1997). Insomniacs also had a less positive view regarding career and future employment (Zammit et al., 1999).

With regards to social and personal life, occasional and chronic insomniacs rated poorer on their personal relationship with spouse, family, and friends (Roth & Ancoli-Israel, 1999). They felt irritated by their children and reported that they were fatigued as a result of taking care of their children. They also disliked helping their children with the homework (Leger et al., 2002). In addition, poor sleep can lead to fatigue and irritability as such it can decrease interest in social activity (Cricco, Simonsick & Foley, 2001). Interestingly, personality of insomniacs is an important factor in reducing social involvement. It has been reported that insomniacs tend to be less concerned, quiet, ill, mentally and physically inactive, uncomfortable, sleepy,

indifferent, and depressed (Marchini, Coates, Magistad & Waldum, 1983). Consequently, they are less likely to enjoy activities and social involvement with other people.

Insomnia has great impacts on economy. Studies of insomnia evaluate the economic impacts of insomnia into direct costs and indirect costs. According to Walsh and Engelhardt (1999), the direct costs of insomnia include the costs of out patient visits, substances used to facilitate sleep, diagnostic testing and treatment by sleep specialists, by mental health organizations, and nursing homes for the elderly. In America, it is estimated that costs of substances used are 1.97 billion and 11.96 billion for health care services. The total direct costs are up to 13.93 billion. Indirect costs are those not directly associated with insomnia but resulting from the decreased productivity it causes. Insomnia leads to accidents, injury, disabilities and death; consequently, the economic output of these people is decreased and it is estimated that the total value of indirect costs is far greater than that of the direct costs.

#### *Representations and coping procedures of insomnia*

To understand how insomniacs interpret and cope with their symptoms, the common sense model by Leventhal and colleagues (Diefenbach & Leventhal, 1996; Leventhal & Cameron, 1987; Leventhal et al., 1992; Leventhal, Narenz & Steel, 1984) is used to provide a framework for this study. This model has been used in nursing to guide the development of conceptual models and explore phenomena related to health and illnesses.

Insomnia is not considered as a life threatening condition as heart attack and



cancer. It is probably an everyday or common illness. However, it is important to understand how people think about and manage their common illnesses because these are the illnesses they face before they have experienced severe health problems. These common illnesses are the vehicles through which people learn to think about illnesses (Lau, Bernard & Hartman, 1989).

In coping with insomnia, insomniacs have employed various methods to improve their sleep. These methods are varied in each person in that it probably depends on how each person thinks about insomnia. For this reason, the common sense model can guide an understanding of these situations. Moreover, this model also mentions the influence of culture and social context on the representations of illness and the selection and evaluation of coping procedures. In this sense, a study of management of insomnia among Thai people may yield results that differ from those of western people.

The commonsense model of illness representation constructed by Leventhal and colleagues is firstly presented and the literature related to representation of insomnia and coping procedures of insomnia are also reviewed.

### *Common sense model of illness representations*

The common sense model of illness representations conceptualizes that an individual is an active problem solver having his or her own common sense ideas about health threats that guide how he or she copes with problems. These definitions or representations of the illness heavily influence the health behaviors of individuals. This individual coping process is not necessarily relevant to the medical views of

control and cure of the diseases or expectations and ideas of health care providers (Diefenbach & Leventhal, 1996). In order to understand how people adapt to illnesses, it is necessary to explore these illnesses from their view points, to understand the methods that they use to manage the illness and their evaluation as to whether or not these coping methods work for them (Leventhal et al., 1992).

An important feature of this model is that it is a parallel processing; that is the processing of information involves two parallel pathways. One is the objective or cognitive representation of an illness threat, a coping procedure for managing the health problem and an evaluation process of the coping plan. The other is the subjective or emotional representation, which creates feeling states and a coping procedure and an evaluation rule for managing emotion (Leventhal et al., 1992). Both pathways are active while people have experience the illness but they can focus on one pathway at a time and can switch back and forth between pathways (Johnson, 1999). The cognitive and emotional representations interact each other. Processing of objective information regarding the attributes of the representations may decrease or increase emotional changes. On the other hand, these emotional reactions can also intensify or diminish bodily symptoms affecting representations and altering coping procedures (Leventhal et al. 1984).

There are three stages in the processing system: representations, coping and appraisal. The representation is a stage in which individuals give meanings or definitions to the problem and the emotion accompanying it. It plays a major role in the selection of methods to control the illness, the performance of procedures and the maintenance of procedures until the illness threat is removed. The origin of the illness representations comes from both internal and external sources (Diefenbach &

Leventhal, 1996). The important source of internal stimuli is the symptoms and the individual's personal illness experience. The external stimuli include the generalized pool of health information presently available in the culture, social communication such as media about health and illnesses, health campaigns, and direct information obtained from communicating with other people including health care professionals.

There are five distinct attributes in the illness representation: identity, timeline, causes, controllability and consequences. The identity dimension refers to a disease label and individual thoughts regarding somatic representation of that disease such as location, extent and feel of the symptoms. The timeline is the belief about whether it is an acute or chronic condition. The cause focuses on ideas about the etiology or the origin or what factors cause the disease. The controllability is the belief that the disease can be controlled or cured. Lastly, the consequences are related to the perception of short-term or long-term outcomes or negative impacts in terms of personal experience, economic, and emotional impacts. Different individuals may construct different representations of the same illness threat leading to different coping actions (Leventhal & Cameron, 1987).

After representation, the second stage in processing for the common sense model is coping. Coping involves choosing and performing actions according to the information contained in the representation. It is a set of procedures that people use for managing their problems both in the cognitive and emotional aspects. In addition, there are a variety of coping procedures ranging from short-term actions such as taking over-the-counter drugs to long-term actions such as changing diet, avoiding risk factors for the disease, obtaining regular check-ups, and adopting several ways to decrease and live with chronic conditions. Moreover, coping procedures are specific

to particular threats and automatic behaviors for managing health threats may occur at all levels of coping (H. Leventhal, E. A. Leventhal & Cameron, 2001).

The third stage is appraisal. This is the process of evaluation and comparison of the outcome of coping methods; that is, determining whether coping procedures have made them come closer or move further from the expected outcome specified by their representations of the illness. The results from the appraisal stage feed-back to the prior stages and can change or update representations and lead to new methods of coping (Diefenbach & Leventhal, 1996).

Aside from the three stages, another interesting feature is the influence of culture and social environment. This model posits that individuals' representations and coping procedures reflect their perception of the beliefs and attitudes of their culture and environmental context. Whether or not the symptoms of a certain disease will be reported is determined by the context of culture. It also influences on health and/or sick role behaviors of individuals. As a result, different representations and coping procedures are found across various cultures (Leventhal & Cameron, 1987).

### *Insomnia representations*

In case of insomnia, the representations of insomnia mean how insomniacs perceived about their insomnia in terms of the related symptoms, negative consequences, duration, controllability, and causes. However, there are no obvious studies on insomnia representations. Some studies of insomnia provide information about the perceptions of insomniacs that are relevant to the representations in a

common sense model. As for literature regarding insomnia, the attributes of causes, consequences, and control are frequently mentioned.

When asked about the causes of insomnia, occasional insomniacs most frequently reported worked-related stress, whereas family-related stress was the reason given most often by both occasional and chronic insomniacs (Ancoli-Israel & Roth, 1999). Insomniacs without depression or anxiety gave more external factors as causes of insomnia. These causes were stress in the environment such as in work, study, and examination, or personal relationship. For depressive and anxious insomniacs, internal attributions such as fear, rumination, and dissatisfaction were perceived as causes of insomnia (Vollrath et al., 1989). Other causes of insomnia were distress, noise, thinking about the next day's work, urination, pain or itching, too hot, too cold and too light in the bedroom (Kageyama et al., 1998). Among insomniacs who presented at a clinic, 94.1 % perceived that psychosocial problems were the causes of insomnia. Of these, work-related problems were reported by 70%, family problems by 67.5%, relationship with friends by 35%, and marital problems by 25%. They also reported other causes of insomnia such as illnesses, alcohol, and drug abuse (Mahendran, 2001).

With regards to the consequence attribute, insomniacs reported that insomnia had serious consequences on their physical health. Furthermore, they thought that they felt tired, irritable, depressed or anxious during the day because they had sleep problems at night (Morin et al., 1993). It is interesting to note that the negative consequences of insomnia lead insomniacs to seek help. Stepanski et al. (1989) conducted a study comparing the characteristics of physician-referred groups to self-referred groups in sleep clinics. The results showed that insomniacs who were

referred by physicians complained of more daytime distress such as depression, irritability, and anxiety than did members of the self-referred group. The researchers concluded that psychological distress was the consequence of insomnia drove insomniacs to seek professional help. In a similar case, a study in insomniacs presented at the clinic demonstrated that 27.1% of insomniacs sought help because of their worsening symptoms (Mahendran, 2001). Another interesting study among community-dwellers, people consulted medical professionals about their insomnia because they thought that insomnia disrupted their daily life (Ohayon & Roth, 2001). However, the researchers did not clarify what characteristics of daily life were affected by insomnia. In addition, the subjective dissatisfaction with sleep was the main reason for seeking treatment (Pallesen et al., 2001).

As for the control attribute, there was evidence that insomniacs felt more hopeless and helpless than good sleepers. Insomniacs believed that their problems were getting worse all the time that no one could help them and that insomnia could ruin their ability to enjoy life (Morin et al., 1993). On the other hand, there was evidence that many of insomniacs viewed their problems as unimportant and felt it unnecessary to consult healthcare professionals about their symptoms. Ohayon, Caulet, and Guilleminault (1997) reported that 25% of subjects complained of at least one nocturnal awakening at least three nights per week, but only 10.8% of subjects considered it a problem. It is possible that individuals perceive the severity of insomnia differently. In some cases, it may be several years before individuals seek help. Most of them have tried several coping methods such as hot bath, self-hypnosis tapes, alcohol, and a variety of over-the-counter drugs. When these methods have failed, they may seek help from health care providers (Morin, 1993).



Taken together, although studies of representations of insomnia have not been directly conducted using the illness representation questionnaire, some studies have demonstrated how insomniacs view their insomnia in terms of causes, consequences and control of insomnia. They have varied thoughts on the causes of insomnia. Relevant to the common sense model, the negative consequences of insomnia lead them to seek help or employ a variety of methods to alleviate their symptoms. Insomniacs have different views on the control of insomnia. Some insomniacs perceive that their insomnia is under control; therefore, they do not consult the doctor about their symptoms. On the other hand, some insomniacs think that they cannot gain control over their symptoms, which leads them to seek professional help.

#### *Coping procedures of insomnia*

Coping strategies of insomnia are the methods that insomniacs use to alleviate their symptoms. However, only a few studies have mentioned coping of insomnia. Insomniacs, especially those who had chronic problems, have used several methods to manage their problems. The methods vary from simple procedures such as physical management, environmental management, and home remedies to complex methods such as drug use, consulting health care professionals, and changing behaviors.

Physically, insomniacs managed their insomnia by employing physical exercise (Ancoli-Israel & Roth, 1999), taking an evening walk (Magnusdottir & Ribacke, 1996), changing their sleep position (Ramsiri, 2000), or getting out of bed (Kales et al., 1984).

Relaxation techniques were used in a variety of ways. Ancoli-Israel and Roth (1999) noted that insomniacs used mental relaxation and reading for helping them to sleep. Similar results were found in a study by Magnusdottir and Ribacke (1996) indicating that insomniacs used relaxing techniques, reading books or watching television. In another study, individuals with current insomnia used music to aid them to sleep (Kuppermann et al., 1995).

It is interesting to note that household remedies for insomnia were used by almost all but to varying degrees. The most popular method of coping with insomnia were avoiding coffee and tea in the evening and drinking warm milk and herbal tea before going to bed (Magnusdottir & Ribacke, 1996). Other home remedies were also mentioned such as drinking warm water and having a hot bath (Kales et al., 1984). Ohayon and Hong (2002) noted that home remedies such as herbal preparations were the most frequent method used to improve sleep quality and quantity. However, these studies did not specify whether these methods were effective for insomniacs.

Insomniacs also used drugs and other substances to help them sleep. Over the counter drugs such as cough syrup, antihistamine, aspirin or paracetamol were simple drugs taken before bedtime (Ancoli-Israel & Roth, 1999; Magnusdottir & Ribacke, 1996). Occasional insomniacs perceived that over-the-counter medications were effective for them and it was found that 28% of insomniacs used alcoholic beverages to help them sleep (Ancoli-Israel & Roth). Many insomniacs utilized hypnotics to facilitate their sleep. Severe insomniacs used both non-prescribed and prescribed hypnotic drugs to alleviate their symptoms (Hohagen et al., 1993). Chevalier et al. (1999) found that 15% to 35% of severe insomniacs consumed drugs for helping them

sleep, however, the researchers did not identify whether they were non-prescribed or prescribed drugs. Forty percent of insomniacs reported that they were self-medicating while only 20% of subjects were taking a hypnotic prescribed by a physician (Ancoli-Israel & Roth). Ohayon and Smirne (2002) reported that 5.7% of the sample currently used sleep-enhancing drugs. A high rate use of these medications was found in women and older people. Similarly, a higher proportion of women than men consumed sleep-promoting medications (Ohayon et al., 1996; Olson, 1996).

In terms of consulting with health care providers, it was found that only a few insomniacs had ever discussed insomnia symptoms with their doctors. In the western countries, only 20% of subjects with insomnia symptoms told a physician about their problems (Ohayon & Roth, 2001). Moreover, only 5% of insomniacs specifically visited their physician to discuss their sleep problems. Those who had never talked to their doctors either did not think they had a problem or felt it was too trivial to discuss (Ancoli-Israel & Roth, 1999). Similarly, only half of severe insomniacs had ever mentioned their insomnia to a physician and only one third had specifically consulted sleep experts (Hajak, 2001). Among a Korean population study, only 6.8% of the sample with insomnia occurring at least three nights per week had ever talked to their doctors (Ohayon & Hong, 1996). In Japan, Kawada et al. (2003) noted that only 17.3% of insomniacs were currently consulting a physician or a specialist. It is possible 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).

Besides several methods used to cope with insomnia mentioned above, other methods were also mentioned in the literature. These methods were trying hard to sleep, turning on the light, going to the bathroom, and eating certain foods (Kales et

al., 1984). Interestingly, changing diet was found as one method that used by young insomniacs to manage their insomnia (Angst et al., 1989).

In summary, insomniacs employ several coping procedures to manage their insomnia. These methods comprise of simple procedures to complex ones. As for simple methods, physical and environmental management, relaxation, and trying hard to sleep are frequently used by many insomniacs. It is interesting to note that consulting health care professionals are less of concern because many insomniacs think that insomnia is not a problem and too trivial to talk with physicians.

### *Conceptual framework*

According to the conceptual framework of insomnia developed by Spielman and colleagues, insomnia is seen as the end result of predisposing factors, precipitating factors and perpetuating factors. Predisposing factors are conditions preceding the onset of insomnia. They serve as a contributing factor or establish a tendency for people to have insomnia. The predisposing factors in this study are composed of age, gender, marital status, occupation, educational level, household income, and perception of income adequacy.

Stacked on the top of the predisposing factors are precipitating factors. Precipitating factors are related to the onset of insomnia and a common precipitating factor is the presence of stressful life events. These life events produce psychological arousal that disrupts the sleep process. Medical illnesses and psychological health problems, particularly anxiety and depression, interfere with sleep. Moreover, environmental factors such as noise, light, ventilation, insects, odor, bed partners and

sleep surfaces can interrupt sleep.

Perpetuating factors are assumed to be the conditions sustaining insomnia. They result from maladaptive sleep habits such as excessive time in bed, irregular sleep schedules, using bed and bedroom for wakeful activities. As a result of these maladaptive habits, a condition of the bedroom and bedtime failing to facilitate sleepiness is established. Lifestyle habits related to unhealthy sleep could also sustain insomnia symptoms. Furthermore, dysfunctional beliefs and attitudes about sleep such as concern for daytime deficits resulting from a poor night sleep and unrealistic expectations about sleep lead to sleep-related anxiety that disrupts sleep.

Once people develop insomnia, the direct experience of insomnia along with information from various types of media and communication with family members, friends, or neighbors as well as consultation with health care providers construct the individuals' representations of insomnia. According to the commonsense model by Leventhal and colleagues, an individual is an active problem solver having his or her own commonsense ideas about insomnia that guide how he or she copes with the problem. Representations are activated and elaborated on the basis of relevant cues such as symptoms, health-related news and when this creates a problem for the individual (health threat), problem solving proceeds by formulating goals, which in turn generate action plan. The attributes define the problem and thereby set the direction of action or coping procedures.

The cognitive representations of insomnia can be classified into five attributes: identity or symptom related to insomnia, timeline or whether or not insomnia's duration is acute or chronic, cause or the etiology of insomnia, consequences or negative impacts of insomnia, and control or whether insomnia can be cured or

controlled. Parallel with these cognitive representations is the emotional representations or the emotional responses to insomnia. The representations of insomnia guides insomniacs to manage their symptoms by choosing and performing actions according to the information contained within the five attributes of representations and coping procedures vary from short-term to long term actions or from simple to complex behaviors.

The conceptual framework of this study is shown in Figure 1.



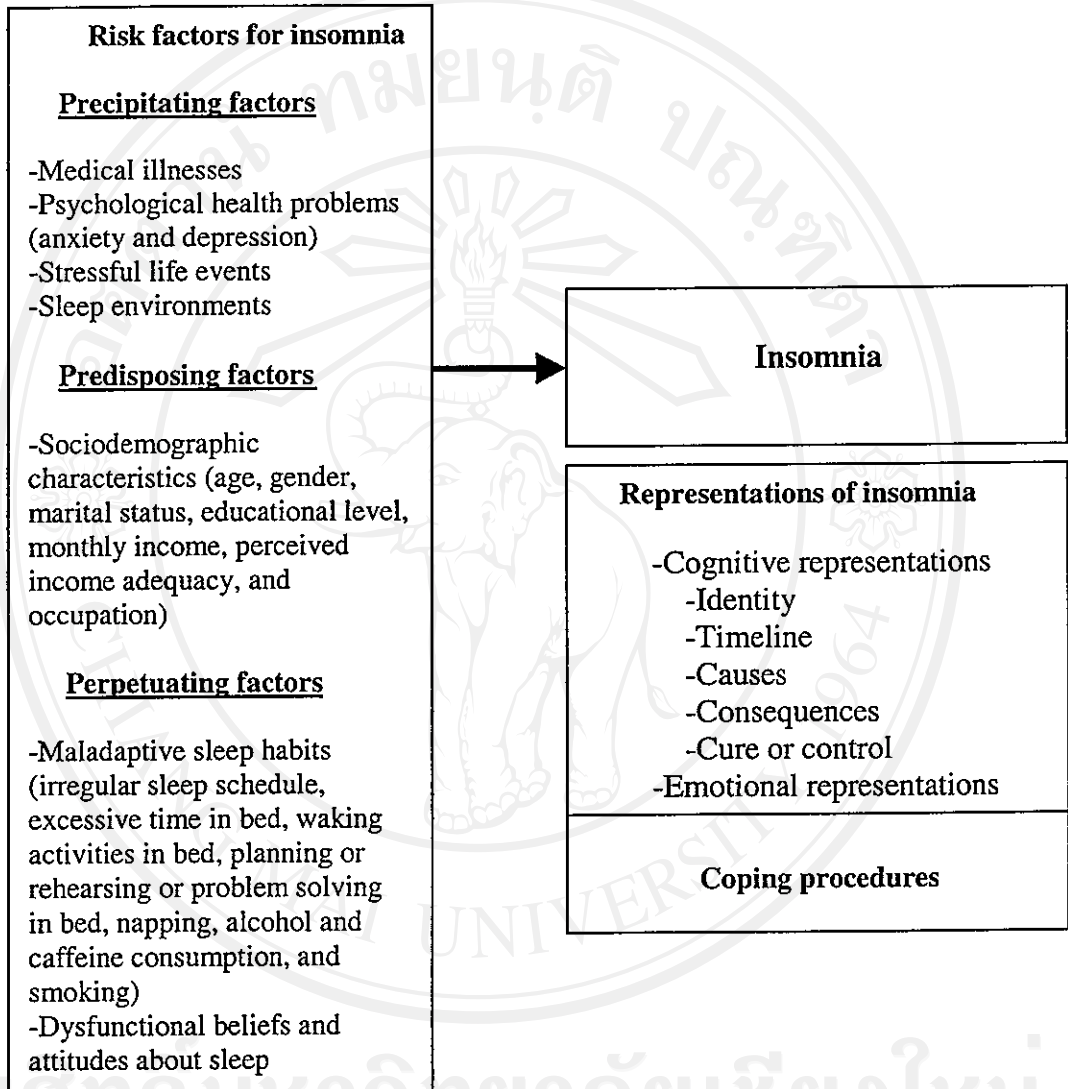


Figure 1. Conceptual Framework of the Study