

DESCRIPTORS OF INSOMNIA AMONG PERSONS WITH HEART FAILURE



Miss Janya Chimluang

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for the Degree of Doctor of Philosophy Program in Nursing Science

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อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว



นางสาวจรรยา ฉิมหลวง

ศูนย์วิทยุทรัพยากร

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาพยาบาลศาสตรดุษฎีบัณฑิต

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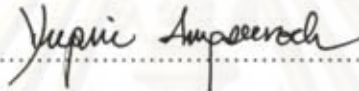
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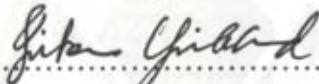
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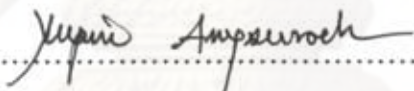
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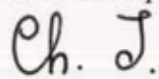
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จรรยา ฉิมหลวง: อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว. (DESCRIPTORS OF INSOMNIA AMONG PERSONS WITH HEART FAILURE) อ. ที่ปรึกษาวิทยานิพนธ์หลัก : รศ. ร.ต.อ. หญิง ดร. ยุพิน อังสุโรจน์, อ. ที่ปรึกษาวิทยานิพนธ์ร่วม ผศ.ดร. ชนกพร จิตปัญญา, 162 หน้า.

การวิจัยเชิงบรรยายครั้งนี้มีวัตถุประสงค์เพื่อศึกษาอาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว และหาความสัมพันธ์ระหว่างปัจจัยโน้มนำ ปัจจัยกระตุ้น และปัจจัยคงอยู่กับอาการนอนไม่หลับ กลุ่มตัวอย่างคือผู้ป่วยหัวใจล้มเหลว จำนวน 340 คนที่มารับการติดตามการรักษาที่คลินิกโรคหัวใจ ของโรงพยาบาลตติยภูมิ 10 แห่งของประเทศไทย ที่ถูกเลือกโดยการสุ่มแบบหลายขั้นตอน การศึกษานี้เก็บรวบรวมข้อมูล ในระหว่างเดือน กรกฎาคม พ.ศ. 2552 ถึง เดือน มกราคม พ.ศ. 2553 เครื่องมือการวิจัยประกอบด้วย แบบสอบถามข้อมูลส่วนบุคคล แบบประเมินความวิตกกังวล แบบประเมินภาวะซึมเศร้า แบบประเมินอาการหายใจลำบาก แบบประเมินการหยุดหายใจในขณะนอนหลับ แบบสอบถามเกี่ยวกับความสามารถในการปฏิบัติกิจกรรม แบบประเมินความตระหนักในเรื่องสุขอนามัยของการนอนหลับและระดับการปฏิบัติ แบบประเมินความเชื่อและทัศนคติที่ไม่ถูกต้องเกี่ยวกับการนอนหลับและแบบประเมินอาการนอนไม่หลับ วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนา การทดสอบไคสแควร์ และ การวิเคราะห์ถดถอยโลจิสติก

ผลการวิจัยพบว่า 32% ของผู้ป่วยหัวใจล้มเหลวมีอาการนอนไม่หลับ โดย 23.8% มีอาการอาการนอนไม่หลับระดับปานกลาง และ 8.2 % มีอาการนอนไม่หลับระดับรุนแรง ชนิดของอาการนอนไม่หลับที่พบมากคือ เริ่มต้นนอนหลับยาก และ ตื่นขึ้นมากกลางดึกแล้วต้องใช้เวลาานจึงจะสามารถหลับใหม่ได้อีกครั้ง ปัจจัยที่มีความสัมพันธ์กับอาการนอนไม่หลับ คือ ความวิตกกังวล ความซึมเศร้า สถานภาพสมรส อาการหายใจลำบาก การหยุดหายใจในขณะนอนหลับ ระดับความสามารถในการปฏิบัติกิจกรรม สุขอนามัยในการนอนหลับ ความเชื่อและทัศนคติที่ผิดเกี่ยวกับการนอนหลับ ส่วนปัจจัยที่สามารถทำนายอาการนอนไม่หลับได้คือ ความวิตกกังวล ความซึมเศร้า สถานภาพสมรส อาการหายใจลำบาก และ ความเชื่อและทัศนคติที่ผิดเกี่ยวกับการนอน

สาขาวิชา พยาบาลศาสตร์  
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ลายมือชื่อนิสิต.....จรรยา ฉิมหลวง  
ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....  
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This descriptive research was designed to explore the characteristics of insomnia in persons with heart failure and examine the relationships among the predisposing factors, the precipitating factors, the perpetuating factors and insomnia. Three hundred and forty heart failure patients, who were followed-up at heart clinic at 10 tertiary hospitals in Thailand, were selected by multi-stage random sampling. Data were collected during July 2009 – January 2010. Research instrument included demographic questionnaire, state-trait anxiety inventory questionnaire, Center for epidemiologic studies depression scale, dyspnea questionnaire, Berlin questionnaire, New York Heart Association functional classification, sleep hygiene awareness and practice scale, dysfunctional beliefs and attitudes about sleep and insomnia severity index. Data were analyzed by using descriptive statistic, Chi-square test, and logistic regression.

The result of the study revealed that there were thirty-two percent of heart failure patients had insomnia. Twenty-three point eight percent had moderate insomnia and 8.2 % had severe insomnia. The most common type of insomnia was difficulty falling asleep and difficulty staying asleep. Correlated factors of insomnia including the predisposing factors: anxiety and depression, the precipitating factors: marital status, dyspnea, sleep disorder breathing and functional status, and the perpetuating factors: sleep hygiene and dysfunctional beliefs and attitudes about sleep. After using logistic regression analysis found that the predictive factors of insomnia were anxiety, depression, marital status, dyspnea, and dysfunctional beliefs and attitudes about sleep.

Field of Study : Nursing Science.....

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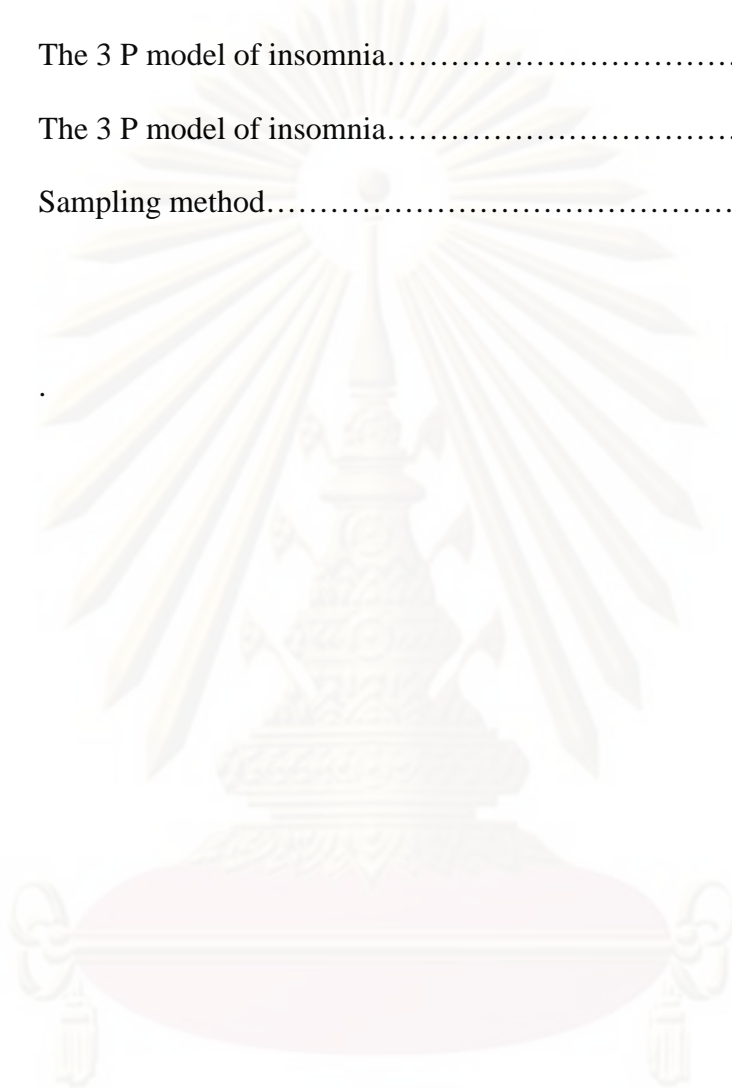


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# CHAPTER I

## INTRODUCTION

### **Background and significance of the study**

Sleep is very crucial for patients with heart failure whose conditions have worsened in terms of cardiac status. Sleep is an important modulator of cardiovascular function, both in physiological conditions and in disease state (Wolk et al., 2005). Sleep is generally time of cardiovascular relaxation. It consists of 2 distinct stages: non rapid eye movement (NREM) and rapid eye movement (REM). NREM makes up 80% to 85% of total sleep time and has 4 stages, beginning with stage 1 and progressing to the deeper sleep found in stage 3 and stage 4. It is during stages 3 and 4 that parasympathetic tone increases, resulting in reduced heart rate, stroke volume, and blood pressure and concomitant reduction in cardiac output, systemic vasculature resistance, and myocardial oxygen workload. The deepest level of relaxation occurs during REM, which follows NREM sleep. REM sleep is essential to waking up feeling rested and refreshed (Trupp, 2004).

Insomnia is a serious problem in patients with heart failure because insomnia could elevate heart rate, increase heart rate variability suggestive of increased sympathetic and decreased parasympathetic activity, adverse hemodynamic consequences for the failing heart, and also potentially debilitating symptoms of heart failure (Becker, 2006; Hayes et al., 2009; Javaheri, 2008; Thase, 2005).

Unfortunately, the previous research found high prevalence of insomnia in patients with heart failure. Brostrom and Johansson (2005) conducted a secondary analysis from 182 abstracts published during 1989-2004 which was relevant to sleep disturbance in patients with heart failure. The results revealed that approximately

33 % of patients had insomnia (Brostrom and Johansson, 2005). Moreover, another study revealed that 31.3% of patients with heart failure reported symptoms suggesting the presence of insomnia in a tertiary care heart failure clinic (Principe-Rodriguez et al., 2005). In Thailand, a study of Phuangphaka Krethong (2007) in patients who followed up at heart clinic found that 64.5% of Thai heart failure patients had sleep problems.

There were various diagnostic criteria and several definitions of insomnia emerging from the research. At present, there was no consensus which definition was the appropriate one. However, according to National Institutes of Health state of the science consensus, insomnia has historically been defined by complaints of disturbed sleep in the presence of adequate opportunity and circumstance for sleep.

The disturbance may consist of one or more of three features: (1) difficulty in initiating sleep; (2) difficulty in maintaining sleep, or (3) waking up too early.

A fourth characteristic, nonrestorative or poor-quality sleep, has frequently been included in the definition, although there is controversy as to whether individuals with this complaint share similar pathophysiologic mechanisms with the others (National Institute of Health [NIH], 2005).

Prior researches in patients with heart failure revealed that difficulty in initiating sleep was reported 19-63% (Erickson et al., 2003; Johansson et al., 2007; Lainscak and Keber, 2003), difficulty in maintaining sleep was reported 23-69%, waking up to early was reported 15-39% (Brostrom et al., 2004; Erickson et al., 2003; Johansson et al., 2007), and also non-restorative sleep was reported 44% (Johansson et al., 2007).

In addition, Erickson et al. (2003) studied about sleep characteristics of heart failure patients, the result found that the mean length of sleep was nearly 8 hours,

however, the mean of the number of daytime naps during the days was 4.2 and 33% reported on using sleeping pills. Moreover, Redeker and Stein (2006) studied insomnia to compare the patients with heart failure and normal population by using actigraph. The result revealed that the patients with heart failure had a significantly higher percentage of wakes after sleep onset and more frequent wake bouts when compared with general population (Redeker and Stein, 2006).

From empirical data found that several factors have been correlated with insomnia. According to The 3P Model of insomnia (Glovinsky and Spielman, 2006), which is the most popular framework for understanding insomnia in the community of sleep experts (Glovinsky and Spielman, 2006) and has been tested with several groups of general people and various groups of patients.

This model suggests that three distinct elements account for the onset and course of insomnia: (1) Predisposing characteristics i.e. physiological hyperarousal, cognitive hyperarousal, Night Owls and Morning Larks, anxiety and depression. (2) Precipitating events, are often outside the individual's control, that can trigger sleep disturbance, i.e. family conflicts, work-related stress, health issues, death of a loved one or other loss, (3) Perpetuating attitudes and practices come into play after insomnia has made its appearance i.e. getting into bed early, staying in bed late, spending extra time in bed, napping, caffeine, sleep medication and worrying about sleep or daytime functioning.

Empirical data from the previous researches which were investigated associated factors of insomnia in general population found that age, married, divorced, separated, or widowed marital status, low monthly income, major life event, depression, poor psychological well-being, poor perceived health or poor self-rated health, sleep apnea and role impairment were associated with insomnia (Cho et al.,

2009; Johansson et al., 2009; Kao et al., 2008; Kawada et al., 2003; Makhlof, Ayoub, and Abdel-Fattah, 2007; Chakrit Sukying, Vandee Bhokakul, and Umaporn Udomsubpayakul, 2003; Thomas et al., 2006; Xiang et al., 2008).

Apart from that, associated factors of insomnia have been studied widely in patients with cancer. The associated factors of insomnia which not included site and treatment of cancer were female sex, widowhood, unemployment, unmet needs in the physical/daily living, anxiety symptoms, depression, dreams, concerns, fatigue, leg restlessness, sick leave, sleep hygiene, maladaptive sleep behaviors, belief about sleep, sedative/hypnotic use (Davidson et al., 2002; Melanie et al., 2009; Nongluk Anunta-ard, 2007; Pattariya Keawphang, 2004; Savard et al., 2001; Savard et al., 2009).

Moreover, Krakow et al. (2001) who studied in sleep disorder breathing patients, the result found that the sleep disorder breathing patients who had insomnia reported significantly more chief complaints of symptoms of insomnia. Saisunee Tubtimtes, Chakrit Sukying, and Somjit Prueksaritanond (2009) studied at out-patient of the family medicine department in Ramathibodi Hospital, the result found that anxiety score, female and perception of their illness and disease were strong factors associated with insomnia. From another research, Griffiths (2005) studied in patients who underwent elective cardiac or orthopedic surgery during a three months period. The result revealed that dysfunctional cognition about sleep is one of the three factors which could predict chronic insomnia.

To the specific on heart failure patients, Erickson and colleagues investigated age, gender, severity of heart failure, etiology, obesity, smoking and use of beta-blocker in 84 heart failure patients. The result found that only male gender was related with trouble returning to sleep but male gender was not a predictive factor of sleep

disturbance in this study (Erickson et al., 2003). Another research studied in 201 patients identified patients with age, gender, paroxysmal nocturnal dyspnea, New York Heart Association (NYHA) functional classification, body mass index (BMI), left ventricular ejection fraction (LVEF) , the result found that only paroxysmal nocturnal dyspnea, New York Heart Association status classification were correlated with insomnia (Principe-Rodriguez et al., 2005).

According to the 3P model of insomnia, the empirical data from prior researches, correlated factors of insomnia in patients with heart failure would be as follows: the predisposing factors were age, gender, anxiety, and depression; the precipitating factors were marital status, dyspnea, sleep disorder breathing, functional status; and the perpetuating factors were sleep hygiene, dysfunctional beliefs and attitudes about sleep (Davidson et al., 2002; Glovinsky and Spielman, 2006; Kawada et al., 2003; Melane et al., 2009; Nongluk Anunta-ard, 2007; Pattariya Keawphang, 2004; Principe-Rodriguez et al., 2005; Saisunee Tubimtes et al., 2009; Savard et al., 2009).

Insomnia can impact to physical, psychological, as well as the patients' health related quality of life. From empirical data found that physical impact including fatigue, tiredness, lethargy, loss of concentration reduction of attention and concentration, listlessness memory lapses, slowed reaction time, poor coordination, increased daytime sleepiness, increase morbidity in terms of health problem (Becker, 2006; Brostrom et al., 2001; Daley et al., 2009; Thase, 2005).

Psychological impact including decreased feelings of well-being during the day, deterioration of mood and motivation, listlessness, loss of temper anxiety or worry about sleep, mental fatigue and depressive mood (American Psychiatric Association, 2000; Becker, 2006; Brostrom et al., 2001; Ohayon and Reynolds, 2009),

as well as reduced health-related quality of life in all dimensions (Brostrom et al., 2004). Moreover, insomnia associated with high healthcare-related financial burden health-care utilization, work absenteeism and reduced productivity, and risk of non-motor-vehicle accidents (Daley et al., 2009; Thase, 2005).

Insomnia is a nursing sensitive outcome which impacts on heart failure patients very negatively. Nurses have to take responsibility for manage insomnia in patients with heart failure who are unable to pump enough blood to any part of their body. Therefore improving these sensitive outcomes, nurses need to understand insomnia and try to correctly respond to it. Knowledge regarding insomnia in patients with heart failure is very important in order to assess insomnia, associated factors and develop appropriate and effective non-pharmacologic intervention to solve this problem so as to reduce sympathetic and increase parasympathetic activity, prevent debilitating symptoms of heart failure, improve their hemodynamic and functional capacity, reduce their suffer and improve their health-related quality of life.

In conclusion, several studies in the western countries have found a high prevalence of insomnia in patients with heart failure. Few characteristic of insomnia were described, only the type of insomnia and some characteristics. There have no study regarding insomnia severity in this population.

Prior research found only three factors including male gender, paroxysmal nocturnal dyspnea and NYHA status classification were correlated factors of insomnia in patients with heart failure in western countries. In Thailand, there has been no study of correlated factors of insomnia in patients with heart failure or patients with cardiac disease. Only two studies have been conducted on the concept of sleep quality in hospitalized heart patients. One was studied about the relationship between uncertainty in illness, event familiarities and sleep quality in hospitalized heart failure



patients (Chopaka Phudphanphaisan, 2001). Another was studied about the correlated factors of sleep quality in hospitalized patients with cardiac disease (Kantaporn Yodchai, 2004).

Thus, the purpose of this study needs to describe the characteristic of insomnia, and examine the relationship of selected factors and insomnia in patients with heart failure at out-patient department in Thailand in order to build up the body of knowledge of insomnia and provide knowledge for further developing intervention to prevent or reduce insomnia in this population.

### **The purposes of the study**

1. Describe the characteristics of insomnia in patients with heart failure.
2. Examine the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep), and insomnia in patients with heart failure.

### **Research Hypotheses and Rationales**

Selected factor of insomnia in this study was guided by the 3P Model of Insomnia (Glovinsky and Spielman, 2006) and factors from the previous research.

The research hypotheses were set in 9 statements as follows:

1. Age would have a positive relationship on insomnia.

**Rationale:** Sleep impairment can result from physiological changes that are apparently part of normal aging. Age-related changes in the amount and the pattern of the various stages of sleep and wakefulness (Bliwise, 2000). The elderly spend more time in bed and less time asleep and are more easily aroused from sleep than young people. The most striking changes include a reduction in slow-wave sleep

(particularly stage 4 sleep), increased nighttime wakefulness, and increased fragmentation of sleep by periods of wakefulness. Less striking age reduction in rapid eye movement (REM) sleep and total nighttime sleep also occur. The age-related impairments in sleep depth and maintenance seem to be accompanied by an age-related increase in sensitivity to environmental stimuli that disturb sleep (Prinz, 2004).

A study in Korean adults reported that insomnia was being higher in those aged 60-69 years than in those aged 20-29 years (odds ratio [OR] = 2.368) (Cho et al., 2009). Another one research, Kappler and Hohagen (2003) studied 2,512 patients in general practice found that age was the most powerful predictors of insomnia. Moreover, Nongluk Anunta-ard (2007) was reported that age had positive relationship with insomnia in hematological malignancies ( $r = .316$ ). Specific on patient with heart failure found that age was not correlated with sleep disturbance in patients with heart failure. However, this study had small sample size, only 84 patients were included and this study focus on sleep disturbance not focus on insomnia.

## 2. Gender would have relationship on insomnia

**Rationale:** Women have more insomnia than men because of normal physiologic periods, including puberty, menstruation, pregnancy, and menopause, which associated with alterations in sleep patterns (Krishnan and Collop, 2006). The most common factors affecting sleep in women are associated with the life cycle of hormone levels, extending from menarche through and after menopause (Miller, 2004).

Prior research found that female was significant correlated with insomnia in hematological malignancies (Nongluk Anunta-ard, 2007). A another one study found that female reported difficulty in initiating and sleep difficulty in maintaining sleep and that early morning awakening more than male. Females were about 1.6 times at

higher risk for insomnia than males (Lia et al., 2002). Moreover, one study at out-patient of the family medicine department, this studied reported that female had strong correlation with insomnia (Saisunee Tubtimtes et al., 2009). Although, one study in patients with heart failure found that male gender was related to trouble returning to sleep but male gender was not a predictor of sleep disturbance (Erickson et al., 2003).

### 3. Anxiety would have a positive relationship on insomnia

**Rationale:** Anxiety brings psychophysiological changes that interfere with sleep onset and sleep maintenance. It can inhibit sleep outright through heart racing, muscle tightening, obsessive thinking, or other means. Alternatively, anxiety may allow to succumb to the first hours of sleep, when the drive for deep NREM sleep is the greatest, only to lead to awakenings when that drive has been partially sated (Glovinsky and Spielman, 2006). Anxiety which is common among patients suffering from heart failure, often has a distinctly disturbing effect on sleep (Biliard, 2003).

Brostrom and Johansson (2005) conducted a qualitative research and found that anxiety is one of the causes of insomnia in patients with heart failure. Anxiety was significant correlated with insomnia in patients with cancer (Pattarieya Keawphang, 2004). Moreover, one study at out-patient of the family medicine department, this studied reported that anxiety had strong correlation with insomnia (Saisunee Tubtimtes et al., 2009).

### 4. Depression would have a positive relationship on insomnia

**Rationale:** Depression brings about psychophysiological changes that interfere with sleep onset and sleep maintenance. Depression is associated with disruptive changes in sleep architecture. People who are depressed spend more time on awakening at night, whether at the beginning, middle, or end. The accumulate less

of the deepest NREM sleep stages, while greater proportion of total sleep time may be devoted to REM sleep, often accompanied by vivid, disturbing dreams (Glovinsky and Speiman, 2006). Studies have shown that depression was a significant positive correlation with insomnia in cancer patients (Nongluk Anunta-ard, 2007; Pattarieya Keawphang, 2004). Moreover, previous researches in the community reported that people with insomnia had greater depression levels than people who had no insomnia and were 9.82 times more likely to have clinically significant depression (Taylor et al., 2005).

#### 5. Marital status would have a relationship on insomnia

**Rationale:** Complex personal relationships, social stress, the gradual dissolution of the traditional family structure and marriage-related problems may have contributed to the higher likelihood of insomnia in the married/divorced/widowed group (Xiang et al., 2008). Married, separated, divorced and widowed marital status were factors for all types of insomnia in Chinese people (Xiang et al., 2008). Another one study in breast cancer patients reported that widowhood significantly associated with the presence of insomnia symptoms (Savard et al., 2001).

#### 6. Dyspnea would have a positive relationship on insomnia

**Rationale:** Dyspnea is respiratory distress that occurs as a result of increased effort in breathing and is the most common symptom of heart failure. Dyspnea led to difficulties lying flat as well as frequent awakenings, followed by feeling of panic (Brostrom et al., 2001). From a qualitative study of patients with congestive heart failure in sleep situations, it was found that dyspnea is one of the symptoms of heart failure which affected sleep negatively (Brostrom et al., 2001). According to a research of Principe-Rodriguez et al. (2005), paroxysmal nocturnal dyspnea correlated with insomnia in patients with heart failure.

#### 7. Sleep disorder breathing would have a relationship on insomnia

**Rationale:** Sleep disorder breathing, including obstructive sleep apnea (OSA) and central sleep apnea (CSA) with Cheyne–Stokes respiration (CSR), was found to be the most common sleep disorder in patients with heart failure (Brostrom and Johansson, 2005). Obstructive sleep apnea is related to complaints of insomnia and unrefreshing sleep (Sidney and Lichstein, 2005). Moreover, obstructive sleep apnea leads to arousals and awakenings during sleep (Roth and Drake, 2004). Central sleep apnea is usually associated with insomnia complaints of difficulty maintaining sleep. These apnea-related awakenings sometimes begin with a gasp for air and a sensation of choking (Sidney and Lichstein, 2005). Problematic insomnia symptoms were reported by 50% of a representative sample of patients with objectively diagnosed sleep disorder breathing (Krakow et al., 2001). Moreover, the prior research found that the difficulty in initiating sleep correlated significantly with sleep disorder breathing (Johansson et al., 2009).

#### 8. Functional status would have a positive relationship on insomnia

**Rationale:** Functional status is defined as the conceptual universe through which a person or a population had the ability to undertake activities designed to meet basic needs, fulfill life roles, and maintain health and well-being (Leidy, 1994 cited in Miller-Davis, Marden and Leidy, 2006). The New York Heart Association (NYHA) functional classification is commonly used to indicate functional status in cardiac patients. Functional status limitations will make heart failure patients unable to perform their normal activities (Stewart et al., 2004).

The prior study found that NYHA class II to IV had moderate or major complaints of difficulty initiating sleep in patients with heart failure (Brostrom et al.,

2004). In addition, the previous study found that NYHA was correlated with insomnia in patients with heart failure (Principe-Rodriguez et al., 2005).

9. Sleep hygiene would have a positive relationship on insomnia

**Rationale:** sleep hygiene is maladaptive behavior which effects to sleep including irregular schedules, exercise close to bedtime, substance use, worry about ability to sleep and improper sleeping environment. Spending extra time in bed will generally increase night-to-night variability, oversleeping in the morning leading to more difficult falling asleep on subsequent nights and increased anxiety regarding bedtime, perpetuating a vicious cycle, daytime napping may make it difficult to fall asleep later that night (Glovinsky and Spielman, 2006).

Caffeine and nicotine, both central nervous system stimulants, can impede sleep onset and reduce sleep efficiency and quality. Alcohol consumption prior to bedtime can lead to more fragmented sleep, early morning awakenings, and subsequent difficulty falling back asleep. A vicious cycle can also result when alcohol is explicitly used as a sleeping aid. Regular exercise in late afternoon or early evening can deepen sleep as a result of the subsequent rebound cooling effect. Conversely, exercising too close to bedtime can have a stimulating effect and delay sleep onset. It is important to minimize noise, sleep in a very dark bedroom, avoid excessive temperature in the bedroom (Morin, Daley, and Ouellet, 2001).

Surang Lertkachararn and Somporn Jarutinkorn (2000) studied in sleep hygiene of Thai chronic non-organic insomniacs. The result found that 83% of patients had poor sleep hygiene. Most of the factors of poor sleep hygiene were irregular sleep/ wake schedules, spending extended amounts of time in bed awake, engaging in exciting or emotionally upsetting activities close to bedtime, daytime naps, poor sleep environment, routine use of alcohol, caffeine, or nicotine near

bedtime. A study of Nongluk Anunta-ard (2007) study in hematological malignancies patients found that sleep hygiene was significant positive correlations with insomnia.

10. Dysfunctional beliefs and attitudes about sleep would have a positive relationship on insomnia

**Rationale:** These are alterations in beliefs and attitudes about sleep that in turn affect sleep itself. People that do not sleep well end up doing a lot more thinking about sleep and about themselves as sleepers and much of this extra thinking is decidedly unhelpful. Chiefly, poor sleepers experience an alteration in their self-image. To change this self-image, the experience of insomnia leads to distortions in attitudes and beliefs about sleep itself (Glovinsky and Spielman, 2006). Griffiths (2005) studied in patients who underwent elective cardiac or orthopedic surgery during a three months period. The result revealed that dysfunctional cognition about sleep is one of the three factors which can predict chronic insomnia. Consistency with Pattarieya Keawphang (2004) found that belief about sleep can predict insomnia among cancer patients.

### **The scope of the study**

This study were describe the characteristics of insomnia in patients with heart failure and examine the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep) and insomnia in patients with heart failure who are 18 years of age and over and had followed-up at a heart clinic out-patient department in Thailand.

## **Definitions of terms**

**Insomnia** is defined as the symptoms of perceived reduction in the quantity or quality of sleep at least 1 month prior to the study period because of one or more as follows:

1. Difficulty falling asleep, it takes more than 30 minutes trying to fall a sleep
2. Difficulty staying asleep with prolonged nocturnal awakenings,  
It takes more than 15 minutes to resume asleep.
3. Waking up too early with an inability to resume sleep, wake up at least 1 hour earlier without an alarm clock

These symptoms occurred along with clinically significant distress or impairment in social, occupational, or other important areas of functioning. Insomnia was measured by Insomnia Severity Index (Morin, 1993). This instrument was translated into Thai by Pattariety Keawphang (2004).

**The characteristic of insomnia** is defined as a type of insomnia, severity of insomnia.

**Age** is defined as a full year of age of heart failure patients starting from the date of birth and up to the date of the study.

**Gender** is defined as the sex of heart failure patients, being male and female.

**Anxiety** is defined as an emotional state, consisting of “unpleasant, consciously perceived feelings of tension and apprehension of patients with heart failure. Anxiety was assessed by using the State-Trait Anxiety Inventory (STAI) of Spielberger et al. (1983). It was translated into Thai by Nittaya Kotchabhakdi, Sairudee Vorakitphokatorn and Malee Nitsaisook (1981), and adapted by Sureeporn Tapa-Amorndech (2003).



**Depression** is defined as a specific alteration in mood including depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance of patients with heart failure. Depression was measured by using the Center for epidemiologic studies depression scale (CES-D Scale) (Radloff, 1977). It was translated into Thai by Tawatchai Worapongsathorn et al. (1990) and adapted to use in heart disease patients by Monruedee Buran (2005).

**Marital status** is defined as the condition of being single, married, separated, divorced, and widowed.

**Dyspnea** is defined as a subjective experience of breathing discomfort of patients with heart failure that consists of intensity, timing, distress and quality as measured by the dyspnea questionnaire of Pataraporn Kheawwan (2003) and adapted by Kantaporn Yodchai (2004).

**Sleep disorder breathing** is defined as a group of disorders characterized by abnormalities in the respiratory pattern (pauses in breathing) or the quantity of ventilation during sleep of patients with heart failure. Sleep disorder breathing was measured by the Berlin questionnaire, this questionnaire was developed by Netzer et al. (1999). The questionnaire was translated by using a back translation technique from Language Institute of Mahasarakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn University.

**Functional status** is defined as worsening in level of ability to perform an activity of patients with heart failure. Functional status of patients with heart failure was quantified by the subjective New York Heart Association (NYHA) functional classification (AHA, 2006). It was translated into Thai by Phuangphaka Krethong (2007).

**Sleep hygiene** is defined as improper regular schedules, diet, exercise, substance use, worry about ability to sleep or sleeping environment which affect to poor sleep. Sleep hygiene was measured by the Sleep Hygiene Awareness and Practice scale of Lack and Rotert (1986). This questionnaire was translated by using a back translation technique from Language Institute of Mahasarakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn Univerity.

**Dysfunctional beliefs and attitudes about sleep** are defined as dysfunctional beliefs and attitudes about sleep on the part of patients with heart failure in the following: (1) perceived consequences of insomnia; (2) worry/helplessness about insomnia; (3) sleep expectations; and (4) beliefs about sleep medication. Dysfunctional beliefs and attitudes about sleep were measured by Dysfunctional Beliefs and Attitudes about sleep (DBAS-16) (Morin, Vallieres, and Ivers, 2007). This questionnaire was translated by using a back translation technique from Language Institute of Mahasarakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn Univerity.

#### **Expected usefulness of the study**

1. This study provides a knowledge regarding characteristics of insomnia in patients with heart failure.
2. The finding provides a knowledge regarding correlated factors and predictive factors of insomnia in patients with heart failure.

3. The finding provide evident base to health care providers, policy makers in order to provide effective health service to heart failure patients who have insomnia.

4. The finding provides predictive factors to develop appropriate nursing intervention to prevent insomnia in this population.



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## **CHAPTER II**

### **LITERATURE REVIEW**

This chapter presents a literature review of heart failure, sleep, insomnia, insomnia in patients with heart failure, negative impact of insomnia, assessment of insomnia, theory of insomnia, related factors of insomnia and related researches.

#### **2.1 Heart Failure**

Heart failure is a major health problem and a serious long-term condition. An estimated 5.7 million Americans are living with heart failure, and 670,000 new cases are diagnosed each year (American Heart Association [AHA], 2009). In Thailand, heart failure is also a major health problem. Cardiovascular disease is top 3 diseases in Thailand (Bureau of Policy and Strategy, 2008) and heart failure is a top three of cardiovascular disease (Department of Medical Services, 2008).

##### **2.1.1 Definition**

Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood through the heart to meet the body's needs for blood and oxygen. Basically, the heart can't keep up with its workload.

At first the heart tries to make up for this by:

1. Enlarging, when the heart chamber enlarges, it stretches more and can contract more strongly, so it pumps more blood.
2. Developing more muscle mass, the increase in muscle mass occurs because the contracting cells of the heart get bigger. This lets the heart pump more strongly, at least initially.
3. Pumping faster, this helps to increase the heart's output.

The body also tries to compensate in other ways:

- The blood vessels narrow to keep blood pressure up, trying to make up for the heart's loss of power.
- The body diverts blood away from less important tissues and organs to maintain flow to the most vital organs, the heart and brain.

These temporary measures mask the problem of heart failure, but they don't solve it. Heart failure continues and worsens until these substitute processes no longer work. Heart failure can involve the heart's left side, right side or both sides. However, it usually affects the left side first.

### **2.1.2 Type of heart failure**

#### **Left-sided heart failure**

The heart's pumping action moves oxygen-rich blood travels from the lungs to the left atrium, then on to the left ventricle, which pumps it to the rest of the body. The left ventricle supplies most of the heart's pumping power, so it is larger than the other chambers and essential for normal function. In left-sided or left ventricular (LV) heart failure, the left side of the heart must work harder to pump the same amount of blood. There are two types of left-sided heart failure.

- **Systolic failure:** The left ventricle loses its ability to contract normally. The heart can't pump with enough force to push enough blood into circulation.
- **Diastolic failure:** The left ventricle loses its ability to relax normally (because the muscle has become stiff). The heart can not properly fill with blood during the resting period between each beat.

### **Right-sided heart failure**

The heart's pumping action moves "used" blood that returns to the heart through the veins through the right atrium into the right ventricle. The right ventricle then pumps the blood back out of the heart into the lungs to be replenished with oxygen. Right-sided or right ventricular (RV) heart failure usually occurs as a result of left-sided failure. When the left ventricle fails, increased fluid pressure is, in effect, transferred back through the lungs, ultimately damaging the heart's right side. When the right side loses pumping power, blood backs up in the body's veins. This usually causes swelling in the legs and ankles.

### **Congestive heart failure**

Congestive heart failure is a type of heart failure which requires seeking timely medical attention, although sometimes the two terms are used interchangeably. As blood flow out of the heart slows, blood returning to the heart through the veins backs up, causing congestion in the body's tissues, often swelling (edema) results. Most often there is swelling in the legs and ankles, but it can happen in other parts of the body, too. Sometimes fluid collects in the lungs and interferes with breathing, causing shortness of breath, especially when a person is lying down. This is called pulmonary edema and if left untreated can cause respiratory distress. Heart failure also affects the kidneys' ability to dispose of sodium and water. This retained water also increases swelling in the body's tissues (edema).

#### **2.1.3 Causes of heart failure**

All of us lose some blood-pumping ability in our hearts as we age, but heart failure results from the added stress of health conditions that either damage the heart or make it work too hard. All of the lifestyle factors that increase risk of heart attack

and stroke – smoking, being overweight, eating foods high in fat and cholesterol and physical inactivity – can also contribute to heart failure.

Having more than one of these factors dramatically increases risk of heart failure.

- Coronary artery disease
- Past heart attack (myocardial infarction)
- High blood pressure (hypertension)
- Abnormal heart valves
- Heart muscle disease (dilated cardiomyopathy, hypertrophic cardiomyopathy) or inflammation (myocarditis)
- Heart defects present at birth (congenital heart disease)
- Severe lung disease
- Diabetes
- Other conditions

#### **2.1.4 Common Tests for Heart Failure**

Healthcare team may do some or all of these diagnostic tests and procedures. Physical Examination, Blood Tests, Chest X-ray, Electrocardiogram (EKG or ECG) Echocardiogram (echo), Exercise Stress Test, Radionuclide Ventriculography or Multiple-Gated Acquisition Scanning (MUGA) and Coronary Angiography or Arteriography.

#### **Ejection Fraction and Heart Failure**

The ejection fraction (EF) is an important measurement in determining how well your heart is pumping out blood and in diagnosing and tracking heart failure. Ejection Fraction is a measurement of how much blood the left ventricle pumps out with each contraction. An ejection fraction of 60 percent means

that 60 percent of the total amount of blood in the left ventricle is pushed out with each heartbeat.

- A normal heart's ejection fraction may be between 55 and 70.
- A measurement under 40 may be evidence of heart failure or cardiomyopathy.
- An EF between 40 and 55 indicates damage, perhaps from a previous heart attack, but it may not indicate heart failure.
- In severe cases, EF can be very low.
- EF higher than 75 percent can indicate a heart condition like hypertrophic cardiomyopathy.

### **NYHA functional classification**

NYHA functional classification is commonly used to indicate functional status in cardiac patients. Functional status limitations will make heart failure patients unable to perform their normal activities (Stewart et al., 2004).

NYHA Functional Classification, it places patients in one of four categories based on how much they are limited during physical activity.

<b>Class</b>	<b>How Patient Feels During Physical Activity</b>
I	No symptoms and no limitation in ordinary physical activity.
II	Mild symptoms and slight limitation during ordinary activity. Comfortable at rest.
III	Marked limitation in activity due to symptoms, even during less-than-ordinary activity. Comfortable only at rest.
IV	Severe limitations. Experiences symptoms even while at rest.

**Table 1** NYHA Functional Classification from American Heart Association

(AHA, 2006).



## **2.2 Sleep**

Human spend about one-third of their lives on sleep (Institute of medicine of the national academies, 2006). Sleep is a basic human need and is essential for good health and quality of life performing well by day. Sleep now is known to be an active process that is regulated by various behavioral neuroendocrine and factors in the central nervous system. The insufficient or poor sleep has been shown to have a variety of adverse effects on important clinical outcome (Vena et al., 2004).

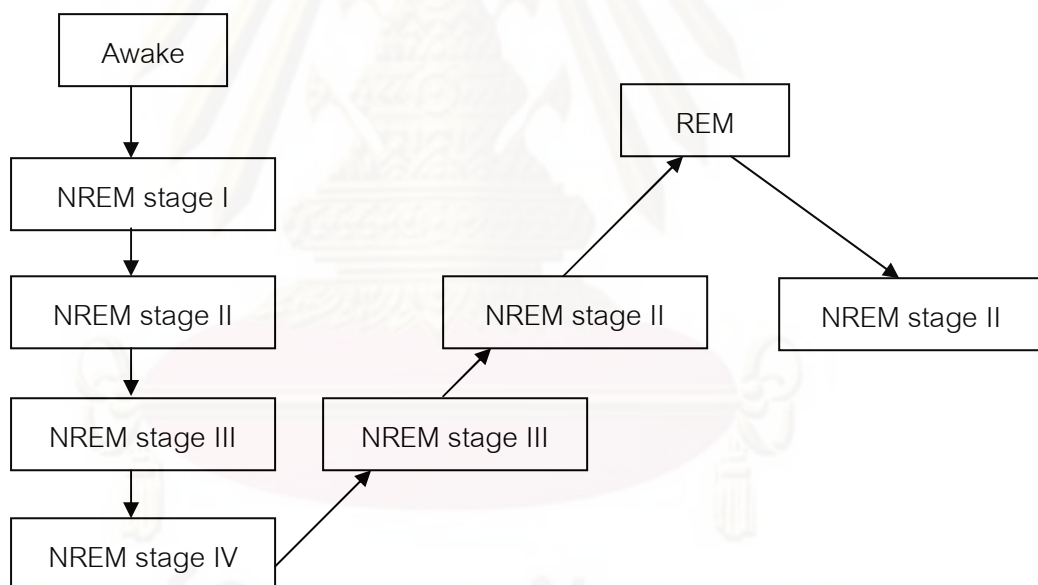
### **2.2.1 Normal Sleep**

Sleep structure and sleep duration are influenced by a multitude of factors and vary considerably from person and person (Tucker, 2007). Most adults need approximately 8 hours of sleep each night, but that can vary from person to person, ranging from 6 to 10 hours (Lundt, 2006). Normal sleep can be further characterized by effortless sleep onset, infrequent nocturnal awakenings of short duration, and natural sleep offset without reliance on an alarm clock or other artificial means of arising in the morning (Tucker, 2007).

### **2.2.2 Stages of Sleep and Sleep cycle**

Sleep is a highly structured and well-organized activity following a circadian periodicity that is regulated by the interplay of internal biologic processes (e.g., melatonin) and environmental (e.g. daylight) factors. Normally, an individual first enters sleep through nonrapid-eye-movement (NREM) sleep, which is also called quiet sleep, because most physiologic functions are slowed down during this period. NREM sleep is subdivided into four stages, from stage 1 to stage 4. From an initial state of drowsiness preceding sleep onset, the individual first drops to stage 1 (transitional phase between wakefulness and sleep) and progressively moves into stage 2 (nonequivocal physiologic sleep), stage 3, and stage 4. Stage 3 and stage 4

sleep is also called delta or slow-wave sleep. This initial sequence is followed by a return from stage 4 to stage 3 and stage 2, leading to the first rapid-eye-movement (REM) episode. REM sleep, also called paradoxical sleep, is characterized by electroencephalographic activation, muscle atony, REMs, and dreams. The duration of this cycle is approximately 90 minutes and is generally repeated four or five times throughout the night, with REM episodes of increasing duration. The last third of the night is mostly characterized by REM sleep, whereas delta sleep is predominant at the beginning of the night (Savard and Morin, 2001).



**Figure 1** A normal adult sleep cycle (Lymberis, 2000)

## **2.3 Insomnia**

### **2.3.1 Definition of Insomnia**

American Psychiatric Association (2000) defined insomnia as a predominant complaint is difficulty initiating or maintain sleep or nonrestorative sleep, for at least 1 month. The sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Lymberis (2000) characterized insomnia by the subjective sense that sleep quality is poor and inadequate. The sleeper will complain of difficulty initiating sleep, sleeping too lightly, easily disrupted sleep with many spontaneous arousals, or early-morning awakenings (Lymberis, 2000).

Savard and Morin (2001) defined insomnia as heterogeneous complaint that may involve (1) difficulties falling asleep (initial or sleep onset insomnia), (2) trouble staying asleep with prolonged nocturnal awakenings (middle or maintenance insomnia), (3) early morning awakening with inability to resume sleep (terminal or late insomnia), or (4) nonrestorative sleep.

Carrol (2004) defined insomnia as a symptom of perceived reduction in the quantity or quality of sleep and is not a single clinical entity.

American Academy of Sleep Medicine (2005) defined insomnia as a complaint of difficulty initiating sleep, difficulty maintaining sleep, or waking up too early, or sleep that is chronically nonrestorative or poor in quality. The sleep difficulty occurs despite adequate opportunity and circumstances for sleep.

National Institutes of Health (2005) defined insomnia by complains of disturbed sleep in the presence of adequate opportunity and circumstance for sleep. The disturbance may consist of one or more of three features: (1) difficulty in initiating sleep (2) difficulty in maintaining sleep, or (3) waking up too early.

Banno and Kryger (2006) characterized insomnia by difficulty in sleep initiation, maintenance duration or quality that occurs despite adequate time and opportunity for sleep, along with daytime consequences such as fatigue, sleepiness, mood disturbances, cognitive difficulties, and social or occupational impairment.

World Health Organization (2007) defined insomnia is a condition of unsatisfactory quantity and/or quality of sleep, which persists for a considerable period of time, including difficulty falling asleep, difficulty staying asleep, or early final waking. Insomnia is a common symptom of many mental and physical disorders, and should be classified here in addition to the basic disorder only if it dominates the clinical picture.

Passarella and Duong (2008) defined insomnia as a subjective complaint of poor sleep quality or quantity despite adequate time for sleep, resulting in daytime fatigue, irritability, and decreased concentration.

In summary, insomnia can be defined as a symptom of perceived reduction in the quantity or quality of sleep at least 1 month because of one or more of difficulty falling asleep, difficulty staying asleep with prolonged nocturnal awakenings, waking up too early with an inability to resume sleep.

These symptoms occurred along with clinically significant distress or impairment in social, occupational, or other important areas of functioning.

### **2.3.2 Insomnia Classification**

From literature review, various insomnia classifications have been proposed.

The ways to classify based on specific symptoms, duration of symptoms, and based on etiology.

#### **Classified based on Specific Symptoms:**

There are 4 symptoms which have been considered as insomnia including difficulty initiating sleep, difficulty to maintain sleep, early morning awakening, or nonrestorative sleep.

#### **Classified based on Duration of Symptoms:**

One method is based on duration of symptoms, identifying insomnia as either chronic (long-term) or acute (transient). A 2005 National Institutes of Health (NIH) State-of-the-Science statement pointed out that time periods of various durations have been used to define chronic insomnia, ranging from 30 days to 6 months. The transient/chronic distinction can be clinically relevant, in as much as transient insomnias often result from specific environmental or social events, such as shift work, death of a loved one, air travel, and noise, and may be more appropriately managed by addressing these stressors and by managing the insomnia directly and often prophylactically. On the other hand, chronic insomnia may be more often related to intrinsic sleep disorders, primary insomnia, or chronic medical and psychiatric conditions, and may require a more extensive evaluation (including assessment of comorbid conditions) in order to delineate appropriate treatment (Doghranji, 2006).

**Classified based on the basis of Etiology:**

Insomnia can be classified on the basis of etiology into primary and secondary subtypes.

Primary insomnia indicates that the insomnia is not caused by any known physical or mental condition but is characterized by a consistent set of symptoms, a defined disease course, and a general responsiveness to treatment. Although the etiology of primary insomnia has yet to be clarified, recent research implicates endocrine, neurologic, and behavioral factors as contributing to its pathogenesis.

Secondary insomnia, in contrast, has been defined historically as insomnia resulting from other medical and psychiatric illnesses, medication use, or other primary sleep disorders. The 2005 NIH State-of-the-Science statement has suggested the use of the term comorbid insomnia, instead of secondary insomnia, based on a limited level of understanding of the causal relationships which may exist between insomnia and coexisting disorders. Conceivably, primary insomnia can coexist as an independent entity in the context of another disorder, as opposed to being caused by it (Doghranji, 2006).

**2.3.3 Insomnia in Patients with Heart Failure**

Heart failure was associated with insomnia in a study of 3,445 patients with chronic illness (Katz and McHorney, 1998). Insomnia was the top two most common of sleep disturbance among patients with heart failure (Brostrom and Johansson, 2005; Principe-Rodriguez et al., 2005). In addition, the empirical data reported high prevalence of insomnia in patients with heart failure. Brostrom and Johansson (2005) conducted a secondary analysis from 182 abstracts published during 1989-2004 which was relevant to sleep disturbance in patients with heart failure. The results revealed that approximately 33 % of patients had insomnia (Brostrom and Johansson, 2005).

Moreover from another study revealed that 31.3% of patients with heart failure reported the symptoms suggesting the presence of insomnia in a tertiary care heart failure clinic (Principe-Rodriguez et al., 2005).

In EuroHeart survey of 187 patients with heart failure found that 63% of patients had difficulties to get to sleep, 69% woke up during the night and had difficulties to get back to sleep, while 60% of patients reported the lack of refreshing sleep (Lainscak and Keber, 2003). Consistency with a study of 84 patients was recruited from out-patient heart failure clinic. The result of this study found that 40% reported trouble falling asleep and 39% awakening early, heart failure patients also reported 4.2 naps each day and 32 % use of sleeping pills (Erickson et al., 2003).

Moreover, the data from a cross-sectional study of 223 patients (male 133 patients and female 90 patients) with HF, New York Heart Association classification II-IV, which were recruited from medical ward, heart failure clinic and primary health care centers showed that 46.7 % of female reported difficulty maintaining sleep. 36.6% of female and 36.9% of male had early morning awakenings. Twenty-five percent of all patients awaked 1-3 hours per night (Brostrom et al., 2004).

A total of 6 % was awake more than 3 hours per night. A total of 36% of the patients stated that they did not get enough sleep and 35% perceived they slept too much (Brostrom et al., 2004). From another study, Redeker and Stein (2006) used actigraph to measure sleep variable. The result revealed that percentage wake after sleep onset 10.56, frequency of wake bouts 56.11, duration of wake bouts (min) 1.21, nocturnal activity count (counts/min) 4.73 and sleep latency 27 minutes. They reported that the patients with heart failure had a significantly higher percentage of wakes after sleep onset and more frequent wake bouts when compare with general population (Redeker and Stein, 2006). Johansson et al. (2007) studied in 212 heart

failure patients. They reported that the most common type was non-restorative sleep, reported as a major complaint by 44% of the patients. Major complains of difficulty in maintaining sleep, difficulty in initiating sleep and early morning awakenings were reported by 23%, 19% and 15% of the patients.

#### **2.4 Negative Clinical Outcome of Insomnia**

Insomnia can impact to physical, psychological, health related quality of life and increased health care cost.

Physical impact including elevate heart rate, increased heart rate variability suggestive of increased sympathetic and decreased parasympathetic activity, adverse hemodynamic consequences for the failing heart, potentially debilitating symptoms of heart failure, elevated 24-hour whole body metabolic rate greater brain metabolism, increased cortisol and catecholamine secretion, increased interleukin-6 excretion, increased beta electroencephalogram (EEG) activity (Becker, 2006; Bonnet and Arand, 1995; Bonnet and Arand, 1998; Brostrom et al., 2001; Burgos et al., 2006; Daley et al., 2009; Hayes et al., 2009; Javaheri, 2008; Michael, 2005; Perlis et al., 2001; Vgontzas et al., 1998).

Moreover, insomnia could lead to fatigue, tiredness, lethargy, loss of concentration reduction of attention and concentration, listlessness memory lapses, slowed reaction time, poor coordination, increased daytime sleepiness, increased morbidity in terms of health problem.

Psychological impact including decreased feelings of well-being during the day, deterioration of mood and motivation, listlessness, loss of temper anxiety or worry about sleep, mental fatigue and depressive mood (American Psychiatric Association, 2000; Becker, 2006; Brostrom et al., 2001, Ohayon and Reynolds, 2009),



Health-related quality of life: a study focusing primarily on patients with heart failure suffering from insomnia found significantly lower HRQOL in almost all dimensions of the generic SF-36 compared to patients without sleeping difficulties, as well as to the normal population (Brostrom et al., 2004). In the same study, the disease-specific Minnesota Living with Heart Failure Questionnaire showed significantly reduced HRQOL regarding total and subscale scores for patients suffering from sleeping difficulties compared to patients without sleeping difficulties. Zambroski et al. (2005) studied in 53 patients found that difficulty sleeping was the most burdensome symptom which significant associated with health-related quality of life in patients with heart failure.

## **2.5 Assessment of Insomnia**

Several ways to assessment insomnia; both of subjective insomnia assessment and objective insomnia assessment.

### **2.5.1 Subjective Insomnia Assessment**

Subjective insomnia assess includes clinical interview, self-report questionnaire, and sleep diary.

#### **Clinical Interview**

The clinical interview is the most important component of an insomnia assessment because it is the springboard from which the clinician formulates hypotheses regarding etiologic factors and bases treatment decisions. In addition to a comprehensive assessment of the insomnia complaint and sleep history, the clinical interview should include evaluation of medication and substance use and medical and psychiatric issues (Edinger and Mean, 2005).

### **Self-Report Questionnaire**

There were several self report questionnaires evaluated of various dimension of insomnia including Insomnia Severity Index, The Pittsburgh Sleep Quality Index, the Athens Insomnia scale, and the Insomnia severity questionnaire.

#### **Insomnia Severity Index**

This self-administration questionnaire which specific measure insomnia symptoms, the scale contain corresponds in part to DSM-IV criteria for insomnia, and measures the subject's perception of symptom severity, distress, and daytime impairment. There are 7 items include: the severity of sleep onset and maintenance (middle and early morning awakening) difficulties, satisfaction with current sleep patterns, interference with daily functioning, appearance of impairment attributed to the sleep problem, and the degree of concern caused by insomnia (Smith and Wegener, 2003).

#### **Sleep Diaries**

A sleep diary was used to record daily bed times, times of sleep onset, times and durations of awakenings during the sleep period, final awakening time, and nap times during the day (Redeker and Hilkert, 2005). Self-report sleep diaries play a vital role in the assessment and treatment of insomnia, providing valuable information to both the patients and the physician. Patients should complete at least 1 week of sleep diaries, recording each night's bedtime, arising time, sleep-onset latency, number and duration of nighttime awakenings, time of last awakening, naps, medication intake, and some measurement of sleep diary (Morin and Espie, 2003 cited in Morin, 2004).

## **2.5.2 Objective insomnia assessment**

Objective insomnia assessment including polysomnography and actigraphy.

### **Polysomnography**

Polysomnography, or all-night sleep recordings, is considered the most accurate measure of sleep and yields measures of specific sleep stages. Polysomnography monitors sleep-related physiologic parameters such as respiratory, neuromuscular, cardiac, gastrointestinal, and endocrine functions. Five Parameters may be measured by electroencephalogram (EEG) (the core of polysomnography), electrooculogram (EOG), electrocardiogram (ECG), or electromyogram (EMG) readings (Beck et al., 2004). However, polysomnography is indicated only when there are symptoms of other sleep disorders (e.g. sleep apnea, periodic limb movements, narcolepsy), the presenting complaint is excessive daytime sleepiness, or the patients with insomnia is unresponsive to treatment (Morin, 2004).

### **Actigraphy**

Actigraphs are small computerized devices that record and store data generated by movement. Modern actigraphs are the size of wristwatches and can record data continuously for days, weeks, or longer. Actigraphy is general term for any of several systems for recording and analyzing devices and producers and software for collecting data, transferring it to a computer, and analyzing the digital record for levels of activity /inactivity or with scoring algorithms to provide estimates of sleep and wake for aggregated epochs of continuously sampled movement data (Acebo, 2006). The actigraph has the advantage of being a nonintrusive tool for assessing sleep in a natural environment (Vallieres and Morin, 2003).

Because insomnia is a subjective symptom therefore the appropriated assessment is self-reported questionnaire. From all self-reported questionnaire,

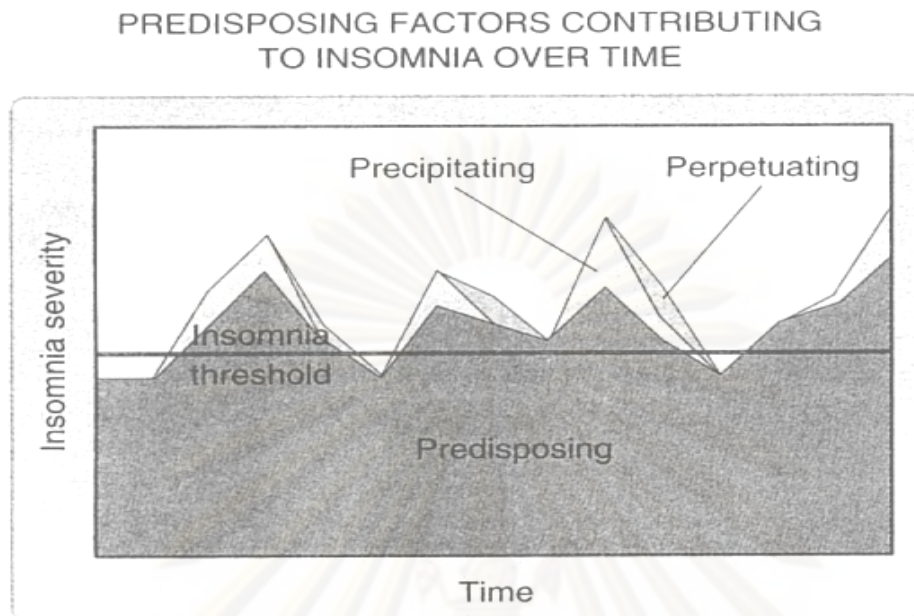
Insomnia Severity Index is a typical measure insomnia which has good validity and reliability and also corresponds with DSM-IV criteria for insomnia.

## **2.6 The 3P Model of Insomnia**

The origin of this model came from Spielman (1986). He presented tripartite schematization. Three categories have been proposed in this schematization as follows: (1) Predisposing condition (2) Precipitating circumstances (3) Perpetuating factor. These factors have been tested in several groups of healthy people and illness people.

The lastest version of this conceptual model is called the 3P Model of Insomnia (Glovinsky and Spielman, 2005). The 3P model of insomnia was conducted to identify and categorize the causes of insomnia. The 3P Model suggests that three distinct elements account for the onset and course of insomnia:

(1) Predisposing characteristics found within individuals that render them more susceptible to develop a particular type of insomnia. Individual traits or characteristics may set the stage of insomnia. Many such factors appear to be present on an inherited basis-indeed; these are likely to be responsible for the quick emergence in infancy of the good sleepers and poor sleepers. But sometimes, it is an acquired characteristic that indirectly leads to insomnia (i.e. physical hyperarousal, cognitive hyperarousal, night owls and morning larks, anxiety and depression).

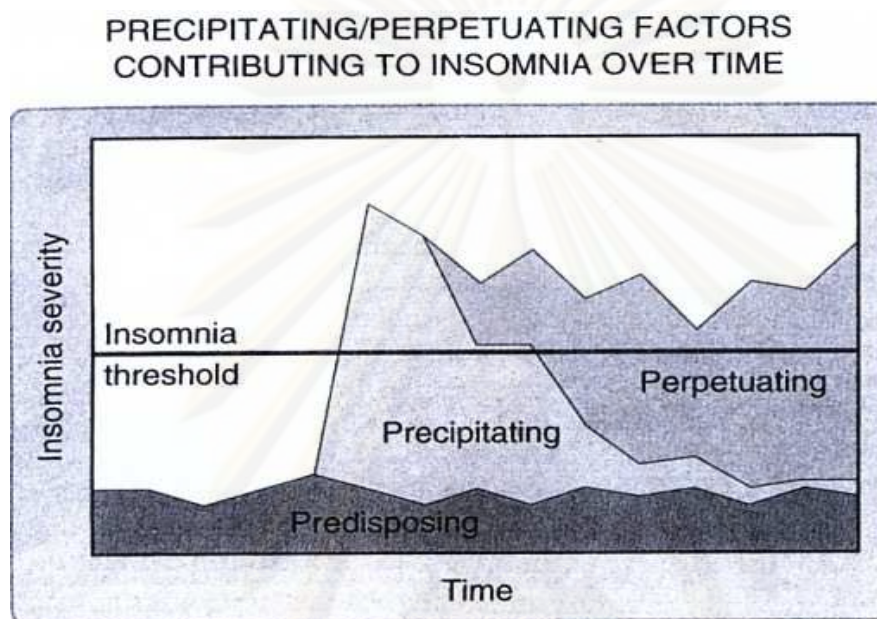


**Figure 2** Predisposing characteristic contributing to insomnia over time

Figure 2 depicts all three factors in the 3P Model at work, it illustrates how Predisposing characteristics may be primary in a given case, and how people who possess strong risk factors for insomnia, such as physiological hyperarousal, may be prone to episodic insomnia. Arousal is easy to trigger in these individuals, whereas dampening this activation after stress hormones have flooded their systems or excitatory impulses have stamped through their brains may be harder to achieve. The figure illustrates predisposing characteristics so strong that it takes only very small precipitating events to induce repeated bouts of sleeplessness.

(2) Precipitating events, often outside the individual's control, that can trigger sleep disturbance. This factor is changes in routine that throw both our waking lives and our sleep out of balance. Precipitating events often arrive abruptly, as with the pain triggered by a herniated disc, the grief of losing a loved one, the disorientating of retirement, or the anxiety touched off by assuming new work responsibilities.

Precipitating events can also build gradually, such as when tensions mount in a failing marriage or when a student falls behind on semester's coursework (i.e. family conflicts, work-related stress, health issues, death of a loved one or other loss).



**Figure 3**

Figure 3 show a stressful event precipitates insomnia. The stress resolves but sleeplessness persists, perpetuated by maladaptive attitudes and practices.

(3) Perpetuating attitudes and practices: when most people suffer through a poor night of sleep, they feel sleepy the next day. Sleep is supposed to be self-correcting: sleep loss increases the drive for sleep; it incurs a "sleep debt." This debt should be experienced as increased sleepiness during waking hours. It should then lead to more sleep of deeper intensity when bedtime rolls around again, which in turn should pay back the sleep debt. The problem may have less to do with sleep and more with the way to cope with sleeplessness. Each disastrous night may trigger shifts in thoughts and attitudes about sleep, confidence, behaviors surrounding bedtime, diet, sleep schedule, and other key determinants of sleep quality. Many people think these

changes are compensating for loss of sleep, but in fact they often serve to prolong the sleep problem (i.e. getting into bed early, stay in bed late, spending extra time in bed, napping, caffeine, sleep medication and worrying about sleep or daytime functioning).

This model is appropriated with this study because the model provides comprehensive factors which lead to insomnia and also this model is the most popular framework for understanding insomnia among the community of sleep experts and has been tested with several groups of general people and various groups of patients.

## **2.7 Related Factors of Insomnia in Patients with Heart Failure**

According to the 3P Model of Insomnia, related factors of insomnia in the previous studies, related factors of insomnia in patients with heart failure would be as follows:

### **2.7.1 Predisposing Factors**

#### **Age**

Age related changes in sleep initiation, sleep maintenance, sleep length (Floyd et al., 2000). The total amount of sleep and the ability to initiate sleep decreases with age, while waking frequency and the duration of waking episodes increase (Floyd et al., 2000). At the age of 20 years the sleep efficiency is still usually around 95%, but it then falls progressively. By 35 years the duration of stage 4 NREM sleep is only around 6% of the total sleep time which is only half of what it is at 20. Wakefulness at night is twice as prolonged and the duration of stage 1 NREM sleep is increased slightly at around 5% of total sleep time. The percentage of REM sleep remains constant at around 22–25% throughout early and middle adult life, but REM density gradually falls. Changes in the circadian rhythms prevent subjects over the age of around 45 from adapting as fast and as completely to changes in sleep

patterns, e.g. shift work. Other environmental factors such as a reduction in exposure to light due to indoor employment, restriction of sleep time and medical and psychological disorders influence sleep patterns (Shneerson, Ohayon, and Carskadon, 2008).

Almost all epidemiological studies reported an increased prevalence of insomnia symptoms with age, reaching close to 50% in elderly individuals (65 year old). Some studies found lower rates in middle-aged individuals, while still other studies reported an increasing prevalence with age. The prevalence of insomnia diagnoses is stable between 15-44 years; it increases from 45 years of age but the prevalence remains the same in elderly individuals (Ohayon, 2002).

A study in Korean adults reported that insomnia was being higher in those aged 60-69 years than in those aged 20-29 years (OR = 2.368) (Cho et al., 2009). Another one research, Kappler and Hohagen (2003) studied 2,512 patients in general practice found that age was the most powerful predictors of insomnia. Moreover, Nongluk Anunta-ard (2007) was reported that age had positive relationship with insomnia in hematological malignancies ( $r = .316$ ). Specific on patient with heart failure found that age was not correlated with sleep disturbance in patients with heart failure. However, this study had small sample size, only 84 patients were included and this study focus on sleep disturbance not scope on insomnia.

### **Gender**

Women had more insomnia than men because of normal physiologic periods, including puberty, menstruation, pregnancy, and menopause, they are associated with alterations in sleep patterns (Krishnan and Collop, 2006).



Women are more likely than men to report insomnia symptoms. Menopause is often offered as an explanation for the discrepancy between men and women in the prevalence of insomnia in mid-aged subjects (Ohayon, 2002).

Prior research found that female was significant correlated with insomnia in hematological malignancies (Nongluk Anunta-ard, 2007). A another one study found that female reported difficulty in initiating and sleep difficulty in maintaining sleep and that early morning awakening more than male. Females were about 1.6 times at higher risk for insomnia than males (Lia et al., 2002). Moreover, one study at out-patient of the family medicine department, this studied reported that female had strong correlation with insomnia (Saisunee Tubtimtes et al., 2009). Scope to patients with heart failure, one study found that male gender was related to trouble returning to sleep but male gender was not a predictor of sleep disturbance (Erickson et al., 2003).

### **Anxiety**

Anxiety has been defined by Spielberger (1972) as an organismic emotional state, consisting of “unpleasant, consciously perceived feelings of tension and apprehension, with associated activation or arousal of the autonomic nervous system. Anxiety is a diffuse apprehension that is vague in the nature and associated with feelings of uncertainty and helplessness. Feelings of isolation, alienation, and insecurity are also present. Anxiety is an emotion and a subjective individual experience. It is an energy and cannot be observed directly (Stuart, 2009).

### **Level of Anxiety**

Peplau (1963) indentified four levels of anxiety and described their effects:

1. Mild anxiety is associated with the tension of day-to-day living. During this stage the person is alert and the perceptual field is increased. The person sees, hears,

and grasps more than before. This kind of anxiety can motivate learning and produce growth and creativity.

2. Moderate anxiety, in which the person focuses only on immediate concerns, involves the narrowing of the perceptual field. The person sees, hears, and grasps less. The person blocks selected areas but can attend to more if directed to do so.

3. Severe anxiety is marked by a significant reduction in the perceptual field. The person tends to focus on a specific detail and does not think about anything else. All behavior is aimed at relieving anxiety, and much direction is needed to focus on another area.

4. Panic is associated with awe, dread, and terror, and the person feeling, it is unable to do things even with direction. Panic involves the disorganization of the personality and can be life threatening. Increased motor activity, decreased ability to relate to others, distorted perceptions, and losses of rational thought are all symptoms of panic (Stuart, 2009).

From integrated review anxiety was prevalent among patients with heart failure (Konstam et al., 2005). From a study in heart failure patients, who followed-up at out-patient department found that more than half of the participants reported anxiety (65.9%) (Phuangphaka Krethong, 2007).

Anxiety which is common among patients suffering from heart failure often has a distinctly disturbing effect on sleep (Biliard, 2003). Anxiety can inhibit sleep outright through heart racing, muscle tightening, obsessive thinking, or other means. Anxiety brings psychophysiological changes that interfere with sleep onset and sleep maintenance (Glovinsky and Speiman, 2006).

A study with a qualitative design explored causes of insomnia in 25 patients with congestive heart failure (Brostrom et al., 2001). They found that anxiety is one of the factors, causing sleep disturbances. According to a study of Spormaker and Bout (2005) it was reported that anxiety correlated with insomnia in adult ( $r = .53$ ). Another one study of Jansson and Linton (2006) reported that anxiety associated with insomnia (OR: 4.61) in community people. Moreover, anxiety was significant correlated with insomnia in patients with cancer (Pattarieya Keawphang, 2004). Another one study at out-patient of the family medicine department, this studied reported that female had strong correlation with insomnia (Saisunee Tubtimtes et al., 2009).

### **Depression**

Depressive symptomatology may reflect the psychological stress of coping with the disease, may be caused by the disease process itself or by the medication used to treat it or may simply coexist in time with the medical diagnosis. Between 20-30% of cardiac patients manifest a depressive disorder (Reus, 2001).

Depression is a common health problem. People may become depressed as a result of injury or illness. Clinical depression is distinguished from everyday feelings of sadness by its duration and severity. Most people occasionally feel down or depressed, but these feelings are short-lived and do not result in impaired functioning (Smeltzer et al., 2008). From integrated review depression was prevalent among patients with heart failure (Konstam et al., 2005). More than half of the participants reported depression or felt down and blue (50.7%) (Phuangphaka Krethong, 2007).

Depression commonly causes insomnia with difficulty falling asleep, waking and being unable to fall back to sleep, or waking early in the morning (Lippincott, Williams, and Wilkins, 2005). Depressed people exhibit a number of other sleeps

disturbances in addition to insomnia, including reduced deep sleep, increased light sleep, and excessive dream sleep. They enter dream sleep earlier in the night and spend a greater percentage of time in dream sleep than non-depressed individuals (Jacobs, 2007).

Studies have shown that depression was a significant positive correlation with insomnia in cancer patients (Nongluk Anunta-ard, 2007; Pattarieya Keawphang, 2004). Moreover, previous researches in the community reported that people with insomnia had greater depression levels than people who had no insomnia and were 9.82 times more likely to have clinically significant depression (Taylor et al., 2005).

### **2.7.2 Precipitating Factors**

#### **Marital status**

Complex personal relationships, social stress, the gradual dissolution of the traditional family structure and marriage-related problems may have contributed to the higher likelihood of insomnia in the married/divorced/widowed group (Xiang et al., 2008). Married, separated, divorced and widowed marital status were factors for all types of insomnia in Chinese people (Xiang et al., 2008). Another research in 12,778 French population found that 34% of widows, 24% of divorcees, 21% of married or living together and 16% of single individual had difficulty in initial sleep (Leger et al., 2000). Moreover, one study in breast cancer patients reported that widowhood significantly associated with the presence of insomnia symptoms (Savard et al., 2001).

#### **Dyspnea**

Dyspnea, breathlessness, and shortness of breath are interchangeable terms used by health care providers to describe reports by patients of breathing discomfort (Caroci and Lareau, 2004).

Dyspnea due to heart failure is generally precipitated or exacerbated by exertion and results from elevated left atrial and pulmonary venous pressures from hypoxia, the former are most commonly caused by left ventricular systolic dysfunction, left ventricular diastolic dysfunction (due to hypertrophy, fibrosis, or pericardial disease), or valvular obstruction. Exertional dyspnea is an anginal equivalent. The acute onset or worsening of left atrial hypertension may result in pulmonary edema. Hypoxia may be due to pulmonary edema or intracardiac shunting.

Orthopnea is dyspnea that occurs in recumbency and results from increase in central blood volume. Paroxysmal nocturnal dyspnea is shortness of breath that occurs abruptly 30 minutes to 4 hours after going to bed and is relieved (after 10 or 20 minutes) by sitting up or standing up; this symptoms is more specific for cardiac disease (Massie and Granger, 2005).

Dyspnea is a respiratory distress that occurs as the result of increased effort in breathing, it is the most common symptoms of heart failure (Lainscak and Keber, 2003). From a study of heart failure patients in Thailand, shortness of breath or dyspnea was reported in more than half of the participants (64.5%) (Phuangphaka Krethong, 2007).

Dyspnea can be present also during the night, especially in the advanced stage of the condition. One can experience either orthopnea or paroxysmal nocturnal dyspnea, causing sleep disturbances, lack of refreshing sleep and daily sleepiness (Lainscak and Keber., 2003).

From a qualitative study in patients with congestive heart failure in sleep situation found that dyspnea affected the sleep negatively (Brostrom et al., 2001). According to a research of Principe-Rodriguez et al. (2005), paroxysmal nocturnal dyspnea correlated with insomnia in patients with heart failure.

### **Sleep Disorder Breathing**

Sleep disordered breathing (SDB) encompasses a wide range of sleep-related respiratory abnormalities and is characterized by repeated pauses in breathing during sleep or abnormalities in the level of ventilation during sleep (Lavie, 2007).

The prevalence of sleep disorder breathing has been estimated to be between 45-82% with patients with heart failure (Brostrom and Johansson, 2005).

Obstructive sleep apnea (OSA), the most common such disorder, is characterized by the repetitive collapse or partial collapse of the pharyngeal airway during sleep and the need to arouse to resume ventilation. Cheyne-Stokes respiration, another type of sleep disorder breathing, is characterized by a crescendo - decrescendo pattern of respiration and is commonly seen during sleep in patients with congestive heart failure (National Heart Lung and Blood Institute, 2008).

Obstructive sleep apnea related with complaints of insomnia and unrefreshing sleep (Sidney and Lichstein, 2005).

Moreover, obstructive sleep apnea leads to arousals and awakenings during sleep (Roth and Drake, 2004). Central sleep apnea is usually associated with insomnia complaints of difficulty maintaining sleep. The apnea-related awakenings sometimes begin with a gasp for air and a sensation of choking (Sidney and Lichstein, 2005).

Problematic insomnia symptoms were reported by 50% of a representative sample of patients with objectively diagnosed sleep disorder breathing (Krakow, 2001).

Moreover, the prior research found that the difficulty in initiating sleep correlated significant with sleep disorder breathing (Johansson et al., 2009).

### **Functional Status**

Functional status is defined as the conceptual universe through which a person or population's ability to undertake activities designed to meet basic needs, fulfill life roles, and maintain health and wellbeing (Leidy, 1994 cited in Miller-Davis, Marden, and Leidy, 2006).

NYHA functional classification is commonly used to indicate functional status in cardiac patients. Functional status limitations will make heart failure patients unable to perform their normal activities (Stewart et al., 2004).

NYHA Functional Classification, it places patients in one of four categories based on how much they are limited during physical activity. Functional class I mean no symptoms and no limitation in ordinary physical activity, functional class II means mild symptoms and slight limitation during ordinary activity. Comfortable at rest, functional class III means marked limitation in activity due to symptoms, even during less-than-ordinary activity. Comfortable only at rest and functional class IV means severe limitations. Experiences symptoms even while at rest.

The prior study found that NYHA class II to IV had moderate or major complaints of difficulty initiating sleep in patients with heart failure (Brostrom et al., 2004). In addition, the previous study found that NYHA was correlated with insomnia in patients with heart failure (Principe-Rodriguez et al., 2005).

### **2.7.3 Perpetuating Factors**

#### **Sleep Hygiene**

Sleep hygiene refers to the various lifestyle and environmental forces that influence the regulation of sleep (Tucker, 2007). The term sleep hygiene was first used by Peter Hauri in the context of providing recommendations for patients to help them improve their insomnia (Hauri, 1977 cited in Stepanski and Wyatt, 2001).

The International Classification of Sleep disorders published in 1991 introduced a diagnostic category called inadequate sleep hygiene (Stepanski and Wyatt, 2001). In the 2005 revised edition of the International Classification of Sleep Disorders (ICSD-2), inadequate sleep hygiene is classified as one of 11 sleep disorders attributed to insomnia (American Academy of Sleep Medicine, 2005). Inadequate sleep hygiene practices are evident as indicated by the presence of at least one of the following: improper sleep scheduling consisting of frequent daytime napping, selecting highly variable bedtimes or rising times, or spending excessive amounts of time in bed. Routine use of products containing alcohol, nicotine, or caffeine, especially in the period preceding bedtime. Engagement in mentally stimulating, physically activating, or emotionally upsetting activities too close to bedtimes, frequent use of the bed for activities other than sleep (such as television watching, reading, studying, snacking, thinking, planning, failure to maintain a comfortable sleeping environment ) (Herdegen, 2009).

Spending extra time in bed will generally increase night-to-night variability, oversleeping in the morning leading to more difficult falling asleep on subsequent nights and increased anxiety regarding bedtime, perpetuating a vicious cycle, daytime napping may make it difficult to fall asleep later that night (Glovinsky and Spielman, 2006).

Daytime napping may indeed perk up, but the cost of diminishing sleep drive, less often appreciated is that a brief nod in the evening, or even just hovering at the edge of sleep while watching TV, may make it difficult to fall asleep later that night. Caffeine and nicotine, both central nervous system stimulants, can impede sleep onset and reduce sleep efficiency and quality. Alcohol consumption prior to bedtime can lead to more fragmented sleep, early morning awakenings, and subsequent difficulty



falling back asleep. A vicious cycle can also result when alcohol is explicitly used as a sleeping aid. Regular exercise in late afternoon or early evening can deepen sleep as a result of the subsequent rebound cooling effect. Conversely, exercising too close to bedtime can have a stimulating effect and delay sleep onset. It is important to minimize noise, sleep in a very dark bedroom, avoid excessive temperature in the bedroom (Morin et al., 2001).

Surang Lertkacharn and Somporn Jarutinkorn (2000) studied in sleep hygiene of Thai chronic non-organic insomniacs. The result found that 83% of patients had poor sleep hygiene. Most of the factors of poor sleep hygiene were irregular sleep/wake schedules, spending extended amounts of time in bed awake, engaging in exciting or emotionally upsetting activities close to bedtime, daytime naps, poor sleep environment, routine use of alcohol, caffeine, or nicotine near bedtime. Another study of Nongluk Anunta-ard (2007) found that sleep hygiene was significant positive correlations with insomnia in hematological malignancies patients.

### **Dysfunctional Beliefs and Attitudes about Sleep**

Alterations in beliefs and attitudes about sleep that in turn affect sleep itself. People who do not sleep well end up doing a lot more thinking about sleep and about themselves as sleepers and much of this extra thinking is decidedly unhelpful (Glovinsky and Spielman, 2005). Chiefly, poor sleepers experience an alteration in their self-image. As a fundamental aspect of life veers out of the control and their daytime functioning plummets, insomnia develop a general sense of vulnerability. Their self-esteem, sense of well-being, and mood are all threatened. Their quality of life suffers, leading to an ever greater focus on sleep.

The vicious cycle of worrying about sleeplessness leading to increased arousal leading to worsening sleep in an all too common outcome. In addition to changes in self-image, the experience of insomnia leads to distortions in attitudes and beliefs about sleep itself (Glovinsky and Spielman, 2005). Dysfunctional beliefs and attitudes about sleep are presumed to play an important role in perpetuating insomnia. These cognitive can be grouped in the following categories: (1) unrealistic sleep requirement expectations, (2) faulty appraisals of sleep difficulties, (3) misattributions of daytime impairments, and (4) misconceptions about the causes of insomnia (Savard and Morin, 2001).

From a study of Pattarieya Keawphang (2004) in cancer patients found that belief about sleep was significant positive correlation and insomnia of cancer patients.

Consistency with Griffiths (2005) studied in undergoing elective cardiac or orthopedic surgery during three months period. The result revealed that dysfunctional cognition about sleep is one of the three factors which could predict chronic insomnia. Moreover, Carney et al. (2010) studied in 5 community base insomnia clinics, the result shows that maladaptive sleep beliefs is most strongly associated with clinically significant levels of insomnia.

## **2.8 Related Researches**

Surang Lertkacharn and Lertkachatarn Jarutinkorn (2000) conducted a research to study the sleep hygiene of Thai chronic non-organic insomniacs. From the result found that 15 patients (17%) from 88 patients had good sleep hygiene, 73 patients (83%) had poor sleep hygiene. Most of the factors of poor sleep hygiene were irregular sleep/ wake schedules (N = 54), spending extended amounts of time in bed awake (N = 54), engaging in exciting or emotionally upsetting activities close to

bedtime (N = 49), daytime naps (N = 33), poor sleep environment (N = 31), routine use of alcohol, caffeine, or nicotine near bedtime (N = 23).

Brostrom et al. (2001) conducted a research by using a phenomenographic approach in order to describe from a nursing perspective, how patients with congestive heart failure conceived their sleep situation. Twenty informants were selected from a medical ward, a cardiology ward and a specialist clinic. The findings showed that the patients' sleep was affected by their daily activities, the disease itself and cardiac symptoms. The sleep disturbances gave effects such as fatigue, listlessness, loss of concentration and loss of temper. These effects led to a need for daytime sleep, seclusion, counseling and information. Patients handled their sleep disturbances through coping mechanisms related to developed patterns of daily life and through support from their psychosocial environment.

Erickson et al. (2003) studied in symptoms and incidence of sleep disturbance in patients with heart failure and also studied to identify symptoms and population characteristics in relationship with sleep disturbance in 84 adult patients with heart failure. From the result found that severity of heart failure was not a predictor of sleep disturbance and sleep disturbance symptoms in heart failure patients are 51%, unable to sleep flat, 44% restless sleep, 40% trouble falling asleep, 39% walking before needs, 38% restless legs, 11% wake with anxiety, 32% trouble returning to sleep, 32% light sleeper, 32% use sleep pills, 23% stop breathing, 16% difficulty waking, 19% not tired at bedtime, 10% sleep late, 10% heart pain, 8% inappropriate sleep and 6% wake with choking feeling.

Brostrom et al. (2004) studied in 223 patients with heart failure in order to describe self-assessed sleep difficulties, daytime sleepiness, and their relation to health-related quality of life in men and women with heart failure. They used the

Uppsala sleep inventory-chronic heart failure and Epworth sleepiness scale, Medical outcome study 36-item short form health survey, and Minnesota living with heart failure questionnaire. From the result found that the most commonly reported sleep difficulties were initial and maintaining sleep. A total of 21% suffered from daytime sleepiness. Patients suffering from difficulties maintaining sleep, initial sleep, and early morning awakenings reported significantly lower health-related quality of life in almost all dimensions of the SF-36 compared to patients without sleeping difficulties, as well as to the normal population. The disease-specific Minnesota living with heart failure questionnaire showed significantly reduced health-related quality of life.

Redeker and Hilkert (2005) conducted research in order to examine the extent to which sleep was associated with functional performance and mental health among sixty-one persons who had stable systolic heart failure. Patients wore actigraphs to record nocturnal sleep and daily activity for 3 days while living at home and complete The Pittsburgh sleep quality index and the Medical outcome study SF-36 questionnaire. Self-reported sleep quality and actigraph-recorded wake time and wake bout time explained 9% to 20% of the variance in the functional performance variables and mental health, after controlling for age, gender, comorbidity, and NYHA. Time in bed was negatively associated with functional performance. There were no statistically significant relationships between sleep duration and functional performance.

Brostrom and Johansson (2005) conducted secondary analysis in patients with heart failure in 182 abstracts published during 1989-2004, from the result found that sleep disordered breathing (SDB) and insomnia were the most common causes of sleep disturbances and occurs in 45-82% (SDB) and one-third (insomnia) of all patients with heart failure. Sleep disorder breathing cause a disturbed sleep structure

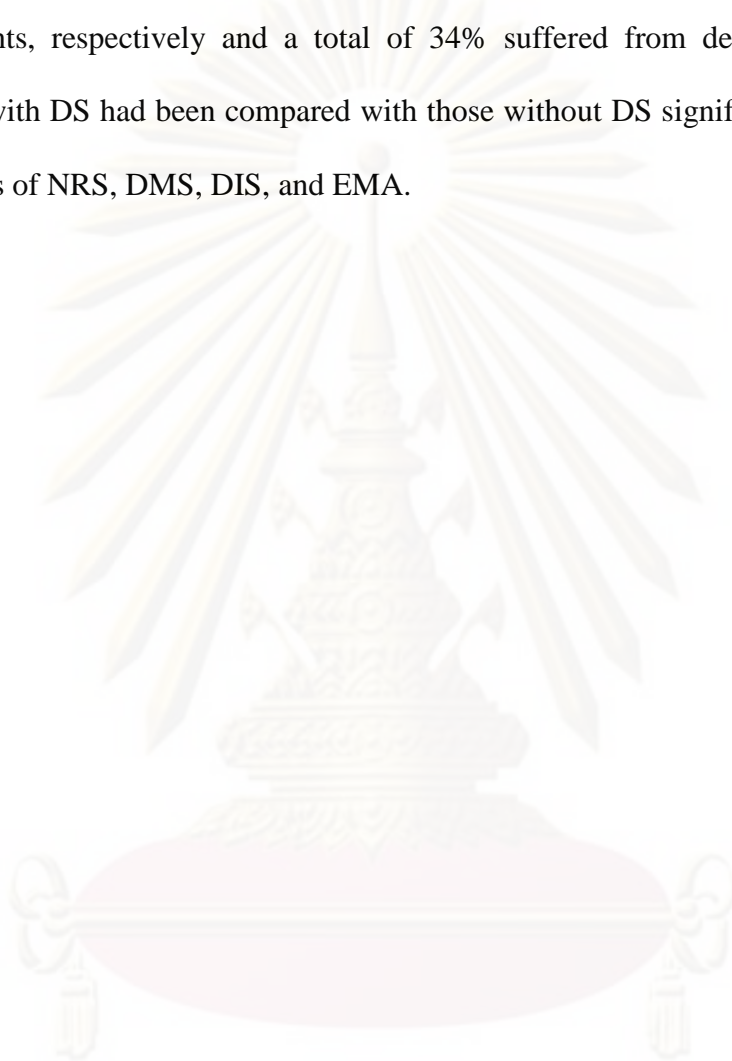
with frequent awakenings, as well as several adverse effects on the cardiovascular system causing increased morbidity and mortality. Insomnia, caused by anxiety, an unknown life situation in relation to the debut of heart failure, or symptoms/deteriorations of chronic heart failure can lead to negative effects on all the aspects of quality of life, as well as daytime sleepiness.

Principe-Rodriguez et al. (2005) studied in 201 heart failure's patients at heart failure clinic to survey sleep symptoms using a standardized questionnaire and correlated symptoms with conventional markers of clinical status. The result showed Sixty-three patients (31.3%) reported symptoms suggesting the presence of insomnia.

Redeker and Stein (2006) used 2-group comparative design to compare the sleep patterns of a sample of patients with stable systolic heart failure and a group of adult participants recruited from the community. The sample of 59 patients with heart failure was recruited from the heart failure/heart transplant out-patient program in the northeastern United States and included male and female patients who had stable NYHA functional class I to IV systolic heart failure, with ejection fractions of 35% or less. The patients with heart failure had a significantly lower percentage of wakes after sleep onset and more frequent wake bouts, as measured with wrist actigraphs. There were no group-related differences in sleep duration. Sixty-seven percent of the patients with heart failure compared with 51% of the comparison group had poor global sleep quality, and from 44% of the patients with heart failure versus, we found that 18.6% of the comparison group reported excessive daytime sleepiness.

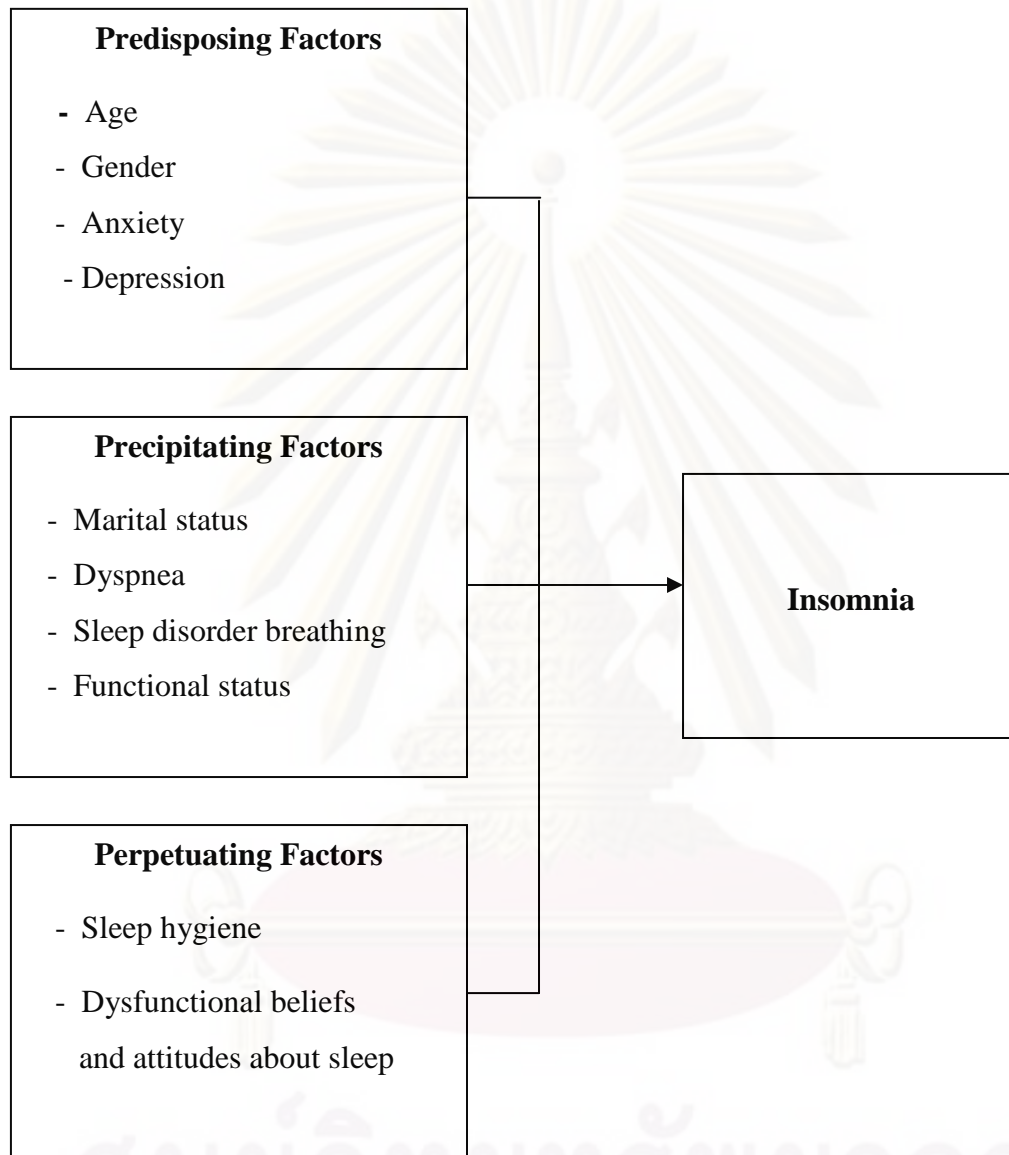
Johnsson et al. (2007) conducted a research to study the association between insomnia and depressive symptoms in patients with heart failure in 212 heart failure patients. They used Uppsala sleep inventory-chronic heart failure so as to assess sleeping difficulties. From the result found that the most common insomnia type was

non-restorative sleep (NRS) reported as a major complaint by 44% of the patients. Major complains of difficulty in maintaining sleep (DMS), difficulty initiating sleep (DIS) and early morning awakenings (EMA) were reported by 23%, 19% and 15% of the patients, respectively and a total of 34% suffered from depressive symptom. Patients with DS had been compared with those without DS significantly more major complains of NRS, DMS, DIS, and EMA.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## Conceptual Framework



## **CHAPTER III**

### **METHODOLOGY**

This chapter describes the research and method including research design, population and samples, sample size determination, sampling method, research instruments, data collection and data analysis, and protection of human subject.

#### **Research Design**

A descriptive research design was used in this study in order to describe characteristics of insomnia, and examine the relationship among the predisposing factors; age, gender, anxiety, depression, the precipitating factors; marital status, dyspnea, sleep apnea, functional status, the perpetuating factors; sleep hygiene, dysfunctional beliefs and attitudes about sleep, and insomnia among patients with heart failure.

#### **Population and Sample**

The population of interest in this study was Thai heart failure patients who attended at out-patient heart clinics of tertiary hospitals in Thailand.

#### **Sample Size Determination**

The sample size which could estimate the prevalence of insomnia in patients with heart failure is below:

$$n = \frac{z^2_{1-\alpha/2} pq}{d^2} \quad (\text{Lemeshow et al., 1990})$$



where  $n$  = sample size

$p$  = estimated prevalence = 0.31  
(the prevalence of insomnia in patients with heart failure  
(Principe-Rodriguez et al. (2005))

$q = 1 - p = 0.69$

$d$  = allowable error in estimating prevalence (margin of error) = 0.05

$\alpha$  = probability of type I error = 0.05 (2-tailed),  $z_{0.025} = 1.96$

$$n = \frac{(1.96)^2(0.21)}{(0.05)^2}$$

$$= 322.69$$

The sample was further increased by 5% to account for contingencies such as non-response or recording error. Therefore the sample was 340 patients. After collecting the data, the final sample was 340 patients. This study had no missing data.

### **Sampling Method**

A multi-stage random sampling procedure was using to select heart failure patients into the study.

1. There were 5 major regions in Thailand, according to Bureau of policy and strategy (2008): North, Northeast, Central, South and Bangkok.

2. Using simple random sampling to select 2 tertiary hospitals in each region of Thailand. Patients with heart failure require advance medical technology, therefore this study was sampling the hospital from tertiary hospital. There were 36 tertiary hospitals in Thailand: 7 tertiary hospitals in the North, 7 tertiary hospitals in the Northeast, 9 tertiary hospitals in the Central region, 6 tertiary hospitals in the South, and 7 tertiary hospitals in Bangkok.

3. Ten tertiary hospitals were obtained. From the North: Chiangrai Regional Hospital, and Maharaj Nakorn ChiangMai Hospital, from the Northeast: Khonkaen Hospital, and Sappasitipasong Hospital, from the Central: Ratchaburi Hospital, and Chonburi Hospital, from the South: Maharaj Nakhon Si Thammarat Hospital, Suratthani Hospital, and from Bangkok: Siriraj Hospital, and King Chulalongkorn Memorial Hospital.

4. The number of patients in each hospital was come from sample size divided by 10 hospitals. Therefore, this study collected the data from 34 patients with heart failure.

5. Screening heart failure patient from medical record by using inclusion and exclusion criteria as follow:

#### **Inclusion Criteria**

- 1) Diagnosed with heart failure and had stable condition.
- 2) Age equal to or more than 18 years old to 80 years old.
- 3) Able to communicate in Thai.
- 4) Willing to participate in this study.

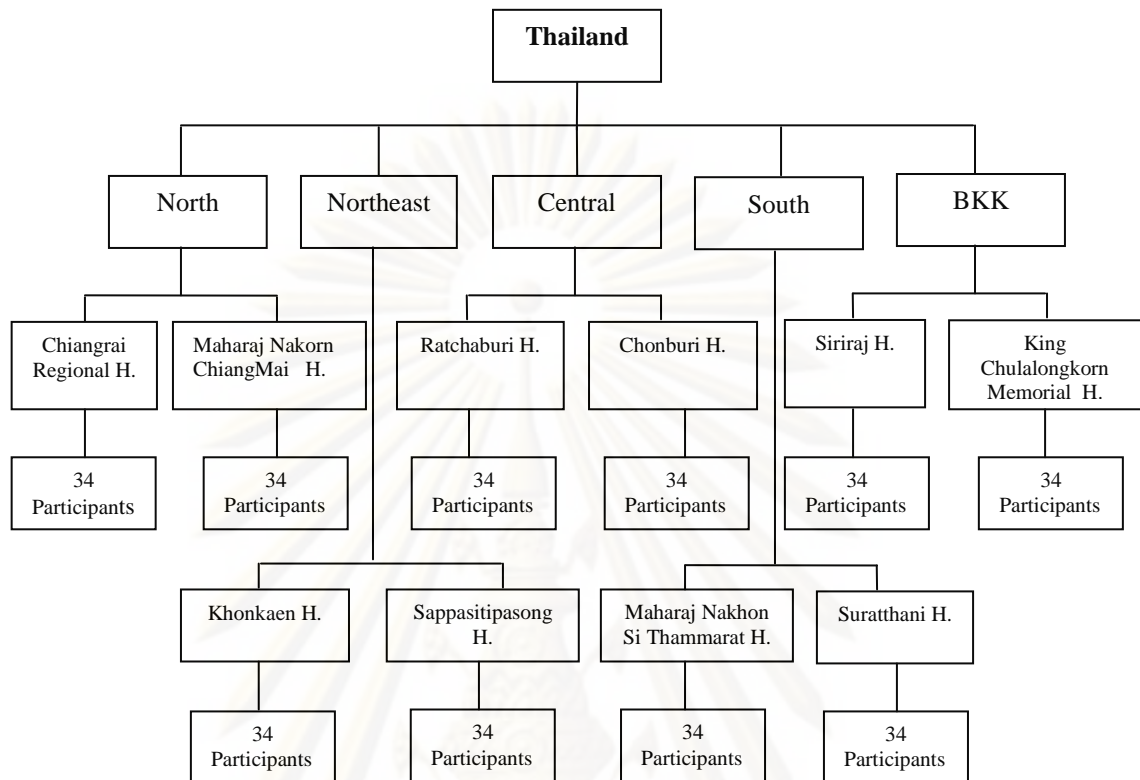
#### **Exclusion Criteria**

- 1) Unstable condition of heart failure such as acute pulmonary edema, severe dyspnea or chest pain
- 2) Serious physical and psychiatric disease such as acute renal failure, cancer

6. Using systematic random sampling to select 34 patients in each hospital.

All procedure was shown in Figure 3

### Sampling Method



**Figure 4**

### Research Instruments

The instruments used in this study include a demographic questionnaire, the state-trait anxiety inventory (STAI), The Center for Epidemiologic Studies Depression Scale (CES-D Scale), the dyspnea questionnaire, Berlin Questionnaire, the New York Heart Association (NYHA) functional classification, Sleep hygiene Practice Scale, Dysfunctional Beliefs and Attitudes about sleep (DBAS-16), and Insomnia Severity Index (ISI). The detailed of the instrument are as follows:

**1. A Demographic Questionnaire** was assessed age, gender, marital status, religion, education, employment status, etiology of heart failure, year of living with

heart failure, left ventricle ejection fraction, comorbidity and sleeping medication.

The data was collected from patients and reviews of patient's medical records.

## **2. The State-Trait Anxiety Inventory (STAI)**

The State-Trait Anxiety Inventory (STAI) of Spielberger was built up in 1983. This study was used S-anxiety (STAI, Form X-1). State anxiety refers to a state of tension and arousal taking place at a given moment. The 10 items are positive and 10 items are negative. Positive items are 1,2,5,8,10,11,15,16,19, and 20. Negative items are 3,4,6,7,9,12,13,14,17, and 18. It was translated into Thai by Nittaya Kochapakdee et al. (1981) and adapted by Sureeporn Tapa-Amorndech in 2003. It was designed to be self-administering and consists of twenty statements.

### **Scoring Criteria**

(1) Positive items were given a weighted score within 4 points in the Likert-type format, ranging from 4 to 1: from "not at all" to "very much so."

(2) Negative items were given a weighted score within 4 points in the Likert-type format, ranging from 1 to 4: from "not at all" to "very much so."

### **Interpretation of Scores**

Total SAI scores were obtained as the sum of weighted scores of the 20 items. Scores for the State Anxiety vary from a minimum of 20 to a maximum of 80.

The larger figure indicates a higher anxiety level. According to Ku, Ku and Ma (2002), the interpretation of score as follows:

The scores between 20 to 40 indicate a mild anxiety level

The scores between 41 to 60 indicate a moderate anxiety level

The scores between 61 to 80 indicate severe anxiety level

### **Validity and Reliability**

The Reliability and Validity of the STAI were estimated by Spielberger et al. (1970) with a know group technique for 197 college students in Florida. In addition, it has been demonstrated in many different populations including medical and surgical patients with test-retest. The alpha reliability coefficient of the STAI was ranged from .83-.92 (Spielberger et al., 1970). The State Anxiety was validated for conceptual equivalence, clarity, and suitable language by 5 experts in field, the content validity (CVI) was .85 (Sureporn Tepas-amorndech, 2003). Reliability of Thai version of The State anxiety was tested with 30 patients with patients after undergoing coronary artery bypass graft who followed-up as outpatients and Cronbach's alpha coefficient was .85 (Sureporn Tepas-amorndech, 2003).

In this study, reliability of The State Anxiety, Cronbach's alpha coefficient was .93 in 340 heart failure patients.

### **3. The Center for Epidemiologic Studies Depression Scale (CES-D Scale)**

The Center for Epidemiologic Studies Depression Scale (CES-D Scale) was developed for use in studies of the epidemiology of depressive symptomatology in the general population (Radloff, 1977). The items of the scale are symptoms associated with depression which have been used in previously validated longer scales.

The CES-D was designed to measure the level of depressive symptomatology, with emphasis on the affective component and depressed mood. The CES-D items were selected from a pool of items from the previously validated depression scale (e.g. Beck et al., 1961; Dahlstrom and Welsh, 1960; Gardner, 1986; Raskin et al., 1969; Zung, 1965).

This scale contained 20 items. It includes six components: depressed mood; feelings of guilt and worthlessness; feelings of helplessness and hopelessness; psychomotor retardation; loss of appetite; and sleep disturbance.

The response options as follows: none of the time, occasionally often, most of the time, and all the time. A higher score is 60 related to a greater depression rating.

### **Scoring Criteria**

(1) Negative items were given a weighted score within 4 points in the Likert-type format, ranging from 1 to 4: from “none of the time” to “all the time”

(2) Positive items were given a weighted score within 4 points in the Likert-type format, ranging from 4 to 1: from “none of the time” to “all the time”

### **Interpretation of Scores**

The total score 16 reflects depression (Tawatchai Worapongsathorn, Wongduen Pandee and Somporn Treamchaisri, 1990)

### **Validity and Reliability:**

The CES-D scale is based on symptoms of depression as seen in clinical cases. It is sensitive to levels of severity of depressive symptomatology, and reflect improvements after psychiatric treatment (Radloff, 1977). Construct validity of this instrument was reported through a study conducted by Hann, Winter and Jacobsen (1999). The construct validity of the CES-D was supported by finding indicating that patients undergoing cancer treatment reported more depressive symptomatology than healthy individuals. In addition, construct validity was demonstrated by moderate to high correlations with measures of fatigue, anxiety, and global mental health functioning. The CES-D was validated for conceptual equivalence, clarity, and suitable language by experts in field of mental health and heart disease, CVI was .90.

This instrument was tested in household interview surveys and in psychiatric settings. It was found to have very high internal consistency (coefficient alpha and the Spearman-Brown, split-halves method) (Nunnally, 1967). They were high in the general population (about .85), even higher in the patients sample (about .90), adequate test retest repeatability. Reliability of this instrument was reported through a study conducted by Hann et al. (1999). The CES-D found to have good internal consistency, with alpha coefficients  $> .85$  for cancer patients and general population as well as adequate test-retest reliability in both group.

The instrument was tested for reliability in 150 patients with post acute coronary syndromes. The reliability (Cronbach's alpha coefficient) was 0.78 (Monruedee Buran, 2005). In this study, reliability of this instrument, Cronbach's alpha coefficient was .90 in 340 heart failure patients.

#### **4. The Dyspnea Questionnaire**

This instrument was developed by Pataraporn Kheawwan (2003) based on the Theory of Unpleasant Symptom (TOUS). The instrument comprises 19 items assessing dyspnea in terms of (1) intensity, (2) timing, (3) distress, and (4) quality in post opened-heart surgery patients receiving mechanical ventilator (Pataraporn Kheawwan, 2003). Then, Kantaporn Yodchai (2004) adapted this questionnaire to use in heart patients who do not on ventilator.

#### **Scoring Criteria**

Each of these items is rated on the 100 mm on the Horizontal Visual Analog Scale ("0" = not at all, "100" = extremely). The total dyspnea score ranges from 0 to 100. An average total score is the total score of all 19 items divided by 19.

### **Interpretation of Scores**

According to Twibell, Siela and Mahmoodi, 2003 cited in Pataraporn Kheawwan (2003).

The score between 0- 39 representing mild dyspnea

The score between 40-60 representing moderate dyspnea

The score between 61-100 representing extreme dyspnea

### **Validity and Reliability**

The content validity was review by 5 experts in field and instrument development. All of them agree with all content which based on the Theory of Unpleasant Symptom (TOUS) in this questionnaire. The instrument was first used with 110 post opened-heart surgery patients receiving a mechanical ventilator.

Then Kantaporn Yodchai (2004) was used this instrument in 150 cardiac patients. Content validity was reviewed by a panel of experts in field of dyspnea, instrument development and heart disease. CVI was 1.00.

The reliability in a study of Pataraporn Kheawwan (2003) Cronbach's alpha coefficient was .95, in a study of Kantaporn Yodchai (2004); Cronbach's alpha coefficient was .94. In this study, reliability of the dyspnea questionnaire, Cronbach's alpha coefficient was .97 in 340 heart failure patients.

### **5. Berlin Questionnaire**

The Berlin Questionnaire was an outcome of the Conference on Sleep in Primary Care, which involved 120 U.S. and German pulmonary and primary care physicians and was held in April 1996 in Berlin, Germany (Netzer et al., 1999). This questionnaire was translated by using a back translation technique from Language Institute of Mahasarakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn Univerity. The Berlin Questionnaire which



addresses three known risk factors for sleep apnea or sleep disorder breathing as follows:

- (1) snoring history (five questions)
- (2) tiredness (four questions)
- (3) history of high blood pressure and/or body mass index (BMI) > 30.

### **Scoring Criteria**

The determination of a “high risk” (high pretest probability) a “lower risk” (low pretest probability) for sleep apnea was based on the frequency of several reported symptoms and on traits. There are three items considered: snoring, daytime sleepiness/fatigue, and BMI > 30/high blood pressure.

### **Interpretation of Scores**

To be “high risk” a person would have report persistent (“>3-4 time/ week” or “everyday”) symptoms in two questions or more about their snoring (Category 1) or about wake time sleepiness and/or drowsy driving (category 2) or persistent symptoms in either category 1 or category 2, and at least one feature (history of high blood pressure or BMI >30) in category 3. Respondents who deny chronic symptoms or have frequent symptoms or signs in only one category were placed in the “lower risk” group.

### **Validity and Reliability**

Risk grouping was useful in prediction of the respiratory disturbance index (RDI). Being in the high-risk group predicted and RDI greater than 5 with a sensitive of 0.86, a specificity of .77 per cent, and positive and negative predictive values .89, and a likelihood ratio of 3.79 (Netzer et al., 1999).

This instrument was tested for reliability in 744 adults in five primary care sites in Cleveland, Ohio. The reliability (Cronbach’s alpha) was 0.86 to 0.92 (Netzer

et al., 1999). In addition, Sharma et al. (2006) tested this instrument in 180 middle aged adults at a tertiary care referral center in northern India. They reported that internal consistency (Cronbach's alpha coefficient) was 0.92-0.96. In this study, reliability of Berlin Questionnaire reported that Cronbach's alpha coefficient was .73 in 340 heart failure patients.

#### **6. The New York Heart Association (NYHA) Functional Classification**

This instrument represents the functional status of patients with heart failure. The NYHA functional classification was developed in 1928 for use, as an essential criterion for a comprehensive cardiac diagnosis (Miller-Davis, Marden, and Kline, 2006). This functional class are class I, II, III or IV. It was designed for clinical assessment of patients by physicians on the basis of the patient's limitations in physical activities caused by cardiac symptoms. The NYHA functional classification is a 4-point semi-quantitative index of functional status of patients with heart failure (Kubo et al., 2004). It is a patient's perspective of four classes of heart failure symptoms: where patients may have symptoms of heart failure at rest (class IV), on less-than-ordinary exertion (class III), on ordinary exertion (class II), or only at levels of exertion that would limit normal individuals activity (class I) (AHA, 2006). It was translated into Thai by Phuangphaka Krethong (2007).

#### **Validity and Reliability**

The frequent use of NYHA classes in both clinical practice and in research studied demonstrates that there is general agreement that the NYHA classes are valid measures of function in cardiac patient (Bennett et al., 2002).

#### **7. Sleep Hygiene Awareness and Practice Scale**

Sleep hygiene was measured by the sleep hygiene awareness and practice scale (SHAPS). This instrument was developed from Lack and Rotert (1986). The

SHAPS has two sections, a 13-item assessment of general sleep hygiene knowledge, and a 19-item assessment of sleep practice. This study was used only the last section.

The sleep hygiene practice section contained 19 questions asking the number of days per week (0-7) that the participant have the experience or engage in the activity list (e.g. take a nap, worry prior to bedtime, exercise 2 hours before bedtime, relax before bedtime).

This questionnaire was translated by using a back translation technique from Language Institute of Maharakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn University.

### **Scoring Criteria**

Each item can vary from 0-7 day, the total hygiene practice scores are range from 0-133 with higher scores indicating less healthy sleep hygiene practice.

### **Interpretation of Scores**

Score more than  $\bar{x} \pm S.D.$  means the patients get high sleep hygiene

Score equal to  $\bar{x} \pm S.D.$  means the patient get moderate sleep hygiene

Score less than  $\bar{x} \pm S.D.$  means the patient get low sleep hygiene

### **Validity and Reliability**

This instrument is widely used in practice. In a study of Brown (2004) which studied the relationship between life event stress, role and job strain and sleep in middle-aged female shift workers found Cronbach's alpha coefficient was .796. Test-retest reliabilities measured with Pearson's Product-Moment Correlations revealed good test-retest reliability  $r = .74$ ,  $p < .001$ . In this study, reliability of the sleep hygiene practice scale reported that Cronbach's alpha coefficient was .60 in 340 heart failure patients.

## **8. Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16)**

Morin and colleagues (1993) developed the dysfunctional beliefs and attitudes about sleep scale to evaluate sleep-disruptive and cognitive cognitions. The original DBAS version included 30 items that were range on 100-mm visual analog scales. This instrument has been translated into several languages and is increasingly used by clinicians and researchers throughout the world. The DBAS has been found to be reliable for discriminating between self-defined good and poor sleepers in both younger and older adults (Morin et al., 2006). For the DBAS-16, this version has been conducted in order to encourage a more widespread use of the DBAS among the sleep community. This questionnaire was translated by using a back translation technique from Language Institute of Maharakham University and reviewing the quality of the translation by Language Institute of Chulalongkorn Univerity.

This instrument consists of 4 themes as follows:

- (1) Perceived consequences of insomnia (item 5, 7,9,12, and 16)
- (2) Worry/helplessness about insomnia (item 3,4,8,10,11, and 14)
- (3) Sleep expectations (item1 and 2)
- (4) Beliefs about sleep medication (item 6, 13 and 15).

### **Scoring criteria**

A Likert-type scale requiring participants to circle a number from 0 (strongly disagree) to 10 (strongly agree) with the same continuous 100-mm line in the background. Scores for all 16 items and dividing by 16 for an average total score. A higher score indicates more dysfunctional beliefs and attitudes about sleep.

### **Interpretation of scores**

According to a study of Carney et al. (2010) reported that the receiver operating characteristic (ROC) curve analysis suggested that DBAS-16 total score above 3.8 is associated with the degree of unhelpful beliefs found in those with clinical insomnia. Hence this study was used this cutoff to classify patients with heart failure into two groups as below:

The result of dysfunctional beliefs and attitudes about sleep was taken:

0-3.8 refers to low dysfunctional beliefs and attitudes about sleep

3.8-10 refers to high dysfunctional beliefs and attitudes about sleep

### **Validity and Reliability**

This instrument was tested in 283 individuals with insomnia, including 124 clinical patients and 159 research participants. The factor structure was similar to the original 30-item version with four factors. This instrument was found to be reliable Cronbach's alpha coefficient was .77 for clinical and 0.79 for research samples and temporal stability ( $r = 0.83$ ) (Morin et al., 2007).

In this study, reliability of dysfunctional beliefs and attitudes about sleep (DBAS-16) reported that Cronbach's alpha coefficient was .85 in 340 heart failure patients.

### **9. Insomnia Severity Index (ISI)**

Insomnia Severity Index (ISI) (Morin, 1993) is a brief self-report instrument measuring the patient's perception of his or her insomnia. For this study, ISI will be used to measure insomnia in heart failure patients. It was translated into Thai by Pattarieya Keawphang (2004). ISI comprises seven items assessing the severity of sleep-onset (initial), sleep maintenance (middle), early morning awakening (terminal) problems, satisfaction with current sleep patterns, interference with daily functioning,

noticeable ability of impairment attributed to the sleep problem, and level of distress caused by the sleep problem.

### **Scoring criteria**

Each of these items is rated on a five-point Likert scale (“0” = not at all, “4” = extremely) and the total score ranges from 0 to 28, with high scores indicating greater insomnia severity.

### **Interpretation of score (Morin, 1993)**

Score between 0-7 indicated no clinically significant insomnia

Score between 8-14 indicated subthreshold insomnia

Score between 15-21 indicated clinical insomnia (moderate severity)

Score between 22-28 indicated clinical insomnia (severe).

### **Validity and Reliability**

The ISI is likely to be a clinically useful tool as a screening device or as an outcome measure in insomnia treatment research (Bastien, Vallieres, and Morin, 2001). The ISI has been validated with samples in 145 patients evaluated for insomnia at a sleep disorders clinic, and in a sample of 78 older patients who participated in a randomized-controlled trial of behavioral and pharmacological therapies for insomnia.

The result found that the ISI is a valid and sensitive measure to detect changes in perceived sleep difficulties with treatment. In addition, there is a close convergence between scores obtained from the ISI patient's version and those from the clinician's and significant other's versions. The internal consistency of the ISI estimated with a Cronbach alpha coefficient was 0.74 to 0.78. The item-total correlations varied from a low of 0.36 (initial) to a high of 0.67 (interference), with an average of 0.54 (Bastien, Vallieres, and Morin, 2001).

The reliability (Cronbach's alpha coefficient) of ISI in cancer patients was 0.86 (Pattarieya Keawphang, 2004). In this study, the reliability, Cronbach's alpha coefficient was .93 in 340 heart failure patients.

### **Data Collection Methods**

1. A letter asking for the permission to collect the data from the Faculty of Nursing, Chulalongkorn University and the certificates of approval of this research from the ethical review committee for research involving human research subjects, health science group, Chulalongkorn University which was sent to the directors and IRB committee of ten tertiary hospitals.

2. After the permission, the researcher made an appointment with the physician and the head nurse of heart clinic at heart clinic outpatients departments of each hospital to introduce the researcher and to inform them regarding the objective and process of the study and asked for cooperation.

3. The researcher had been collected the data by the researcher in 5 hospitals and collecting the data with research assistant 1 hospital and another 4 hospitals in the North and the South, the researcher trained research assistants to collect the data. The research assistants in this study graduated master degree in nursing science and another 2 the research assistants had studying master degree in nursing science in the second year. Before collecting the data, the researcher went to 5 hospitals and explained regarding the objective, process and every item in the questionnaire and giving the research assistant a guideline questionnaire in order to clear all of the questions.

4. Collect clinical data of the patients from OPD Card.

5. Approach all of the patients who met the inclusion criteria at heart clinic, out-patient department, gave patient information sheet and informed consent to them and explain the details of both forms.

6. When the patients were willing to participate in the study, the researcher would invite the patients to the place prepared in order to sign consent. Then, gave all the questionnaires to the patients. The patients had to answer all the questionnaires by themselves.

7. Protect the rights of the individuals who volunteered as subjects by having each patient sign a consent form, which included an explanation of the purpose of the study, assurance of confidentiality, informed about the questionnaire destruction when finishing the study as well as the option to withdraw from the study at any time with no consequence at all.

### **Data Analysis**

Both of descriptive and inferential statistics were utilized to describe the research hypotheses. The process of data analysis was as follows:

1. Descriptive statistics were described the demographic, the clinical characteristic, characteristics of insomnia and basic features of selected factors of insomnia of the patients in this study with frequencies, percentages, the standard deviation and the range.

2. Chi-square test and Contingency coefficient was used to explore the relationship among the predisposing factors (age, gender, anxiety, and depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, and functional status), the perpetuating factors (sleep hygiene, and dysfunctional beliefs and attitudes about sleep) and insomnia among patients with heart failure.



3. Multiple logistic regressions was used to examine the predictability among the predisposing factors (age, gender, anxiety, and depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, and functional status), the perpetuating factors (sleep hygiene, and dysfunctional beliefs and attitudes about sleep) and insomnia among patients with heart failure.

### **Human Subject Protection**

The permission of the patient's interviews were obtained from The Ethical Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University and the permission from 10 hospitals had been obtained before to approach the patients. The researcher gave the patients' informed consent and explained about the objective of the study. The researcher did not address his or her name in the data. The participants can withdraw from the study. If the patients have some symptoms such as discomfort, tiredness, fatigue or fainting. The researcher would let them take a rest and care about the patients. Everything went well throughout collecting data process. The patients did not have any discomfort symptoms.

## **CHAPTER IV**

### **RESULTS**

The objective of this study were to describe the characteristics of insomnia in patients with heart failure and examine the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep), and insomnia in 340 patients with heart failure.

The data analysis is presented as follows:

Part 1 the study of demographic and clinical characteristic of the patients by using descriptive statistics: frequency, percentage, means, and standard deviation is shown in

Table 2-3.

Part 2 the studies of characteristics of insomnia by using descriptive statistic: frequency, percentage, means, standard deviation is shown in Table 4-6.

Part3 the studies of selected factors of insomnia by using descriptive statistics: frequency, percentage, means, and standard deviation is shown in Table 7-12.

Part 4 Examine the relationship among the predisposing factors (age, gender, anxiety, and depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), and the perpetuating factors (sleep hygiene, and dysfunctional beliefs and attitudes about sleep) by using Chi-square test is shown in Table 13-15.

Part 5 Examine the predictive factors of insomnia by using multiple logistic regression is shown in Table 16.

## 1. The Characteristics of the Patients

### 1. 1 The Demographic Characteristics of the Patients

**Table 2** The frequency, percentage, means and standard deviation of demographic characteristic of patients with heart failure (N=340)

Characteristics	Frequency	Percent
<b>Gender</b>		
Female	176	51.8
Male	164	48.2
<b>Age (years)</b>		
20-40	33	9.7
41-60	140	41.2
61-80	167	49.1
Mean = 59.22 years, S.D. = 12.98		
<b>Marital status</b>		
Married	237	69.7
Widowed	50	14.7
Single	34	10.0
Separated	13	3.8
Divorced	6	1.8
<b>Educational Level</b>		
Non- education	43	12.6
Primary school	213	62.6
Secondary school	54	15.9
High school	19	5.6
Certificate/ Bachelor' Degree	9	2.6
Master' Degree	2	0.6
<b>Occupation</b>		
Unemployed person	159	46.8
Employee	60	17.6
Agriculturalist	60	17.6
Merchant	34	10.0
Government officer	16	4.7
Businessman	9	2.6
Student	2	0.6

**Table 2 con't**

<b>Characteristics</b>	<b>Frequency</b>	<b>Percent</b>
<b>Incomes/month (Baht)</b>		
Less than 5,000 Baht	237	69.7
5,000-10,000 Baht	66	19.4
10,001-20,000 Baht	22	6.5
20,001-30,000 Baht	9	2.6
More than 30,000 Baht	6	1.8

According to Table 2 the results show that one hundred and sixty-four were male and 176 were female. Most of the patient's age group was between 61-80 years old (49.1%). In term of marital status, the majority of the patients were married (69.70%), as regards of education levels, most of them received education in a primary school (62.6%), and most of them was employed person (46.8%), more than half of the subjects (69.7%) have income less than 5,000 Baht.

## 1.2 The Clinical Characteristics of the Patients

**Table 3** The frequency, percentage, means and standard deviation of the clinical characteristics of patients with heart failure (N=340)

Characteristics	Frequency	Percent
<b>Time since initial diagnosis (years)</b>		
< 5	222	65.3
5-10	99	29.1
>10	19	5.6
Mean = 4.24 years, S.D. = 4.22		
<b>Etiology</b>		
Valvular heart disease	145	42.6
Hypertension	93	27.4
Coronary artery disease	93	27.4
Cardiomyopathy	90	26.5
Cardiac arrhythmia	75	22.1
Diabetes	49	14.4
Rheumatic heart disease	16	4.7
<b>The New York Heart Association (NYHA) Functional Classification</b>		
FC I	221	65.0
FC II	79	23.2
FC III	35	10.3
FC IV	5	1.5
<b>Left ventricular ejection fraction</b>		
< 40%	96	28.2
40-54	57	16.8
55-70	73	21.5
>70	17	5.0
<b>Body Mass Index</b>		
< 18.5 (underweight)	47	13.8
18.5-24.99 (normal range)	213	62.6
≥ 25 (overweight)	57	16.8
≥ 30 (obese)	23	6.8
Mean = 22.80, S.D. = 4.47		

Table 3 shows that most of the patients living with heart failure < 5 years (65.3%). The average of years was 4.24 years. The majority of etiology was valvular heart disease (42.6%). Most of patient have FC I (65%). The patients had Left ventricular ejection fraction (LVEF) less than 40% were 28.2%, LVEF between 40%-55% were 16.8% and LVEF higher than 70% were 5%. Heart failure patients had underweight (13.8%) and overweight (16.8%).

## 2. Characteristic of Insomnia in Patients with Heart Failure

### 2.1 Severity of Insomnia in Patients with Heart Failure

**Table 4** The frequency and percentage of insomnia as measured by Insomnia Severity Index (ISI) (N=340)

Severity of insomnia	Frequency	Percent
None (0-7)	131	38.5
Sub-threshold insomnia) (8-14)	100	29.4
Moderate insomnia (15-21)	81	23.8
Severe insomnia (22-28)	28	8.2
Moderate-severe (clinically significant insomnia) (15-28)	109	32.0

Table 4 shows that there were 109 (32%) heart failure patients who had score of ISI  $\geq$  15, this cut point score indicated that they have clinical insomnia.

## 2.2 Types of Insomnia

**Table 5** The frequency and percentage of 3 types of insomnia in heart failure patients (N=340)

Type	Clinical Insomnia	
	Frequency	Percent
Difficulty falling asleep (1)	102	30.00
Difficulty staying asleep (2)	102	30.00
Waking up too early (3)	88	25.88

Table 5 reveals that the most common symptoms of insomnia were difficulty falling asleep (30%), difficulty staying asleep (30%) and waking up too early.

**Table 6** The frequency and percentage of 3 types and combination type of insomnia in heart failure patient who had clinically significant insomnia (N=109)

Type	Frequency	Percent
Difficulty falling asleep (1)	3	2.75
Difficulty staying asleep (2)	2	1.80
Waking up too early (3)	1	0.92
(1) & (2)	16	14.68
(1) & (3)	3	2.75
(2) & (3)	4	3.67
(1) & (2) & (3)	80	73.40

Table 6 presented types of the patients who had clinical insomnia. Most of heart failure patients had mixed all types of insomnia (73.40%).

### 3. The Descriptive of Selected Factors of Insomnia

#### 3.1 The Descriptive of The Predisposing factors, The Precipitating factors, and The Precipitating factors.

**Table 7** The frequency, percentage, means, and standard deviation of anxiety

<b>Anxiety</b>	<b>Frequency</b>	<b>Percent</b>	<b>Mean</b>	<b>S.D.</b>
Mild anxiety	242	71.2	29.95	6.10
Moderate anxiety	90	26.5	46.68	5.48
Severe anxiety	8	2.4	62.00	1.60
<b>Total score</b>			<b>35.13</b>	<b>10.30</b>

Table 7 revealed that 28.9 % of heart failure patients had anxiety in moderate and severe level of anxiety.

**Table 8** The frequency, percentage, means and standard deviation of depression

<b>Depression</b>	<b>Frequency</b>	<b>Percent</b>	<b>Mean</b>	<b>S.D.</b>
Depression	104	30.6	25.17	8.39
No depression	236	69.4	8.32	4.32
<b>Total score</b>			<b>13.47</b>	<b>9.74</b>

Table 8 showed that 30.6 % of heart failure patients had depressive symptoms.



**Table 9** The frequency, percentage, means, and standard deviation of dyspnea

<b>Dyspnea</b>	<b>Frequency</b>	<b>Percent</b>	<b>Mean</b>	<b>S.D.</b>
Mild dyspnea	280	82.4	11.35	11.44
Moderate dyspnea	39	11.5	48.04	6.12
Severe dyspnea	21	6.2	69.71	6.74
<b>Total score</b>			<b>19.22</b>	<b>20.43</b>

Table 9 presented that 11.5% of heart failure patients who had moderate dyspnea and 6.2% of them had severe dyspnea.

**Table 10** The frequency and percentage of each item of the Berline questionnaire to measure sleep disorder breathing

<b>Sleep disorder breathing</b>	<b>Frequency</b>	<b>Percent</b>
<b>Category 1</b>		
Snoring	107	37.5
Snoring at least 3-4 time/ weeks	74	21.8
Snoring louder than talking	88	25.9
Snoring bothered other people	83	24.4
Breathing pauses has been observed by others at last 3-4 time/week	11	3.2
<b>Total score is 2 or more points</b>	<b>98</b>	<b>28.82</b>

**Table 10** con't

<b>Sleep disorder breathing</b>	<b>Frequency</b>	<b>Percent</b>
<b>Category 2</b>		
Feel tired or fatigued after sleep at least 3-4 times a week	42	12.4
Feel tired or fatigued or not up to par during waking time at least 3-4 times a week	43	12.6
Fallen asleep while driving a vehicle or watching very interesting TV program	64	18.8
<b>Total score is 2 or more points</b>	<b>36</b>	<b>10.59</b>
<b>Category 3</b>		
Have high blood pressure	89	26.18
BMI > 30	30	8.82
<b>High blood pressure or BMI &gt; 30</b>	<b>119</b>	<b>35</b>
<b>Interpretation</b>		
High risk <sup>a</sup>	60	17.65
Low risk <sup>b</sup>	280	82.35

<sup>a</sup> There are 2 or more categories where the score is positive

<sup>b</sup> There is only 1 or no categories where the score is positive

Table 10 presented that 17.65% of heart failure patients had high risk of sleep disorder breathing.

**Table 11** Mean and standard deviation of each item of the sleep hygiene practice scale

<b>Sleep hygiene</b>	<b>Mean</b>	<b>S.D.</b>
1. No exercise in the afternoon or in the evening.	5.05	2.62
2. Take a nap.	3.39	2.63
3. No manage the time for rest taking before going to bed.	3.12	2.90
4. No approximate sleep for the same period of every night.	1.98	2.35
5. Worry that you may be unable to fall asleep while going to bed.	1.14	1.84
6. Worry during the day time that you may be unable to fall asleep at night.	1.08	1.82
7. Do not set the thermostat at a comfortable temperature for sleeping inside the bedroom.	0.97	2.03
8. Allow the noise to disturb while sleeping.	0.80	1.89
9. Take sleeping pills regularly.	0.52	1.42
10. Leave the lights on while sleeping.	0.44	1.38
11. Go to bed while thirsty.	0.41	1.29
12. Go to bed while hungry.	0.39	1.16
13. Allow a person who sleeps in the same bed to disturb you while sleeping.	0.31	1.30
14. Drink the beverages containing caffeine within 4 hours before sleeping.	0.22	1.10
15. Consume or take medicine which contains caffeine within 4 hours before going to bed.	0.13	0.71
16. Over exercise within 2 hours before going to bed.	0.08	0.61
17. Drink more than 3 ounces of alcohol within 2 hours before going to bed.	0.08	0.55

**Table 11** con't

<b>Sleep hygiene</b>	<b>Mean</b>	<b>S.D.</b>
18. Use alcohol in order to fall asleep easily.	0.06	0.52
19. Smoke more than one pack of cigarettes per day.	0.04	0.44
<b>Total score of the sleep hygiene practice scale</b>	<b>20.23</b>	<b>10.83</b>

Table 11 shows that sleep hygiene which patients with heart failure did a lot was as follows: they had no exercise in the afternoon or in the evening, the average was 5.05 days per week, it means that about 2 days that they exercise. The average of napping during the day was 3.39 days per week. They did not manage the time for rest taking before going to bed; the average was 3.12 days per week. No for approximate sleep for the same period on every night was 1.14 days per week. They worry about unable to fall asleep while going to bed and worry during the day time that unable to fall asleep at night were 1.14 and 1.08 days per week respectively.

**Table 12** Mean and standard deviation of each item of dysfunctional beliefs and attitudes about sleep (DBAS-16)

<b>Dysfunctional beliefs and attitudes about sleep</b>	<b>Mean</b>	<b>S.D.</b>
<b>1. Perceived consequences of insomnia</b>		
1.1 After a poor night's sleep. I know that it will interfere with my daily activities on the next day.	6.72	2.77
1.2 When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	6.43	2.94
1.3 When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	6.12	3.16
1.4 Without an adequate night's sleep, I can hardly function the next day.	5.58	3.29
1.5 I avoid or cancel obligations (social, family) after a poor night's sleep.	5.03	3.46
<b>2. Worry/helplessness about insomnia</b>		
2.1 I am concerned that chronic insomnia may have serious consequences on my physical health.	8.21	2.40
2.2 I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	6.30	3.05
2.3 I can't ever predict whether I'll have a good or poor night's sleep.	5.99	3.20
2.4 I have little ability to manage the negative consequences of disturbed sleep.	5.46	3.29

**Table 12** con't

<b>Dysfunctional beliefs and attitudes about sleep</b>	<b>Mean</b>	<b>S.D.</b>
2.5 I am worried that I may lose control over my abilities to sleep.	4.26	3.41
2.6 When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week.	4.09	3.42
<b>3. Sleep expectations</b>		
3.1 I need 8 hours of sleep to feel refreshed and function well during the day.	8.79	1.96
3.2 When I don't get proper amount of sleep on a given night, I need to catch up on the next day by napping or on the next night by sleeping longer.	6.71	3.04
<b>4. Beliefs about sleep medication</b>		
4.1 I believe insomnia is essentially the result of a chemical imbalance.	6.17	3.02
4.2 In order to be alert and function well during the day I believe I would be better off taking a sleeping pill rather than having a poor night's sleep.	3.03	3.63
4.3 Medication is probably the only solution to sleeplessness.	2.96	3.45

Table 12 shows that high average of score of dysfunctional beliefs and attitudes about sleep in every dimension. Especially, sleep expectation;

“I need 8 hours of sleep to feel refreshed and function well during the day”

However, low average score in item of beliefs about sleep medication, heart failure patients did not think that medication is probably the solution to sleeplessness.

#### 4. The Relationship between Selected Factors and Insomnia

**Table 13** The relationship between the predisposing factors (age, gender, anxiety, and depression) by using Chi-square test and Contingency Coefficient (C) (N = 340)

Factor	No insomnia		Insomnia	
	Frequency	Percent	Frequency	Percent
<b>Age</b>				
20-40	25	7.35	8	2.35
41-60	100	29.41	40	11.76
61-80	106	31.18	61	17.94
$\chi^2 = 3.238, C = .097, p = .198$				
<b>Gender</b>				
Male	113	33.24	51	15.00
Female	118	34.71	58	17.06
$\chi^2 = .134, C = .020, p = .714$				

Table 13 con't

Factor	No insomnia		Insomnia	
	Frequency	Percent	Frequency	Percent
<b>Anxiety</b>				
Mild anxiety	195	57.35	47	13.82
Moderate anxiety	35	10.29	55	16.18
Severe anxiety	1	0.29	7	2.06
$\chi^2 = 63.909, C = .398, p = .000^{**}$				
<b>Depression</b>				
No depression	191	56.18	45	13.24
Depression	40	11.76	64	18.82
$\chi^2 = 59.781, C = .387, p = .000^{**}$				

\*\* p < .001

Table 13 shows that anxiety and depression were significant correlated with insomnia in patients with heart failure ( $p < .05$ ), with a strength of association  $C = .398$  and  $.387$  respectively. Age and gender were not significant correlated with insomnia.

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**Table 14** The relationship between the precipitating factors (marital status, dyspnea, sleep disorder breathing, and functional status) by using Chi-Square Test and Contingency Coefficient (N = 340)

Factor	No insomnia		Insomnia	
	Frequency	Percent	Frequency	Percent
<b>Marital status</b>				
Single	29	8.53	5	1.47
Married	165	48.53	72	21.18
Separated/ divorced/widowed	37	10.88	32	9.41
$\chi^2 = 14.15$ , C = .200, p = .007*				
<b>Dyspnea</b>				
Mild dyspnea	206	60.59	74	21.76
Moderate dyspnea	22	6.47	17	5.0
Severe dyspnea	3	0.88	18	5.29
$\chi^2 = 34.212$ , C = .302, p = .000**				

\* p < .01, \*\* p < .001

**Table 14** The relationship between the precipitating factors (marital status, dyspnea, sleep disorder breathing, and functional status) by using Chi-Square Test and Contingency Coefficient (N = 340) (continue)

Factor	No insomnia		Insomnia	
	Frequency	Percent	Frequency	Percent
<b>Sleep disorder breathing</b>				
High risk	34	10.00	26	7.65
Low risk	197	57.94	83	24.41
$\chi^2 = 4.252$ , $C = .111$ , $p = .039^*$				
<b>Functional status</b>				
FC I	167	49.12	54	15.88
FCII	48	14.12	31	9.12
FCIII	16	4.71	19	5.59
FCIV	0	0	5	1.47
$\chi^2 = 26.304$ , $C = .268$ , $p = .000^{**}$				

\*  $p < .05$ , \*\*  $p < .001$

Table 14 shows that marital status, dyspnea, sleep disorder breathing and functional status were significant correlated with insomnia in patients with heart failure ( $p < .05$ ), with a strength of association  $C = .200$ ,  $.302$ ,  $.111$  and  $.268$  respectively.

**Table 15** The relationship between the perpetuating factors (sleep hygiene, and sleep dysfunctional beliefs and attitudes about sleep) by using Chi-square and Contingency Coefficient (N = 340)

Factor	No insomnia		Insomnia	
	Frequency	Percent	Frequency	Percent
<b>Sleep hygiene</b>				
Low	39	11.48	9	2.65
Moderate	174	51.18	73	21.47
High	18	5.29	27	7.94
$\chi^2 = 20.744$ , $C = .240$ , $p = .000^{**}$				
<b>Dysfunctional beliefs and attitudes about sleep</b>				
Low	36	10.59	3	0.88
High	195	57.35	106	31.18
$\chi^2 = 12.008$ , $C = .185$ , $p = .001^*$				

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

Table 15 shows that both of sleep hygiene and dysfunctional beliefs and attitudes about sleep were significant correlated with insomnia in patients with heart failure ( $p < .05$ ), with a strength of association  $C = .240$ , and  $.185$  respectively.

## 5. The Predictive Factors of Insomnia

**Table 16** Multiple logistic regression analysis for the relationship between selected factors and insomnia (N = 340)

Factors	B	S.E.	Wald	df	Exp(B)	95%CI	
						Lower	Upper
<b>Marital status</b>							
Single (reference)							
Married	1.094	.614	3.169	1	2.985	.895-	9.952
Separated, divorced, and widowed	1.953	.658	8.804	1	7.051*	1.940-	25.617
<b>Anxiety</b>							
Mild (ref.)							
Moderate	1.142	.357	10.211	1	3.133*	1.555-	6.311
Severe	2.213	1.147	3.722	1	9.146	.965-	86.648
<b>Depression</b>							
No (ref.)							
Yes	.924	.355	6.773	1	2.519*	1.256-	5.051
<b>Dyspnea</b>							
Mild (ref.)							
Moderated	.163	.414	.155	1	1.177	.450-	2.385
Severe	2.210	.716	9.526	1	9.114*	2.240-	37.083

**Table 16** con't

Factors	B	S.E.	Wald	df	Exp(B)	95%CI
						Lower-Upper
<b>Dysfunctional beliefs and attitudes about sleep</b>						
Low (ref.)						
High	1.424	.636	5.012	1	4.156*	1.194-14.462
Constant	-4.158	.863	23.202	1	.016**	

\*  $p < .05$ , \*\*  $p < .001$

Table 16 presents the result of multiple logistic regression analysis, The predictive factors of insomnia by using multiple logistic regression, forward stepwise was conducted in five steps. All factors correlated with insomnia from  $\chi^2$  test were included into a multiple logistic regression as predictor factors of insomnia. The beginning block and step 5 results are displayed in Appendix E.

After entering correlated factors of insomnia in each step of the forward logistic regression analysis, five factors including marital status, anxiety, depression, dyspnea and dysfunctional beliefs and attitudes about sleep were retained in the final step of the analysis. These factors were found to predict insomnia with a significant  $p < .001$ . Functional status, sleep disorder breathing, and sleep hygiene were not entered into this analysis.

There were 5 significant predictive factors of insomnia with 95% confident level ( $\alpha = 0.05$ ) and all of them had  $\text{Exp}(B) > 1$  mean that 5 factors can increase the probability of insomnia as follows:

1. Separated, divorced and widowed marital status was determined to be significant ( $p = .003$ ) and added to the model during step 4, with and odds ratio of 7.051. It means that the patients with Separated, divorced and widowed marital status were roughly seven times more likely to be insomnia than the patients who was single marital status.

2. Anxiety in moderate level was determine to be significant ( $p = .001$ ) and added to the model during step 2, with and odds ratio of 3.133. It means that the patients with moderate anxiety were approximately three times more likely to be insomnia than the patients who had mild anxiety.

3. Depression was determined to be significant ( $p = .009$ ) and added to the model during step 1, with and odd ratio of 2.519. It means that the patients who had depression were approximately two point five times more likely to be insomnia than the patients who had no depression.

4. Dyspnea in severity level was determined to be significant ( $p = .005$ ) and added to the model during step 5, with and odd ratio of 9.114. It means that the patients who had severe dyspnea were approximately nine times more likely to be insomnia than the patients who had mild dyspnea.

5. Dysfunctional beliefs and attitudes about sleep in high level was determined to be significant ( $p = .002$ ) and added to the model during step 5, with and odd ratio of 4.156. It means that the patients who had high dysfunctional beliefs and attitudes about sleep were approximately four times more likely to be insomnia than the patients who had low dysfunctional beliefs and attitudes about sleep.

**Logistic Regression Model Predicting Insomnia**

$$\begin{aligned} \text{Logit (P)} = & -4.158 + 1.094 (\text{married}) + 1.953 (\text{separated, divorced and widowed})^* \\ & + 1.142 (\text{moderate anxiety})^* + 2.213 (\text{severe anxiety}) \\ & + .924 (\text{depression})^* + .163 (\text{moderate dyspnea}) \\ & + 2.210 (\text{severe dyspnea})^* + 1.424 (\text{high dysfunctional beliefs} \\ & \text{and attitudes about sleep})^* \end{aligned}$$



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## CHAPTER V

### DISCUSSION, IMPLICATION, AND RECOMMENDATIONS

This study was descriptive research design. The objectives of the study were as follows:

1. Describe the characteristics of insomnia in patients with heart failure.
2. Examine the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep), and insomnia in patients with heart failure.

The sample was 340 patients with heart failure. It was obtained by using multi-stage random sampling. Setting was heart clinic at 10 tertiary care hospitals including Chiangrai Regional Hospital, Maharaj Nakorn ChiangMai Hospital, Khonkaen Hospital, Sappasitipasong Hospital, Ratchaburi Hospital, Chonburi Hospital, Maharaj Nakhon Si Thammarat Hospital, Suratthani Hospital, Siriraj Hospital, and King Chulalongkorn Memorial Hospital. Collecting data was done during July 2009 to January 2010. Inclusion criteria as follows:

- 1) Diagnosed with heart failure and had stable condition
- 2) Age equal to or more than 18 years old to 80 years old
- 3) Able to communicate in Thai
- 4) Willing to participate in this study

The instruments used in this study including a demographic questionnaire, the state-trait anxiety inventory (STAI), the Center for epidemiologic studies depression scale (CES-D Scale), The dyspnea questionnaire, Berlin Questionnaire, The New York Heart Association (NYHA) functional classification, Sleep Hygiene



Awareness and Practice Scale, Dysfunctional Beliefs and Attitudes about sleep (DBAS-16), and Insomnia Severity Index (ISI).

Data Analysis by using descriptive and inferential statistic was as follows:

1. Descriptive statistics were described the demographic and clinical characteristics, characteristic of insomnia and selected factors of insomnia in patients with heart failure by using frequencies, percentages, the standard deviation and the range.

2. Chi-square test was used to explore the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep), and insomnia in patients with heart failure.

3. Multiple logistic regressions was used to examine the predictability of the predisposing factors (age, gender, anxiety, and depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, and functional status), the perpetuating factors (sleep hygiene, and dysfunctional beliefs and attitudes about sleep) and insomnia among patients with heart failure.

## **The Summary of the Result**

### **1. The Characteristics of Heart Failure Patients**

In this study, there were 164 male patients (48.2%) and 176 female patients (51.8%). Mean age was 59.22, S.D. 12.98, most of them was married 69.7%, the majority of education level was primary school, most of them was unemployed person (46.8%). Sixty-nine point seven percent had income less than 5,000 Baht.

For clinical characteristics, most of heart failure patients living with heart failure less than 5 years, most etiology was valvular heart disease (42.6%), most of them had more than 1 etiology (48.53%). The majority of their functional class was functional class 1 (65%). Most of patients had left ventricular ejection fraction more than 40% (43.2%), heart failure patients had underweight (13.8%) and overweight (16.8%).

### **3. The Characteristics of Insomnia in Patients with Heart Failure**

One hundred and nine patients with heart failure (32%) reported clinical insomnia. There were 81 patients (23.8%) had moderate insomnia and 28 patients had severe insomnia (8.2%). For no clinical insomnia group of patients, there were 131 patients had no insomnia and 100 patients (29.4%) had subthreshold insomnia.

The most common type of insomnia, identified by 30% of patients with heart failure was difficulty falling asleep and difficulty staying asleep. Waking up too early was reported 25.88%. Most heart failure patients with insomnia (80.20%) indicated that they had combination of these problems; 6.8% had two types of insomnia, 73.40% had three types of insomnia. Only 1.8 % had only one type of insomnia.

The average of napping more than 30 minutes was 3.39 days per weeks.

Twenty-seven percent of all patients nap every day. There were 43 patients (12.65%) of all heart failure patients have been taking sleeping pills. However, 15 patients (4.41%) of them still had clinical insomnia. Most of heart failure patients with insomnia did not taking sleeping pills every day because they knew from the physician that sleeping pills was not good for their health therefore they had taking sleeping pills only the day that they felt their symptoms of insomnia in severity level. Moreover, 94 patients (27.65%) of all heart failure patient who had clinical insomnia

did not consult with anyone in health care team regarding their symptoms of insomnia because they thought that they had to help themselves and they tried to napping during the day.

#### **4. The Relationship between Selected Factors and Insomnia in Patients with Heart Failure**

The predisposing factors including anxiety, depression, the precipitating factors including marital status, dyspnea, sleep disorder breathing, and functional status, the perpetuating factors including sleep hygiene and dysfunctional beliefs and attitudes about sleep. All of these factors were significant correlated with insomnia ( $p < .05$ ).

#### **5. Predictors of insomnia in patients with heart failure**

There were 5 significant predictive factors of insomnia with 95% confident level ( $\alpha = 0.05$ ) and all of them had  $\text{Exp (B)} > 1$  mean that 5 factors can increase the probability of insomnia as follows:

1. Separated, divorced and widowed marital status was determined to be significant ( $p = .003$ ) and added to the model during step 4, with and odds ratio of 7.051. It means that the patients with separated, divorced and widowed marital status were roughly seven times more likely to be insomnia than the patients who was single marital status.

2. Anxiety in moderate level was determine to be significant ( $p = .001$ ) and added to the model during step 2, with and odds ratio of 3.133. It means that the patients with moderate anxiety were approximately three times more likely to be insomnia than the patients who had mild anxiety.

3. Depression was determined to be significant ( $p = .009$ ) and added to the model during step 1, with and odd ratio of 2.519. It means that the patients who had

depression were approximately two point five times more likely to be insomnia than the patients who had no depression.

4. Dyspnea in severity level was determined to be significant ( $p = .005$ ) and added to the model during step 5, with an odd ratio of 9.114. It means that the patients who had severe dyspnea were approximately nine times more likely to be insomnia than the patients who had mild dyspnea.

5. Dysfunctional beliefs and attitudes about sleep in high level was determined to be significant ( $p = .002$ ) and added to the model during step 5, with an odd ratio of 4.156. It means that the patients who had high dysfunctional beliefs and attitudes about sleep were approximately four times more likely to be insomnia than the patients who had low dysfunctional beliefs and attitudes about sleep.

## **Discussion**

**Objective 1.** 1. Describe the characteristics of insomnia in patients with heart failure. One hundred and nine patients with heart failure (32%) reported clinical insomnia. This result did not differ from the prevalence of insomnia in western countries, according to a secondary analysis from 182 abstracts published during 1989-2004 which was relevant to sleep disturbance in patients with heart failure. The results revealed that approximately 33 % of patients had insomnia (Brostrom and Johansson, 2005).

Moreover, another study revealed that 31.3% of patients with heart failure reported symptoms suggesting the presence of insomnia in a tertiary care heart failure clinic (Principe-Rodriguez et al., 2005). This percentage was higher than general population. The previous studies in Asian populations reported that the prevalence of insomnia was 15.3% in a Singaporean study (Yeo et al., 1996), 17.0% of 3,719

Korean population (Ohayon and Hong, 2002), and 21.4% in 3,030 in general Japanese population (Kim et al., 2000).

There were 81 patients (23.8%) had moderate insomnia and 28 patients had severe insomnia (8.2%). For no clinical insomnia group of patients, there were 131 patients had no insomnia and 100 patients (29.4%) had subthreshold insomnia.

The most common type of insomnia, identified by 30% of patients with heart failure was difficulty falling asleep and difficulty staying asleep. Waking up too early was reported 25.88%. The prior researches in patients with heart failure from western country, difficult in initiating sleep was reported 19-63% (Erickson et al., 2003; Johansson et al., 2007; Lainscak and Keber, 2003), difficulty falling asleep was reported 23-69% and waking up too early was reported 15-39% (Brostrom et al., 2004; Erickson et al., 2003; Johansson et al., 2007). However, all of them using different definition of insomnia and different instrument of insomnia. Therefore, the percentage of each study was different. In this study was using Insomnia Severity Index which corresponds in part to DSM-IV criteria for insomnia. This instrument classified insomnia into no clinical insomnia and clinical insomnia and the patients have to have clinical insomnia at least one month.

Most heart failure patients with insomnia (80.20%) indicated that they had combination of these problems; there were 6.8% of the patients had two types of insomnia, 73.40% had three types of insomnia. Only 1.8% had only one type of insomnia. The average of napping more than 30 minutes was 3.39 days per week. Twenty-seven percent of all patients nap every day. There were 43 patients (12.65%) of all heart failure patients have been taking sleeping pills. However, 15 patients (4.41%) of them still had clinical insomnia. Most of heart failure patients with insomnia did not take sleeping pills every day because they knew from the

physician that sleeping pills was not good for their health therefore they had taking sleeping pills only the day that they felt their symptoms of insomnia in severity level.

A study in patients with heart failure in western country reported 33% using sleeping pills but in this study only 12.65% have been taking sleeping pills. There were 94 patients (27.65%) of all heart failure patient who had clinical insomnia did not consult with anyone in health care team regarding their symptoms of insomnia.

The reason because Thai heart failure patients had clinical insomnia but many of them didn't pay attention to these suffering symptoms, many of them thought that they had an old age so this situation was normal in aging people. They thought that they had to help themselves and they tried to napping during the day.

**Objective 2** Examine the relationship among the predisposing factors (age, gender, anxiety, depression), the precipitating factors (marital status, dyspnea, sleep disorder breathing, functional status), the perpetuating factors (sleep hygiene, dysfunctional beliefs and attitudes about sleep), and insomnia in patients with heart failure.

### **Predisposing factors**

#### **Age**

**Hypothesis:** Age would have a positive relationship on insomnia.

Age was not significant correlated with insomnia in patients with heart failure by using Chi-square test. This result did not support the hypothesis. The result was consistent with the previous study in patients with heart failure (Erickson et al., 2003). However, this result is inconsistent with a study in general population in Korea, this study reported that insomnia was being higher in those aged 60-69 years than in those aged 20-29 years (OR = 2.368) (Cho et al., 2009). Another one research, Kappler and Hohagen (2003) studied 2,512 patients in general practice found that age was the most powerful predictors of insomnia. Moreover, Nongluk Anunta-ard (2007) was reported

that age had positive relationship with insomnia in hematological malignancies ( $r = .316$ ).

The reason of this study may be sleep of patients with heart failure difference from general population. In general populations, the pattern of sleep changing by age (Bliwise, 2000; Prinz, 2004). However, heart failure patients who had a worsening function of their heart. This severity of their function may not explain their sleep pattern like general population. Age was not correlated in this study may be in every age group had symptoms of dyspnea, this symptoms was one of predicting factors of insomnia or anxiety and depression may explain the difference between the result of this study and other because this study found that anxiety and depression occurred in every age group.

### **Gender**

**Hypothesis:** Gender would have a relationship on insomnia.

The result found that gender was not significant related with insomnia.

This result did not support the hypothesis. This result is inconsistent with previous research in patients with heart failure. This result reported that male gender was related to trouble returning to sleep (Erickson et al., 2003). This result was inconsistent with a study of sleep problem in out-patient of primary care unit, this study found that female was strong factors associated with insomnia (Saisunee Tubtimtes et al., 2009). and inconsistent with a research conducted in Hong Kong Chinese. The result found that a total of 9,851 subjects, females were about 1.6 times at higher risk for insomnia than males (Lia et al., 2002).

Although, several study reported that female had insomnia more than male. Krishnan and Collop (2006) proposed that women have more insomnia than men because of normal physiologic periods, including puberty, menstruation, pregnancy,

and menopause, which associated with alterations in sleep patterns. However, gender may not lead to insomnia by itself but gender correlated with insomnia in a previous study in heart failure patients may be explaining by depression. From the result of this study found that high number of depression both male and female and the number of these symptoms was not significant difference both in male and female.

### **Marital status**

**Hypothesis:** Marital status would have a relationship on insomnia.

This study found that marital status was correlated with insomnia ( $p < .05$ ) and by using multiple logistic regressions found that separated/divorced and widowed marital status was approximately 7 times more likely to be insomnia (odds ratio = 7.051, CI = 1.940-25.617). This result consistency with one study in breast cancer patients, this study reported that widowhood significantly associated with the presence of insomnia symptoms (Savard et al., 2001) and slightly difference with previous study in Chinese people, the result of that study found that married, separated, divorced and widowed marital status were factors for all types of insomnia in Chinese people (Xiang et al., 2008). The reason may be couple in Thai had good relationship and they support each other in many way.

### **Anxiety**

Anxiety would have a positive relationship on insomnia.

Anxiety was significant related with insomnia ( $p < .05$ ) in patients with heart failure, and by using multiple logistic regression analysis found that anxiety significant predictor of insomnia ( $p < .05$ ). Moderate anxiety was approximately three times more likely to be insomnia (OR = 3.133, CI = 1.555-6.311).

This result was consistent with the 3P Model of insomnia, this model was stated that anxiety can inhibit sleep outright through heart racing, muscle tightening,



obsessive thinking, or other means. Anxiety brings psychophysiological changes that interfere with sleep onset and sleep maintenance (Glovinsky and Speiman, 2006).

This result also consistency with a qualitative design explored causes of insomnia in 25 patients with congestive heart failure (Brostrom et al., 2001). They found that anxiety is one of the factors, causing sleep disturbances. In addition a previous study in out-patient of primary care unit, anxiety was strong factors associated with insomnia (Saisunee Tubtimtes et al., 2009) and consistency with a study of Jansson and Linton (2006), this study found that anxiety associated with insomnia in community people (odds ratio: 4.61) and also consistency with 3 studies in patients with cancer, these studies found that higher anxiety significantly associated with clinical significant insomnia.(Keawphang, 2004; Melanie et al., 2009; Savard et al., 2009).

### **Depression**

**Hypothesis:** Depression would have a positive relationship on insomnia.

Depression was significant correlated with insomnia ( $p < .05$ ), and by using multiple logistic regression found that depression was a significant predictive factors of insomnia. Depression was approximately 2.36 times more likely to be insomnia (odds ratio = 2.519, CI = 1.256-5.051).

This result is consistent with the 3P Model of insomnia. This mode was stated that depressed people exhibit a number of other sleep disturbances in addition to insomnia, including reduced deep sleep, increased light sleep, and excessive dream sleep. People who are depressed spend more time awake at night, whether at the beginning, middle, or end. They accumulate less of the deepest NREM sleep stages, while a greater proportion of total sleep time may be developed to REM sleep, often accompanied by vivid, disturbing dreams (Glovinsky and Spielman, 2006).

Depression commonly causes insomnia with difficulty falling asleep, waking and being unable to fall back to sleep, or waking early in the morning (Lippincott, Williams, and Wilkins, 2005). They enter dream sleep earlier in the night and spend a greater percentage of time in dream sleep than nondepressed individuals (Jacobs, 2007).

This result is consistent with both healthy population and illness patients. The study in Japanese women found that depressive state was risk factors for insomnia (OR = 1.2) (Kawada et al., 2003). In addition, studies have shown that depression was a significant positive correlation with insomnia in cancer patients (Nongluk Anuntard, 2007; Pattarieya Keawphang, 2004). Another one researches in the community reported that people with insomnia had greater depression levels than people who had no insomnia and were 9.82 times more likely to have clinically significant depression (Taylor et al., 2005).

### **Precipitating Factors**

#### **Dyspnea**

**Hypothesis:** Dyspnea would have a positive relationship on insomnia.

Dyspnea was significant related with insomnia ( $p < .05$ ), and by using multiple logistic regression found that dyspnea was a significant predictive factors of insomnia. Severe dyspnea was approximately nine times more likely to be insomnia (odds ratio = 9.114, CI = 2.240-37.083). This result is consistent with the 3P Model of insomnia; this model was stated that health issue is a precipitating factor of insomnia. A precipitating event is often outside the individual control, that can trigger sleep disturbance (Glovinsky and Spielman, 2006).

Dyspnea is a respiratory distress that occurs as a result of increased effort in breathing and is the most common symptom of heart failure. Dyspnea led to

difficulties lying flat as well as frequent awakenings, followed by feeling of panic (Brostrom et al., 2001). This result consistent with a research of Principe-Rodriguez et al. (2005). Paroxysmal nocturnal dyspnea correlated with insomnia in patients with heart failure. In addition, from previous qualitative studied in patients with congestive heart failure in sleep situation found that dyspnea was affected the sleep negatively (Brostrom et al., 2001).

### **Sleep Disorder Breathing**

**Hypothesis:** Sleep disorder breathing would have a relationship on insomnia.

Sleep disorder breathing was significant correlated with insomnia in this study ( $p < .05$ ). This result was consistent with the prior research, this result was found that difficulty in initiating sleep correlated significant with sleep disorder breathing (Johansson et al., 2009). However, by using multiple logistic regressions found that sleep disorder breathing was not a significant predictor of insomnia.

Sleep disorder breathing was not significantly predictors of insomnia when other confounding variables were taken into account, this can be explained by the fact that there was low number of patients who had sleep disorder breathing, and about 18% of heart failure patients had sleep disorder breathing.

### **Functional Status**

**Hypothesis:** Functional status would have a positive relationship on insomnia.

There was 65% of heart failure patients had functional class I, 23.2 % had functional class II, 10.3% had functional class III, and 1.5% had functional class IV.

Functional status was significant related with insomnia ( $p < .01$ ). This result is consistent with previous researches in patients with heart failure, this study reported that worsening functional status can correlate with difficulty initiating sleep (Brostrom et al., 2004; Principe-Rodriguez et al., 2005). However, when using

multiple logistic regression functional status was not a significant predictive factors of insomnia.

Functional status was not significantly related with insomnia when other confounding variables were taken into account, this can be explained by the fact that separated/ divorced and widowed, anxiety, depression, dyspnea, and dysfunctional beliefs and attitudes about sleep can predict insomnia better than functional status as a single factor. This result may indicated that functional status per se was not associated with insomnia, and that correlated with functional status and insomnia was due to presence of anxiety and depression, one study found that functional status (NYHA functional class) were a predictors of anxiety and depression in patients with heart failure (Scherer et al., 2007).

### **Perpetuating factors**

#### **Sleep Hygiene**

**Hypothesis:** sleep hygiene would have a positive relationship on insomnia.

Sleep hygiene was a significant correlated with insomnia ( $p < .05$ ). However, by using multiple logistic regressions found that sleep hygiene was not a significant predictive factors of insomnia. This result was consistent with a study of Pattarieya Keawphang (2004), sleep hygiene behavior was not correlated with insomnia in cancer patients. However, this result is inconsistent with the prior research in patients with cancer, the result of this study found that maladaptive sleep behavior was associated with an increase risk for insomnia incidence (Savard et al., 2009).

Sleep hygiene was not significantly predictors of insomnia when other confounding variables were taken into account, this can be explained by the fact that most of heart failure patients in this study did a good sleep hygiene. Most of patient received the information from health care team to take care themselves, there were

lower rate of patients who drinking alcohol, drinking beverages containing caffeine, smoking, or taking sleeping pills.

### **Dysfunctional Beliefs and Attitudes about Sleep**

**Hypothesis:** Dysfunctional beliefs and attitudes about sleep would have a positive relationship on insomnia.

Dysfunctional beliefs and attitudes about sleep was a significant related with insomnia ( $p < .05$ ) and by using multiple logistic regression found that dysfunctional beliefs and attitudes about sleep was a significant predictive factors of insomnia. High dysfunctional beliefs and attitudes about sleep was approximately 4.2 times more likely to be insomnia (OR = 4.156, CI = 1.194-14.462).

This result was consistent with the 3P Model of insomnia, this model was stated that alterations in beliefs and attitudes about sleep that in turn affect sleep itself. People who do not sleep well end up doing a lot more thinking about sleep and about themselves as sleepers and much of this extra thinking is decidedly unhelpful. Chiefly, poor sleepers experience an alteration in their self-image. As a fundamental aspect of life veers out of the control and their daytime functioning plummets, insomnia develop a general sense of vulnerability. Their self-esteem, sense of well-being, and mood are all threatened. Their quality of life suffers, leading to an ever greater focus on sleep. The vicious cycle of worrying about sleeplessness leading to increased arousal leading to worsening sleep in an all too common outcome. In addition to changes in self-image, the experience of insomnia leads to distortions in attitudes and beliefs about sleep itself (Glovinsky and Spielman, 2005).

This result was consistent with a study of Pattarieya Keawphang (2004) studied in cancer patients in order to examine selected factors and insomnia, the result found that belief about sleep significant positive correlation and insomnia of cancer

patients and dysfunctional beliefs about sleep were associated with increased risk for insomnia incident in patient with cancer (Savard et al., 2009), and consistent with Carney et al. (2010) studied in 5 community base insomnia clinics, the result shows that maladaptive sleep beliefs is most strongly associated with clinically significant levels of insomnia.

## **Implications and Recommendations**

The implications and recommendations of this study focus on the implications for nursing practice, nursing education, nursing research, health policy and recommendations for further studies.

### **1.1 Implications for Practice**

The finding of this study demonstrates that high percentage of insomnia in patients with heart failure. Few of them consult with health care providers. Many patients choose to be patients instead of consult because they think that this is a normal situation. This problem was overlooked in real phenomena. Various factors including the predisposing factors (age, depression), the precipitating factor (marital status, dyspnea) and perpetuating factors (dysfunctional beliefs and attitudes about sleep) were predictive of insomnia in patients with heart failure.

Nurse have to concern insomnia problem in this population and find out the factors which lead to insomnia. This study found that the patients had physical symptoms, psychological symptoms, and dysfunctional in their thinking about sleep which causes insomnia. Screening a process should be developed in order to detect insomnia symptoms and the factors that lead to insomnia in each patient. Moreover, appropriate and effective intervention should be developed so as to prevent or reduce insomnia in patients with heart failure. Several factors can be managed by using

independent roles of nurses including psychological factors, cognitive factors and behavioral factors.

### **1.2 Implications for Education**

The finding of this study provides new knowledge regarding the prevalence of insomnia in patients with heart failure who follow-up at heart clinic provides knowledge about the specific characteristic of insomnia in this population and also provide associated factors of insomnia. Not only physical symptoms can produce insomnia but also a psychological aspect and cognitive dimension can increase insomnia in this group of patients. Nursing curricula should be included this knowledge in the field of nursing, particularly in field of cardiovascular nursing.

### **1.3 Implications for Further Research**

This study found 5 predictive factors which lead to insomnia. However, further researches should be study more regarding associated factors of insomnia in this population.

Creating non-pharmacological intervention to manage predictive factors so as to prevent insomnia or decrease insomnia symptom.

### **1.4 Implications for Health Care Policy**

According to the finding of this study, insomnia was a problem which was overlooked in real situations. Insomnia could not be detected until the patient had insomnia in severity. Most of the patients with heart failure did not complain to the health care team about their symptoms of insomnia. Therefore, every hospital should have a policy or a clinical guideline to detect insomnia in patients with heart failure. Moreover, the health care team should set a system to screen or detect the real factors of insomnia and conduct an intervention to solve the insomnia problem or decrease the symptoms of insomnia in patients with heart failure.

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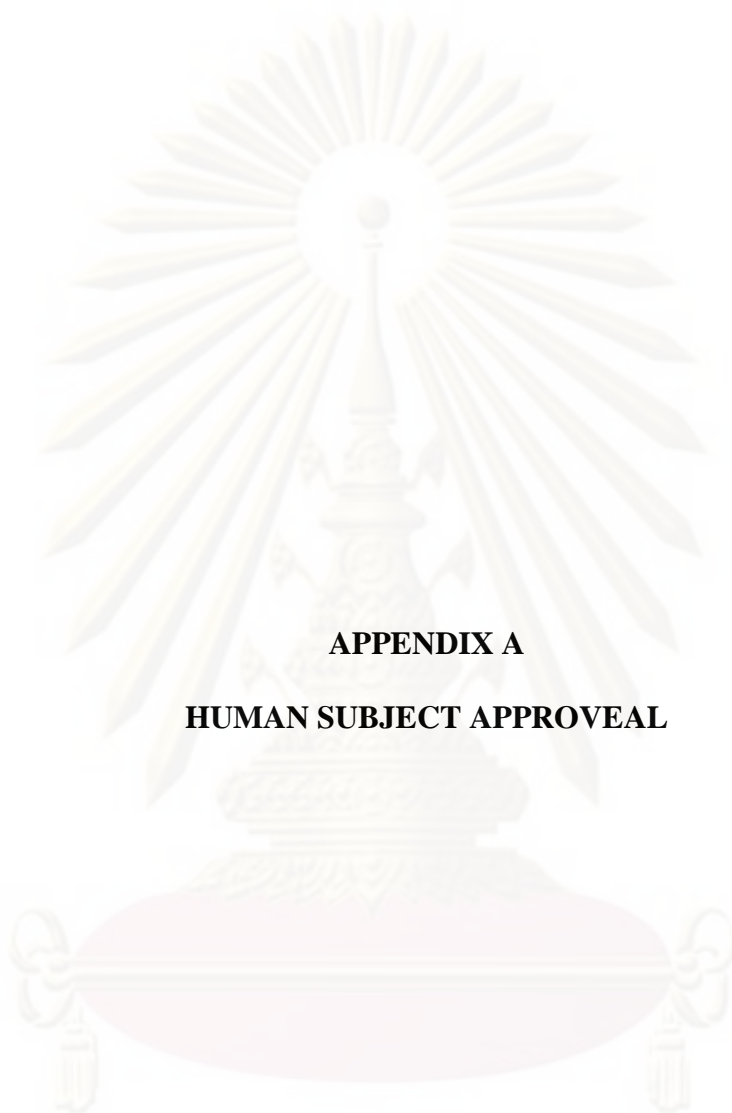
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**APPENDICES**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



**APPENDIX A**

**HUMAN SUBJECT APPROVEAL**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

AF 02-11



The Ethical Review Committee for Research Involving Human Research Subjects,  
Health Science Group, Chulalongkorn University  
Institute Building 2, 4 Floor, Soi Chulalongkorn 62, Phyat hai Rd., Bangkok 10330, Thailand,  
Tel: 0-2218-8147 Fax: 0-2218-8147 E-mail: [eccu@chula.ac.th](mailto:eccu@chula.ac.th)

COA No. 049/2009

### Certificate of Approval

**Study Title No. 021.1/52** : DESCRIPTORS OF INSOMNIA AMONG PERSONS WITH HEART FAILURE  
**Principle Investigator** : Miss Janya Chimluang, Doctor of Philosophy in Nursing Sciences  
**Place of Proposed Study/Institution** : Faculty of Nursing,  
Chulalongkorn University

The Ethical Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, Thailand, has approved, constituted in accordance with the International Conference on Harmonization – Good Clinical Practice (ICH-GCP), the above study project.

Signature: *Prida Tasanapradit*  
(Associate Professor Prida Tasanapradit, M.D.)  
Chairman

Signature: *Nuntaree Chaichanawongsaroj*  
(Assistant Professor Nuntaree Chaichanawongsaroj, Ph.D.)  
Secretary

Date of Approval : 8 April 2009

Approval Expire date : 7 April 2010

#### The approval documents including

- 1) Research proposal
- 2) Patient/Participant Information Sheet and Informed Consent Form
- 3) Researcher
- 4) Questionnaire



เลขที่โครงการวิจัย 021.1/52  
วันพิจารณา - 8 APR 2009  
วันหมดอายุ - 7 APR 2010

#### The approved investigator must comply with the following conditions:

1. I fully understand that it is unethical to collect studied data before the project has been approved by the Ethical Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University (ECCU).
2. The research project activities must be ended on the approval expired date. If require extension of approval required, application should be done along with research progress report not less than one month prior to expired date.
3. Strictly conduct the research project activities as mentioned in the proposal.
4. Use only forms bearing the ECCU's seal of approval (participant information sheet, consent form, advertising leaflet (if any), and send photocopies of the first set of forms used to ECCU).
5. Report to ECCU for any serious adverse events within 5 working days.
6. Report to ECCU for any change of the research project activities prior to conducting the activities.
7. Send final report (AF 03-11) and abstract for a one year (or less) research project within 30 days after the completion of the research project. For thesis, send abstract within 30 days after the completion of the research project.

คุณจุฬาลงกรณ์มหาวิทยาลัย

ที่ ขร 0027.102/ 24533



เอกสารรับรองโครงการวิจัย

โดย

คณะกรรมการพิจารณาด้านจริยธรรมในการศึกษาวิจัยทางชีวเวชศาสตร์

โรงพยาบาลเชียงรายประชานุเคราะห์

คณะกรรมการพิจารณาด้านจริยธรรมในการศึกษาวิจัยทางชีวเวชศาสตร์ โรงพยาบาลเชียงราย-  
ประชานุเคราะห์ ขอรับรองว่า

โครงการวิจัย : อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว

ของ : นางสาวจรรยา ฉิมหลวง

สังกัด : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ได้รับการพิจารณาแล้ว เห็นว่า ไม่มีการล่วงละเมิดสิทธิ สวัสดิภาพ และไม่ก่อให้เกิดอันตรายแก่  
อาสาสมัครที่เข้าร่วมการวิจัย

จึงเห็นสมควรให้ดำเนินการวิจัยในโรงพยาบาลเชียงรายประชานุเคราะห์ตามขอบข่ายของ  
โครงการวิจัย ที่เสนอได้ ระหว่างวันที่ 13 สิงหาคม 2552 ถึงวันที่ 12 สิงหาคม 2553

ออกให้ ณ วันที่ 30 สิงหาคม 2552

ลงนาม

(นายแพทย์สุภัท ปิไลภกร)

แทน ประธานกรรมการพิจารณาด้านจริยธรรม

ในการศึกษาวิจัยทางชีวเวชศาสตร์

ลงนาม

(นายแพทย์สุทัศน์ ศรีวิไล)

ผู้อำนวยการ

โรงพยาบาลเชียงรายประชานุเคราะห์

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย



**Certificate of Approval**

No. 199/2009

<b>Name of Ethics Committee :</b> Research Ethics Committee 3, Faculty of Medicine, Chiang Mai University <b>Address of Ethics Committee :</b> 110 Intavaroros Rd., Amphoe Muang, Chiang Mai, Thailand 50200	
<b>Principal Investigator :</b> Janya Chimluang Faculty of Nursing, Chulalongkorn University	
<b>Protocol title:</b> Descriptors of Insomnia among Persons with Heart Failure <b>Study code :</b> 09MAY211114 <b>Sponsor :</b> -	
Documents filed	Document reference
Research protocol	- Version 1 date 30 April 2009
Informed consent documents /Patient information sheet	- Version 2 date 10 June 2009
Case Report Form	- Version date 1 July 2009
Principal Investigator Curriculum vitae	- Version date 30 April 2009
Opinion of the Ethics Committee/Institutional Review Board : PLS. CHECK ONE <input checked="" type="checkbox"/> Approval <input type="checkbox"/> Conditional approval (Specify on space below) ..... <b>DECISION :</b> By expedited review process <b>Date of Approval :</b> July 1, 2009 <b>Expiration Date:</b> June 30, 2010 This Ethics Committee is organized and operates according to GCPs and relevant international ethical guidelines, the applicable laws and regulations.	
Signed : ..... <i>P. Kulapongs</i> ..... (Emeritus Professor Panja Kulapongs, M.D.) Chairperson, Faculty of Medicine  Signed : ..... <i>N. Nantachit</i> ..... (Associate Professor Niwes Nantachit, M.D.) Dean, Faculty of Medicine	

ศูนย์วิจัยทางการแพทย์  
จุฬาลงกรณ์มหาวิทยาลัย

ใบรับรองจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลขอนแก่น (จ.4)



## เอกสารรับรองจริยธรรมการวิจัยในมนุษย์

เอกสารฉบับนี้ เพื่อแสดงว่า โครงการวิจัย

เรื่อง อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว

ผู้วิจัย คือ นางสาวจรรยา จิมหลวง และคณะ

สถาบัน/หน่วยงาน นิตินันท์ปริญญาคุชกุ๊ปบัณฑิต คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ได้ผ่านการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลขอนแก่นโดยอ้าง  
 ปฏิบัติตามเฮลซิงกิแล้ว และเห็นว่าผู้วิจัยต้องดำเนินการตามโครงการวิจัยที่ได้กำหนดไว้ หากจะมีการ  
 ปรับเปลี่ยนหรือแก้ไขใด ๆ ควรผ่านความเห็นชอบหรือแจ้งต่อคณะกรรมการจริยธรรมการวิจัยใน  
 มนุษย์ โรงพยาบาลขอนแก่นก่อน

ออกให้ ณ วันที่ 21 เดือน กรกฎาคม พ.ศ. 2552

ลงชื่อ .....

(นายสมศักดิ์ ประภักถาวร)

นายแพทย์เชี่ยวชาญ

ประธานกรรมการจริยธรรมการวิจัยในมนุษย์

โรงพยาบาลขอนแก่น

ลงชื่อ .....

(นายวิระศักดิ์ อนุสรย์กุล)

นายแพทย์ชำนาญการพิเศษ

ผู้อำนวยการแทนผู้อำนวยการ โรงพยาบาลขอนแก่น

คณะกรรมการ  
จริยธรรมวิจัยในมนุษย์

รพ.ขอนแก่น

ลำดับที่ 66/02 /2552

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลขอนแก่น

สำนักงาน: งานวิจัยและระบาดวิทยาคลินิก กลุ่มพัฒนาระบบบริการสุขภาพ โรงพยาบาลขอนแก่น

ถนนศรีจันทร์ อำเภอเมือง จังหวัดขอนแก่น 40000 ; e-mail : nichits@yahoo.com

โทร. (043) 336789 ต่อ 1160 โทรสาร (043) 337053

จุฬาลงกรณ์มหาวิทยาลัย

รหัสเอกสารรับรอง 010/2552



## เอกสารรับรองจริยธรรมโครงการวิจัยในมนุษย์


คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสรรพสิทธิประสงค์ อุบลราชธานี


ชื่อโครงการ           อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว  
 DESCRIPTORS OF INSOMNIA AMONG PERSONS WITH HEART FAILURE

ผู้วิจัยหลัก           นางสาวจรรยา งามหลวง

หน่วยงาน/สภามัน     คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสรรพสิทธิประสงค์ อุบลราชธานี ได้พิจารณารายละเอียดของโครงการวิจัย เอกสารข้อมูลสำหรับอาสาสมัคร เอกสารแสดงความยินยอม เข้าร่วมการวิจัยภาษาไทยแล้ว มีมติสมควรให้ดำเนินการวิจัยในขอบเขตของโครงการที่เสนอได้

  
 (นายแพทย์จิวรัตน์ มุลศาสตร์)  
 ประธานคณะกรรมการการวิจัยในมนุษย์

  
 (นายแพทย์ยิมนิต กนกศิลป์)  
 ผู้อำนวยการโรงพยาบาลสรรพสิทธิประสงค์

วันที่รับรอง : 25 ส.ค. 2552

วันหมดอายุของการรับรอง : 24 ส.ค. 2553

## เอกสารที่รับรองรวมถึง

1. โครงการวิจัย
2. ใบยินยอมและเอกสารชี้แจงอาสาสมัคร
3. ผู้วิจัย/คณะผู้วิจัย
4. แบบสอบถาม/แบบบันทึกข้อมูล

ผู้วิจัยที่ไว้ดำเนินการรับรองต้องปฏิบัติตามเงื่อนไขดังต่อไปนี้

1. ผู้วิจัยที่ทราบว่าเป็นการวิจัยจริยธรรมที่จะรวบรวมข้อมูลเพื่อศึกษาค้นคว้าโครงการได้รับการรับรองโดยคณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสรรพสิทธิประสงค์ อุบลราชธานี
2. กิจกรรมของโครงการวิจัยต้องจบลงภายในวันหมดอายุของการรับรอง ถ้าต้องการขยายเวลา ต้องยื่นแสดงความจำนงก่อนวันหมดอายุ 30 วัน
3. ผู้วิจัยต้องทำการศึกษาดูตามระเบียบไว้ในโครงการงานวิจัยอย่างเคร่งครัด
4. ใช้เพียงแบบฟอร์มที่คณะกรรมการจริยธรรมการวิจัยในมนุษย์ (ใบยินยอมและเอกสารชี้แจงอาสาสมัคร, แบบประชาสัมพันธ์ เป็นต้น) และ คณะกรรมการจริยธรรมที่มีสิทธิตรวจสอบเอกสารดังกล่าวได้ทุกครั้งเมื่อต้องการ
5. ในกรณีที่เกิดเหตุการขัดแย้งเรื่องร้องเรียน ต้องรายงานคณะกรรมการจริยธรรมภายใน 5 วันทำการ
6. ในกรณีที่มีการเปลี่ยนแปลงกิจกรรมไปจากเดิมที่รับรองไว้ ต้องรายงานคณะกรรมการจริยธรรมฯ ก่อนที่จะเริ่มทำกิจกรรมนั้นๆ
7. ส่งรายงานการวิจัยฉบับสมบูรณ์ถึงโครงการวิจัยเสร็จสิ้นแล้ว จำนวน 1 ฉบับ

เอกสารนี้เป็นของ: ศูนย์วิจัย รพ.สรรพสิทธิประสงค์ ๓, สรรพสิทธิ ๓, ในเมือง ๔, เมือง ๔, อุบลราชธานี 34000 โทรศัพท์ 0-45-244923  
 ๒๕ 1 195



ศูนย์วิจัยการแพทย์ทางไกล  
 จุฬาลงกรณ์มหาวิทยาลัย

เอกสารเลขที่ 35 /2552



เอกสารรับรองโครงการวิจัย  
โดย คณะกรรมการวิจัย โรงพยาบาลชลบุรี

โครงการวิจัย : อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว  
Descriptors of Insomnia among Persons with Heart Failure

ผู้ดำเนินการวิจัยหลัก : นางสาวชรรษา ฉิมหลวง

หน่วยงานที่รับผิดชอบ : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการวิจัย โรงพยาบาลชลบุรี ได้พิจารณาแล้วเห็นว่าสมควร ให้ดำเนินการวิจัยในขอบข่ายของ  
โครงการวิจัยที่เสนอได้ ตั้งแต่ตั้งแต่วันที่ 13 สิงหาคม 2552 จนถึงวันที่ 13 สิงหาคม 2553

ออกหนังสือ ณ วันที่ 10 สิงหาคม 2552

ลงนาม

(นายแพทย์ทรงเทพ ไซประสิทธิ์)  
ประธานคณะกรรมการวิจัย

ลงนาม

(นายแพทย์ชาติร์ ตันติยวงศ์)  
ผู้อำนวยการ โรงพยาบาลชลบุรี

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย





COA No. 421/2009  
IRB No. 131/52

**INSTITUTIONAL REVIEW BOARD**  
**Faculty of Medicine, Chulalongkorn University**  
1873 Rama 4 Road, Patumwan, Bangkok 10330, Thailand, Tel 662-256-4455 ext 14, 15

**Certificate of Approval**

The Institutional Review Board of the Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, has approved the following study which is to be carried out in compliance with the International guidelines for human research protection as Declaration of Helsinki, The Belmont Report, CIOMS Guideline and International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

**Study Title** : Descriptors of Insomnia among Persons with Heart Failure

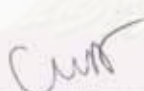
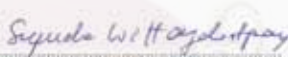
**Study Code** :-

**Study Center** : Chulalongkorn University

**Principal Investigator** : Miss Janya Chimluang

**Document Reviewed** :

1. Protocol Version 2 Date April 9, 2009
2. Information sheet for research volunteer version 2 date April 9, 2009
3. Consent Form version 2 date April 9, 2009
4. CRF

Signature:  Signature:   
(Associate Professor Unnop Jaisamram MD, MHS) (Associate Professor Supescha Wittayalertpanya)  
Acting Chairman of Acting Committee and Secretary of  
The Institutional Review Board The Institutional Review Board

**Date of Approval** : May 21, 2009

**Approval Expire Date** : May 21, 2010

Approval is granted subject to the following conditions: (see back of this Certificate)

ศูนย์วิทยุโทรพยากร

จุฬาลงกรณ์มหาวิทยาลัย

2 PRANNOK RD, BANGKOKNOI  
BANGKOK 10700



Tel. (662) 4196405-6  
FAX (662) 4196405

MAHIDOL UNIVERSITY  
Since 1888

Siriraj Institutional Review Board

Certificate of Approval

COA no.SI 341/2009

**Protocol Title** : Insomnia among congestive heart failure patient.

**Protocol number** : 255/2552(EC2)

**Principal Investigator/Affiliation** : Miss Janya Chimluang  
Faculty of Nursing, Chulalongkorn University.

**Research site** : Faculty of Medicine Siriraj Hospital

**Approval includes** :

1. SIRB Submission Form
2. Proposal
3. Informed Consent Form
4. Case Record Form
5. Questionnaire

**Approval date** : July 17, 2009

**Expired date** : July 16, 2010

This is to certify that Siriraj Institutional Review Board is in full Compliance with International Guidelines For Human Research Protection such as the Declaration of Helsinki, the Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP).

(Prof. Jariya Lertakyamane, M.D.)  
Chairperson

July 20, 2009

date

(Clin. Prof. Teerasat Kulthanan, M.D.)  
Dean of Faculty of Medicine Siriraj Hospital

July 22, 2009

date

Page 1 of 2

จุฬาลงกรณ์มหาวิทยาลัย

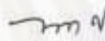


เอกสารรับรองจริยธรรมทางการวิจัย

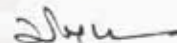
เอกสารฉบับนี้ เพื่อแสดงว่า โครงการวิจัย  
เรื่อง อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว  
ผู้วิจัย คือ นางสาวจรรยา นิมหลอด  
หน่วยงาน คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ได้ผ่านการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสุราษฎร์ธานีแล้ว และเห็นว่า  
ผู้วิจัยต้องดำเนินการตามโครงการวิจัยที่ได้กำหนดไว้แล้ว หากมีการปรับเปลี่ยนหรือแก้ไขใด ๆ ควรผ่าน  
ความเห็นชอบหรือแจ้งต่อคณะกรรมการจริยธรรมทางการวิจัยอีกครั้ง

ออกให้ ณ วันที่ 26 เดือน สิงหาคม พ.ศ. 2552

ลงชื่อ   
(นายทรงศักดิ์ เสรีโรคม)  
นายแพทย์ 9

ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์

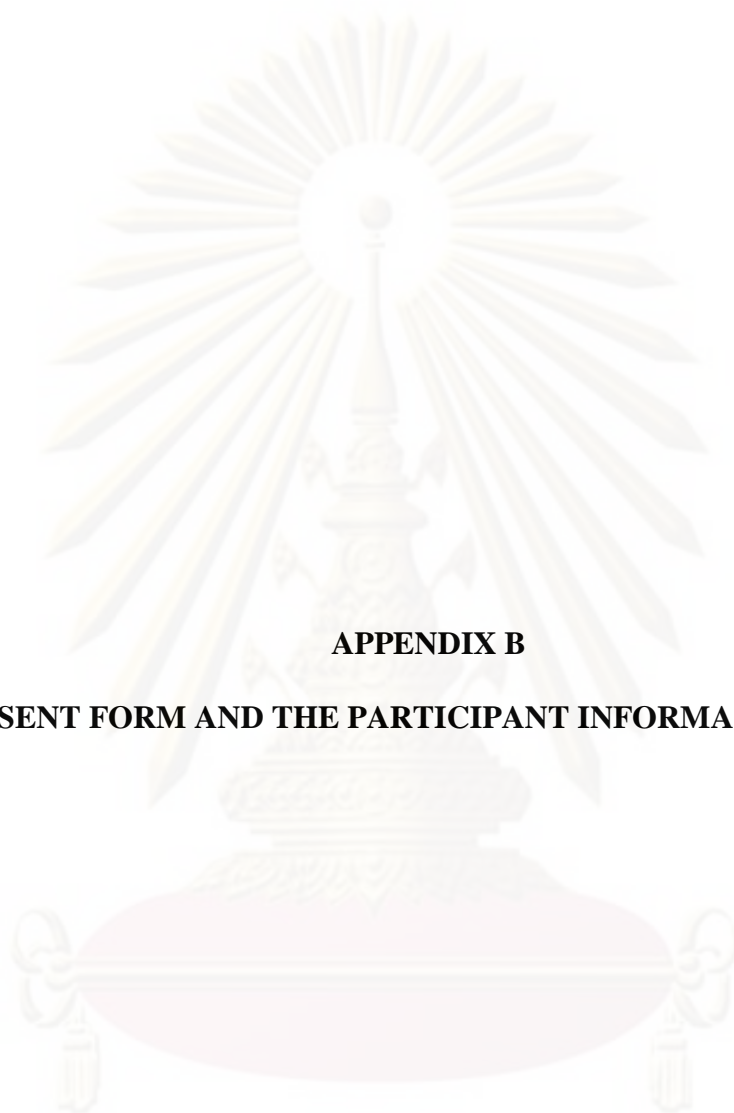
ลงชื่อ   
(นายประวิง เอื้อนนัทธ)  
ผู้อำนวยการ

ลำดับที่ 22/2552

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสุราษฎร์ธานี อ.ศรีวิชัย อ.เมือง จ.สุราษฎร์ธานี 84000  
โทร. (077) 272231 ต่อ 2464, 2079 โทรสาร (077) 283257

ศูนย์วิจัยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย



**APPENDIX B**

**CONSENT FORM AND THE PARTICIPANT INFORMATION SHEET**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

**ใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย  
(Informed Consent Form)**

ชื่อโครงการวิจัย อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว

เลขที่ ประชากรหรือผู้มีส่วนร่วมในการวิจัย.....

ข้าพเจ้าซึ่งได้ลงนามที่ด้านล่างของหนังสือเล่มนี้ ได้รับคำอธิบายอย่างชัดเจนจนเป็นที่พอใจจากผู้วิจัย ชื่อ นางสาวจรรยา ฉิมหลวง นิสิตปริญญาเอก คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย สถานที่ติดต่อ คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย เบอร์โทรศัพท์มือถือ 080-5510640 ถึงวัตถุประสงค์และขั้นตอนการวิจัย ความเสี่ยง/อันตราย และประโยชน์ซึ่งจะเกิดขึ้นจากการวิจัยเรื่องนี้แล้ว

ข้าพเจ้าเข้าร่วมการวิจัยครั้งนี้ด้วยความสมัครใจที่จะตอบแบบสอบถาม 9 ชุด โดยใช้เวลาในการตอบแบบสอบถามประมาณ 30 นาที และข้าพเจ้ามีสิทธิ จะถอนตัวออกจากการวิจัยเมื่อไรก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล ซึ่งการถอนตัวออกจากการวิจัยนั้น จะไม่มีผลกระทบในทางใดๆ แก่ข้าพเจ้าทั้งสิ้น

ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติตามข้าพเจ้าตามข้อมูลที่ได้ระบุไว้ และข้อมูลใดๆ ที่เกี่ยวข้องกัข้าพเจ้าจะเก็บรักษาเป็นความลับ

ข้าพเจ้ายินดีเข้าร่วมการวิจัยครั้งนี้ ภายใต้เงื่อนไขที่ระบุไว้ในเอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

ข้าพเจ้าได้รับสำเนาเอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัยแล้ว

.....

.....

สถานที่ / วันที่

( )

ลงนามผู้มีส่วนร่วมในการวิจัย

.....

.....

(นางสาวจรรยา ฉิมหลวง)

สถานที่ / วันที่

ลงนามผู้วิจัยหลัก

.....

.....

สถานที่ / วันที่

( )

พยาน

### Informed Consent Form

**Title of research project** Descriptors of insomnia among persons with heart failure  
**Code number of participant** .....

I who have signed here below agree to participate in this research project  
 (Title Descriptors of insomnia among persons with heart failure)

I have (read or been informed) about objective of the project, what will be done upon me, risk/harm and benefit of this project. The researcher has explained to me and I clearly understand with satisfaction. The researcher name is Miss Janya Chimluang from faculty of nursing, Chulalongkorn University. Contact the researcher at faculty of nursing, Chulalongkorn University. My mobile phone number is 080-5510640.

I willingly agree to participate in this project and consent the researcher to response to 9 questionnaires, the total amount of time to do the questionnaire about 30 minute.

I have the right to withdraw from this research project at any time as I wish with no need to give any reason. This withdrawal will not have any negative impact upon me by all means.

I have been guaranteed that the researcher will act upon me exactly what have been indicated in the information. Any of my personal information will be kept confidential. Results of study will be reported as total picture. Any indirect information which could be able to identify me will not appear in the report.

I also have received a copy of information sheet and informed consent form

-----  
 Place / Time

-----  
 (Participant signature)

-----  
 Place / Time

-----  
 (Miss Janya Chimluang)

-----  
 Place / Time

-----  
 (Witness signature)

ศูนย์วิทยุทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย  
(Patient/ Participant Information Sheet)

ชื่อโครงการวิจัย อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว

ชื่อผู้วิจัย นางสาวจรรยา ฉิมหลวง นิสิตคณะพยาบาลศาสตร์จุฬาลงกรณ์มหาวิทยาลัย

สถานที่ติดต่อผู้วิจัย คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ที่อยู่ 4206 ม. 1 ซ. ด่านสำโรง 50 /27 ต. สำโรงเหนือ อ.เมือง จ. สมุทรปราการ

รหัสไปรษณีย์ 10270 หมายเลขโทรศัพท์ 02-3613349

หมายเลขโทรศัพท์มือถือ 080-5510640

ดิฉันนางสาวจรรยา ฉิมหลวง นิสิตปริญญาเอก คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย มีความประสงค์ที่จะขอความร่วมมือจากท่านเพื่อเป็นผู้มีส่วนร่วมในการวิจัยเรื่อง อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว โดยรายละเอียดเกี่ยวกับการวิจัยเป็นดังนี้ รายละเอียดเกี่ยวกับการวิจัยเป็นดังนี้

1. เนื่องจากผู้วิจัยได้ทำการศึกษาเรื่อง อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว โดยงานวิจัยนี้ต้องการศึกษาความชุกของอาการนอนไม่หลับ รูปแบบของอาการนอนไม่หลับและปัจจัยที่มีความสัมพันธ์กับอาการนอนไม่หลับ

2. ผู้เข้าร่วมโครงการวิจัยในครั้งนี้เป็นผู้ป่วยหัวใจล้มเหลว ที่มีอายุตั้งแต่ 18 ปีขึ้นไป พูดภาษาไทยได้ ไม่มีปัญหาเรื่องความคิด ความจำ หรือโรคจิตประสาท ที่เข้ารับการรักษาที่คลินิกโรคหัวใจ แผนกผู้ป่วยนอก โดยผู้วิจัยใช้วิธีการสุ่มโรงพยาบาลระดับใหญ่จำนวน 2 โรงพยาบาล ในแต่ละภาคของประเทศไทย รวมเป็นทั้งหมด 10 โรงพยาบาล ในแต่ละโรงพยาบาลจะมีผู้เข้าร่วมโครงการวิจัยจำนวน 34 คน โดยงานวิจัยนี้จะมีผู้เข้าร่วมโครงการวิจัยทั้งหมด 340 คน

3. ท่านจะได้รับการชี้แจงจากผู้วิจัยถึงเป้าหมายขั้นตอนการเก็บข้อมูล หลังจากนั้นท่านจะได้รับแบบสอบถาม 9 ชุด เพื่อให้ผู้เข้าร่วมโครงการวิจัยตอบคำถามในแบบสอบถาม ดังนี้

1. ข้อมูลทั่วไป
2. แบบสอบถามความวิตกกังวล
3. แบบสอบถามอาการซึมเศร้า
4. แบบสอบถามอาการหายใจลำบาก
5. แบบสอบถามการหยุดหายใจในขณะนอนหลับ
6. แบบสอบถามระดับความสามารถในการปฏิบัติกิจกรรม
7. แบบสอบถามความตระหนักในเรื่องสุขอนามัยของการนอนหลับและระดับการปฏิบัติ
8. แบบสอบถามความเชื่อและทัศนคติที่ผิดเกี่ยวกับการนอนหลับและ
9. แบบสอบถามอาการนอนไม่หลับ โดยใช้เวลารวมทั้งหมดประมาณ 30 นาที

4. ท่านจะเสียเวลาในการตอบแบบสอบถามทั้งหมดประมาณ 30 นาที และท่านอาจเกิดอาการดังต่อไปนี้ เช่น รู้สึกไม่สบาย มีอาการเหนื่อย หรืออ่อนเพลียในขณะที่ตอบแบบสอบถาม โดยท่านสามารถพักได้ตลอดเวลาโดยผู้วิจัยหรือผู้ช่วยวิจัยจะดูแลและช่วยเหลือท่าน
5. ท่านอาจไม่ตอบคำถามข้อใดข้อหนึ่งที่ท่านรู้สึกไม่สบายใจที่จะตอบและท่านสามารถถอนตัวจากการวิจัยได้ทุกขณะโดยไม่เสียประโยชน์ที่จะได้รับ
6. ผู้วิจัยจะขอข้อมูลในเรื่องของอาการ โรคประจำตัว และการรักษาที่ได้รับจากแพทย์จากแฟ้มประวัติของท่านด้วย
7. หากท่านมีข้อสงสัยให้สอบถามเพิ่มเติมได้โดยสามารถติดต่อผู้วิจัยได้ตลอดเวลาที่เบอร์มือถือ 080-5510640
8. ข้อมูลที่เกี่ยวข้องกับท่านจะเก็บเป็นความลับ หากมีการเสนอผลการวิจัยจะเสนอเป็นภาพรวม
9. เพื่อเป็นการตอบแทนการเสียเวลาในการตอบแบบสอบถามผู้วิจัยขอมอบถุงผ้าใส่ของให้แก่ผู้เข้าร่วมวิจัยทุกราย
10. หากท่านไม่ได้รับการปฏิบัติตามข้อมูลดังกล่าวสามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ชั้น 4 อาคารสถาบัน 2 ซอย จุฬาลงกรณ์ 62 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์ 0-2218-8147 โทรสาร 0-2218-8147 E-mail: eccu@chula.ac.th

ขอขอบคุณในการร่วมมือของท่านมา ณ ที่นี้

.....

ศูนย์วิทยพัชร์พยากร  
จุฬาลงกรณ์มหาวิทยาลัย



### **Patient/ Participant Information Sheet**

**Title of research project** Descriptors of insomnia among persons with heart failure

**Principles researcher's Name** Janya Chimlaung Doctoral student in nursing

**Office address** Faculty of Nursing, Chulalongkorn University, Bangkok, Thailand

**Home address** 4206 Moo 1 Soi Dansomrong 50/27 Sukumvit Road Tumbon Somrongneai Amphur Muang Samuthprakarn Province Zip code 10270

**Telephone (home)** 02-3613349 **Cell phone** 080-5510640

I am Miss Janya Chimluang, nursing student in doctoral degree at Chulalongkorn University. I would like you to cooperate as participant in my study. The detail of this study as follows:

1. The objectives of this study are to estimate prevalence of insomnia, to study patterns of insomnia and also examine predictive factors of insomnia.

2. Participants in this study are the persons with heart failure age  $\geq 18$  years. The participants can communicate with Thai Language; do not have some problem about thinking memory or psychosis and no chest pain who follow up at outpatients department. The researcher was random 2 hospitals from tertiary hospital in each region. The total 10 hospitals were included in this study. Then the researcher will be random 34 participants from each of hospital. The total of participants in this study is 340 participants.

3. The participants will receive the information from the researcher about objective of the study and the process of data collection. Then, the researcher give 9 questionnaire to the participant to answer the questionnaire including demographic questionnaire, anxiety questionnaire, depression questionnaire, dysnea questionnaire, sleep apnea questionnaire, subjective New York Heart Association Functional Classification questionnaire, sleep hygiene awareness and practice scale and dysfunctional beliefs and attitudes about sleep questionnaire and Insomnia Severity Index. The total amount of time about 30 minutes.

4. During answer the question in questionnaire, the possibility fatigue and tiredness may occur. Participants can rest anytime. The researcher will caring and support participants.

5. The benefits of conducting this will be provided knowledge for nurses and other health care providers regarding insomnia in persons with heart failure in order to prevent and conducting intervention to improve insomnia symptoms in patients with heart failure.

6. Participation to the study is voluntary and participant has the right to withdraw from the study at any time, no need to give any reason, and there will be no bad impact upon that participant.

7. If you have any question or would like to obtain more information. Participants can contact the researcher Janya Chimluang, via cell phone number 080-5510640 all the time. If the researcher has now information regarding benefit on risk/harm, participants will be informed as soon as possible", this practice will provide an opportunity for participants to decide whether to stay/not stay with the project.

8. Information related directly to you will be kept confidential. Results of the study will be reported as total picture. Any indirect information which could be able to identity you will not appear in the report.

9. Participant will receive souvenir from the researcher

10. If researcher does not perform upon participants as indicated in the information. The participant can report the incident to the Ethical Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University (ECCU). Institute Building 2, 4<sup>th</sup> Floor, Soi Chulalongkorn 62, Phayathai Rd., Bangkok 10330, Thailand, Tel: 0-2218-8147 Fax: 0-2218-8147 E-mail: eccu@chula.ac.th.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



**APPENDIX C**  
**INSTRUMENT**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

### แบบบันทึกข้อมูลส่วนบุคคล

คำชี้แจง : โปรดเติมค่าลงในช่องว่าง หรือทำเครื่องหมาย (✓) หน้าข้อที่ตรงกับข้อมูลส่วนบุคคลของท่าน

#### 1. แบบบันทึกข้อมูลส่วนบุคคล

- 1.1 อายุ ..... ปี
- 1.2 เพศ  ชาย  หญิง
- 1.3 สถานภาพสมรส  โสด  แต่งงาน  แยกกันอยู่  หย่า  หม้าย
- 1.4 ศาสนา  พุทธ  อิสลาม  คริสต์  อื่น ๆ.....
- 1.5 ระดับการศึกษาสูงสุด
- ไม่ได้เรียนหนังสือ  ปริญญาตรี
- ประถมศึกษา  ปริญญาโท
- มัธยมศึกษา  ปริญญาเอก
- อาชีวศึกษา/ประกาศนียบัตร
- 1.6 อาชีพ
- ไม่ได้ประกอบอาชีพ  ธุรกิจส่วนตัว
- นิสิต/นักศึกษา  รับราชการ/รัฐวิสาหกิจ/พนักงานของรัฐ
- รับจ้าง  เกษตรกร/ทำสวน/ทำไร่
- ค้าขาย  อื่น ๆ ระบุ.....
- 1.7 รายได้ต่อเดือน
- น้อยกว่า 5,000 บาท  20,001- 30,000 บาท
- 5,001-10,000 บาท  มากกว่า 30, 000 บาท
- 10,001-20,000 บาท

#### 2. แบบบันทึกข้อมูลเกี่ยวกับภาวะหัวใจล้มเหลวและการรักษา (ผู้วิจัยเป็นผู้บันทึกจากแฟ้มประวัติ)

- 2.1 สาเหตุของภาวะหัวใจล้มเหลว.....
- 2.2 ระยะเวลาของการมีภาวะหัวใจล้มเหลว.....
- 2.3 ค่าการบีบตัวของหัวใจห้องล่างซ้าย.....
- 2.4 โรคประจำตัวอื่น ๆ .....
- 2.5 ยาที่ได้รับ ปริมาณยาที่ให้ต่อครั้งและเวลาที่ใช้.....
- .....
- .....

### แบบประเมินความวิตกกังวล

**คำชี้แจง** แบบประเมินนี้ประกอบด้วย 20 ข้อ ข้อความแต่ละข้อใช้อธิบายความรู้สึกของท่าน ในช่วง 1 เดือนที่ผ่านมา ขอให้ท่านพิจารณาข้อความที่ตรงกับความรู้สึกของท่านมากที่สุด แล้วทำเครื่องหมาย (✓) ลงในช่องว่างด้านขวามือ โดยมีเกณฑ์ในการตอบคำถามดังนี้

- มีมาก (4) หมายถึง ข้อความนั้นตรงกับความรู้สึกของท่านมากที่สุด  
 มีค่อนข้างมาก (3) หมายถึง ข้อความนั้นตรงกับความรู้สึกของท่านค่อนข้างมาก  
 มีเล็กน้อย (2) หมายถึง ข้อความนั้นตรงกับความรู้สึกของท่านเล็กน้อย  
 ไม่มีเลย (1) หมายถึง ข้อความประโยคนั้นไม่ตรงกับความรู้สึกของท่าน

ข้อความ	ไม่มีเลย (1)	มีเล็กน้อย (2)	มีค่อนข้างมาก (3)	มีมาก (4)
1. ข้าพเจ้ารู้สึกสงบ.....	.....	.....	.....	.....
2. ข้าพเจ้ารู้สึกมั่นคงในชีวิต.....	.....	.....	.....	.....
3. ท่านรู้สึกดีที่เครียด.....	.....	.....	.....	.....
.	.....	.....	.....	.....
.	.....	.....	.....	.....
.	.....	.....	.....	.....
.	.....	.....	.....	.....
20. ท่านรู้สึกสดชื่นแจ่มใส.....	.....	.....	.....	.....

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

### แบบประเมินภาวะซึมเศร้า

**คำชี้แจง** โปรดพิจารณาว่าข้อใดตรงกับความรู้สึกของท่านมากที่สุดในช่วงเวลา **1เดือนที่ผ่านมา** แล้วทำเครื่องหมาย (✓) ลงในช่องว่างของแต่ละกิจกรรมที่ตรงกับความรู้สึกของท่านมากที่สุด

ข้อความ	ไม่เลย (0)	นานๆครั้ง 1-2 วัน ต่อสัปดาห์ (1)	ค่อนข้างบ่อย 3-4 วัน ต่อสัปดาห์ (2)	บ่อยครั้ง 5-7 วัน ต่อสัปดาห์ (3)
1. ท่านรู้สึกหงุดหงิดง่าย.....	.....	.....	.....	.....
2. ท่านรู้สึกเบื่ออาหาร.....	.....	.....	.....	.....
3. ท่านรู้สึกว่าไม่สามารถจัดความ หม่นหมองออกไป แม้ว่าจะมีคนใน ครอบครัวหรือเพื่อนคอยช่วยเหลือ...	.....	.....	.....	.....
.	.....	.....	.....	.....
.	.....	.....	.....	.....
.	.....	.....	.....	.....
20. ท่านรู้สึกท้อแท้ในชีวิต.....	.....	.....	.....	.....

### แบบประเมินอาการหายใจลำบาก

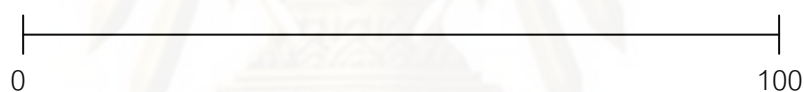
**คำชี้แจง** แบบประเมินนี้ประกอบด้วยข้อคำถาม เกี่ยวกับความรู้สึกหายใจลำบากของท่าน

**ในช่วงเวลา 1 เดือนที่ผ่านมา** โดยมีช่วงคะแนนความรู้สึกระหว่าง 0 – 100 คะแนน ขอให้ท่านทำเครื่องหมายกากบาท (X) ลงบนเส้นตรงตำแหน่งที่ตรงกับความรู้สึกของท่านขณะนั้นจริงๆ ไม่ว่าจะท่านจะกากบาทลงบนตำแหน่งใด จะไม่มีตำแหน่งที่ถูกหรือผิด เพราะเป็นความรู้สึกของท่านเอง

#### ตัวอย่างเช่น



1. ท่านรู้สึกว่าการหายใจลำบากของท่านมีความรุนแรงมากน้อยเพียงใด



ไม่มีอาการหายใจลำบากเลย

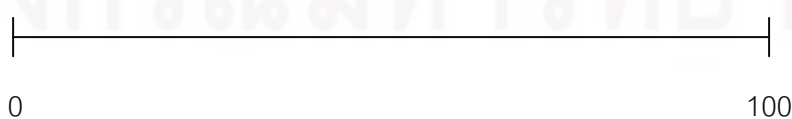
มีอาการหายใจลำบากมาก

ที่สุด

19. ฉันรู้สึกเหมือนหายใจไม่ได้

ไม่มี

มี ระบุความรุนแรง



ไม่มีความรุนแรง

รุนแรงมากที่สุด

### แบบประเมินการหยุดหายใจในขณะนอนหลับ

กรุณาทำเครื่องหมาย (X) หน้าคำตอบที่ตรงกับพฤติกรรมของคุณ ในช่วง 1 เดือนที่ผ่านมา

ส่วนสูง..... น้ำหนัก .....

(ชุดที่ 1)

1. คุณกรนหรือไม่

- ก. ใช่
- ข. ไม่ใช่
- ค. ไม่ทราบ

ถ้าคุณกรน

2. เสียงกรนของคุณ

- ก. ดังกว่าเสียงหายใจเล็กน้อย
- ข. ดังเท่ากับเสียงพูด
- ค. ดังมากกว่าเสียงพูด
- ง. ดังมากจนห้องข้างๆ ได้ยิน

(ชุดที่ 2)

6. บ่อยแค่ไหนที่คุณรู้สึกเหนื่อยหรืออ่อนล้าหลังจากตื่นนอน

- ก. เกือบทุกวัน
- ข. 3-4 ครั้งต่อสัปดาห์
- ค. 1-2 ครั้งต่อสัปดาห์
- ง. 1-2 ครั้งต่อเดือน
- จ. ไม่เคยเลยหรือแทบไม่เคย

7. ในระหว่างวันคุณรู้สึกเหนื่อยหรืออ่อนล้าผิดปกติหรือไม่

- ก. เกือบทุกวัน
- ข. 3-4 ครั้งต่อสัปดาห์
- ค. 1-2 ครั้งต่อสัปดาห์
- ง. 1-2 ครั้งต่อเดือน
- จ. ไม่เคยเลยหรือแทบไม่เคย



## แบบสอบถามเกี่ยวกับความสามารถในการปฏิบัติกิจกรรม

**คำชี้แจง** แบบสอบถามนี้เป็นแบบบันทึกความคิดเห็นของท่าน เกี่ยวกับข้อจำกัดในการปฏิบัติกิจกรรมต่าง ๆ ในช่วง 1 เดือนที่ผ่านมา ให้ท่านขีดเครื่องหมาย (✓) ลงในช่องหน้าข้อที่ท่านคิดว่าการปฏิบัติกิจกรรมต่าง ๆ ในช่วงเวลา 1 เดือนที่ผ่านมา กิจกรรมในข้อใดที่ทำให้ท่านมีอาการอย่างใดอย่างหนึ่งหรือมากกว่า 1 อาการ เช่น ทำให้ท่าน **รู้สึกเหนื่อย** หรือ **หายใจไม่เต็มอิม** **หมดแรง** **รู้สึกใจสั่น** หรือ **เจ็บหน้าอก** **โปรดเลือกเพียง 1 ข้อ**

1. ขณะปฏิบัติกิจกรรมตามปกติ เช่น
- ทำความสะอาดบ้าน
  - ล้างรถด้วยมือ
  - ตัดหญ้า
  - เดินขึ้นบันไดบ้าน 1-2 ชั้น หรือเดินบนพื้นราบในระยะ 50-100 เมตร
2. ขณะปฏิบัติกิจกรรมตามปกติ เพียงเล็กน้อย ทำงานเบา ๆ เช่น
- ประกอบอาหาร
  - ปูที่นอน
  - ล้างจาน
  - อาบน้ำ
  - เดินขึ้นบันไดได้แค่ครึ่งชั้น หรือเดินบนพื้นราบได้ไม่ถึง 10 เมตร
3. ขณะปฏิบัติกิจกรรมเพียงเล็กน้อย เช่น
- ขณะเปลี่ยนเสื้อผ้า
  - โกงหนด
  - เดินจากห้องหนึ่งไปยังอีกห้องหนึ่งภายในบ้าน
  - ขณะรับประทานอาหาร
  - ขณะพูดคุย
4. ขณะอยู่เฉย ๆ
- ไม่สามารถนอนราบหรือหนุนหมอน 1 ใบได้ตามปกติ ต้องนอนศีรษะสูง ใช้จำนวนหมอนหนุนศีรษะเพิ่มจากปกติ
  - ต้องอยู่ในท่านั่งตลอดเวลา

แบบสอบถามความตระหนักในเรื่องสุขอนามัยของการนอนหลับและระดับการปฏิบัติ  
การปฏิบัติเพื่อสุขอนามัยในการนอนหลับ

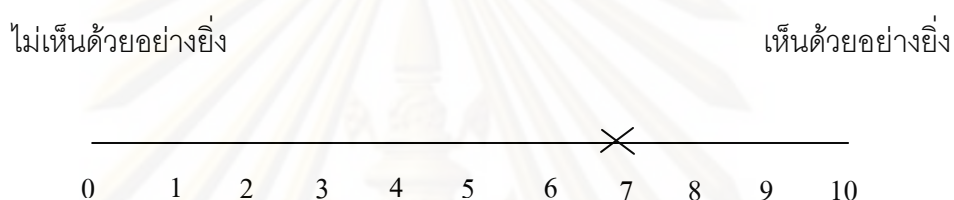
กรุณาทำเครื่องหมาย (✓) ลงในช่องเพื่อระบุจำนวนวันหรือคืนโดยเฉลี่ยต่อสัปดาห์ที่ท่านทำ  
พฤติกรรมดังต่อไปนี้

ข้อความถาม	จำนวนวันต่อสัปดาห์							
	0	1	2	3	4	5	6	7
1. ท่านงีบหลับในตอนกลางวันกี่วันต่อสัปดาห์								
2. ท่านเข้านอนในขณะหัวกึ่งวันต่อสัปดาห์								
3. ท่านเข้านอนในขณะที่กระหายน้ำกี่วันต่อสัปดาห์								
4. ท่านสูบบุหรี่วันละมากกว่าหนึ่งซองกี่วันต่อสัปดาห์								
5. ท่านกินยานอนหลับกี่วันต่อสัปดาห์								
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19. ท่านตั้งอุณหภูมิในห้องนอนที่พอเหมาะทำให้นอนหลับสบายกี่วันต่อสัปดาห์ (เช่น เปิดหน้าต่าง เปิดพัดลม หรือเปิดแอร์ให้อากาศเย็นสบาย)								

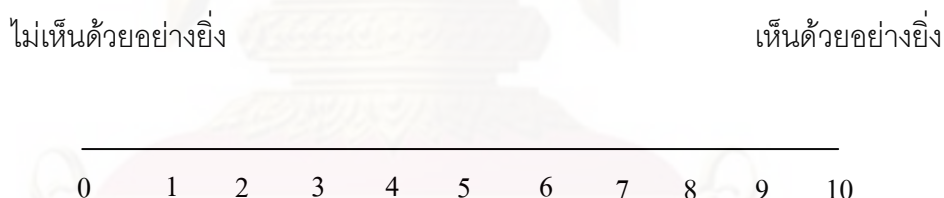
### แบบประเมินความเชื่อและทัศนคติที่ไม่ถูกต้องเกี่ยวกับการนอนหลับ

คำกล่าวต่างๆ ตามรายการข้างล่างนี้สะท้อนให้เห็นถึงความเชื่อและทัศนคติเกี่ยวกับการนอนหลับ กรุณาแสดงระดับความคิดเห็นของคุณว่าเห็นด้วยหรือไม่เห็นด้วยกับคำกล่าวในแต่ละข้อคำตอบของคุณจะไม่มีถูกหรือผิด ในแต่ละข้อให้คุณทำเครื่องหมาย (X) ที่หมายเลขที่ตรงกับระดับความเชื่อของคุณเอง กรุณาตอบคำถามทุกข้อแม้ว่าบางข้ออาจจะไม่เกี่ยวกับสถานการณ์ของคุณโดยตรง

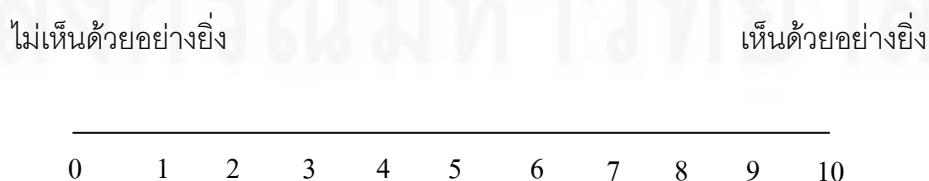
#### ตัวอย่าง



- การนอนวันละ 8 ชั่วโมงในตอนกลางคืนจะทำให้รู้สึกสดชื่นและสามารถทำงานต่างๆ ได้ดีในระหว่างวัน



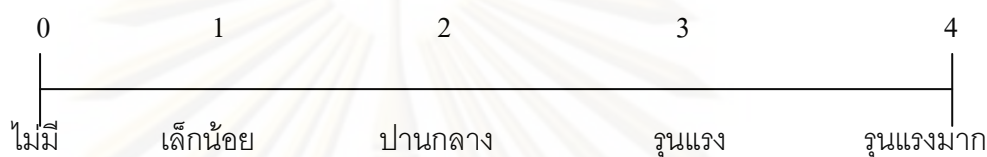
- ฉันคิดว่าถ้าฉันนอนหลับได้ไม่ดีในตอนกลางคืน ฉันจะต้องหลีกเลี่ยงหรือไม่เข้าร่วมกิจกรรมกับ สังคมหรือครอบครัว



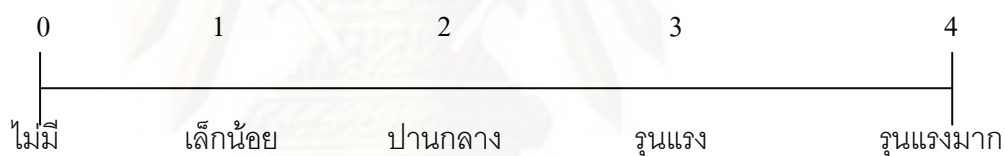
### แบบประเมินอาการนอนไม่หลับ

**คำชี้แจง** แบบประเมินนี้ประกอบด้วย 7 ข้อคำถามเกี่ยวกับอาการนอนไม่หลับของท่าน **ในช่วง 1 เดือนที่ผ่านมา** โดยมีช่วงคะแนนความรู้สึก 0 – 4 คะแนน ขอให้ท่านทำเครื่องหมาย (X) ลงบนเส้นตรงตำแหน่งที่ตรงกับความรู้สึกของท่าน **ในช่วง 1 เดือนที่ผ่านมา** มากที่สุด

1. ใน 1 เดือนที่ผ่านมาท่านพยายามนอนแต่ไม่ค่อยหลับต้องใช้เวลามากกว่า 30 นาทีจึงจะหลับได้

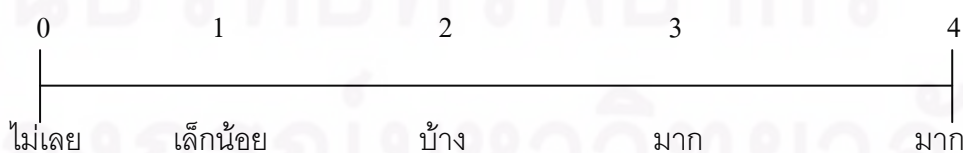


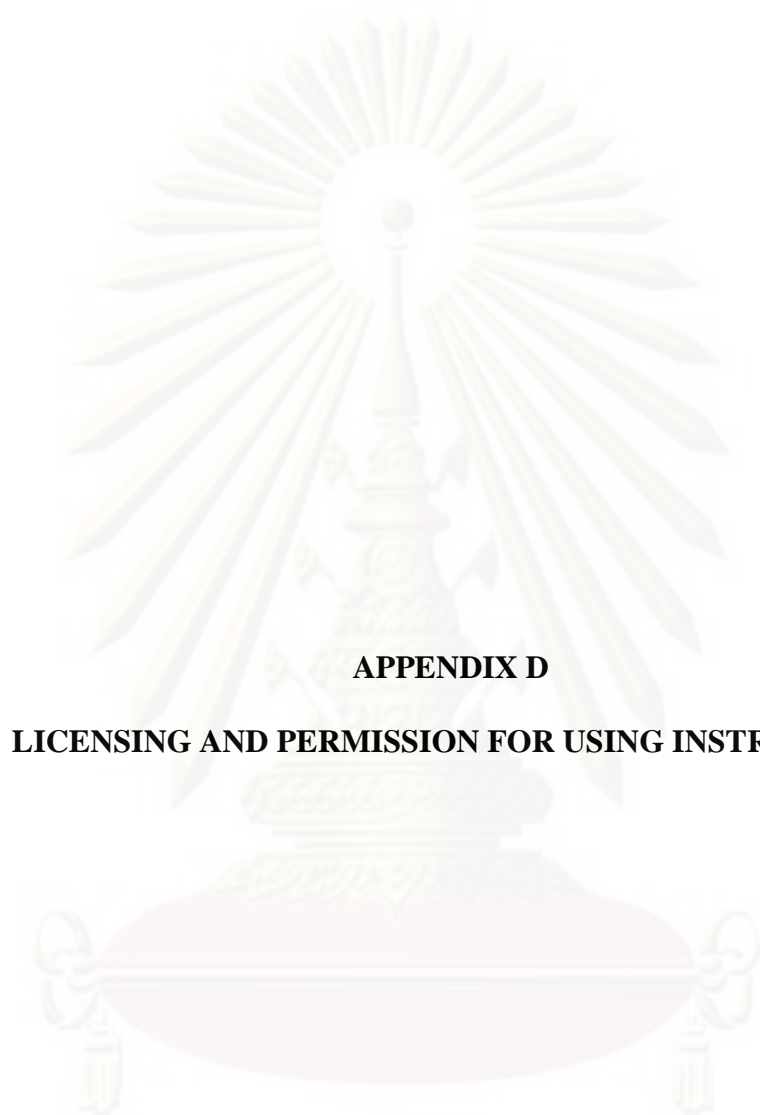
2. ใน 1 เดือนที่ผ่านมาเมื่อท่านตื่นขึ้นกลางดึกแล้ว พยายามนอนต่อแต่กลับไม่หลับ ต้องใช้เวลา มากกว่า 15 นาทีจึงจะหลับต่อได้อีกครั้ง



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7. ท่านรู้สึกกังวลหรือหุดหู่แค่ไหนกับการนอนไม่หลับ





**APPENDIX D**

**LICENSING AND PERMISSION FOR USING INSTRUMENT**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย  
ทำเรื่องขออนุญาตใช้เครื่องมือวิจัยของ

FON-CU-THESIS09

เลขที่รับ.....
วันที่.....
เวลา.....น.
ผู้รับ.....

เรื่อง ขออนุญาตใช้เครื่องมือวิจัย

เรียน คณบดี (ผ่านรองคณบดีฝ่ายวิจัย)

ข้าพเจ้านางสาวอรอร่า ฉิมหลวง เลขประจำตัว 4877977836

ที่อยู่ปัจจุบันเลขที่ 759 หอพักศึกษานิเวศน์ จุฬา ซอย 6 ถนน บรรทัดทอง แขวง วังใหม่

เขต ปทุมวัน จังหวัด กรุงเทพฯ รหัสไปรษณีย์ 10330

โทรศัพท์ที่สามารถติดต่อได้ทันที 080-5510640

หัวข้อวิทยานิพนธ์ที่ได้รับอนุมัติจากคณะกรรมการประจำคณะฯ (เฉพาะภาษาไทย)

อาการนอนไม่หลับในผู้ป่วยหัวใจล้มเหลว

มีความประสงค์ที่จะขออนุญาตใช้เครื่องมือการวิจัย โปรดกรอรายละเอียดดังนี้

1) แบบประเมินความวิตกกังวล

จากวิทยานิพนธ์เรื่อง ผลของโปรแกรมการฟื้นฟูสมรรถภาพหัวใจต่อความสามารถในการทำงานและความวิตกกังวล  
ของผู้ป่วยหลังผ่าตัดทางเบี่ยงหลอดเลือดหัวใจ ปี 2546

เจ้าของเครื่องมือ ร้อยตำรวจเอกหญิงสุวิทย์ เทพอมระเดช

ชื่อ อาจารย์ที่ปรึกษา ผู้ช่วยศาสตราจารย์ ดร.ชนกพร จิตปัญญา

2) แบบประเมินอาการนอนไม่หลับ

จากวิทยานิพนธ์เรื่อง ความสัมพันธ์ระหว่างปัจจัยคัดสรรกับอาการนอนไม่หลับของผู้ป่วยมะเร็ง vúใหญ่ ปี 2547

เจ้าของเครื่องมือ พัทริญา แก้วแพง

ชื่อ อาจารย์ที่ปรึกษา ผู้ช่วยศาสตราจารย์ ดร.ชนกพร จิตปัญญา

3) แบบประเมินอาการหายใจลำบาก

จากวิทยานิพนธ์เรื่อง ปัจจัยคัดสรรที่เกี่ยวข้องกับคุณภาพการนอนหลับของผู้ป่วยโรคหัวใจที่เข้ารับการรักษาใน  
โรงพยาบาล ปี 2547

เจ้าของเครื่องมือ ก็นศพร ยอดไชย

ชื่อ อาจารย์ที่ปรึกษา ผู้ช่วยศาสตราจารย์ ดร.ชนกพร จิตปัญญา

ศูนย์วิทยุทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

FON-CU-THESIS09


## 4. แบบประเมินภาวะเชิงเสรี

จากวิทยานิพนธ์เรื่อง ปัจจัยคัดสรรที่มีความสัมพันธ์กับภาวะเชิงเสรีในผู้ว่างการเกิดคลื่นเนื้อหัวใจ

ภาคเคียดฉบับพิมพ์ ปี 2548

เจ้าของเครื่องมือ มณฑล บูราณ

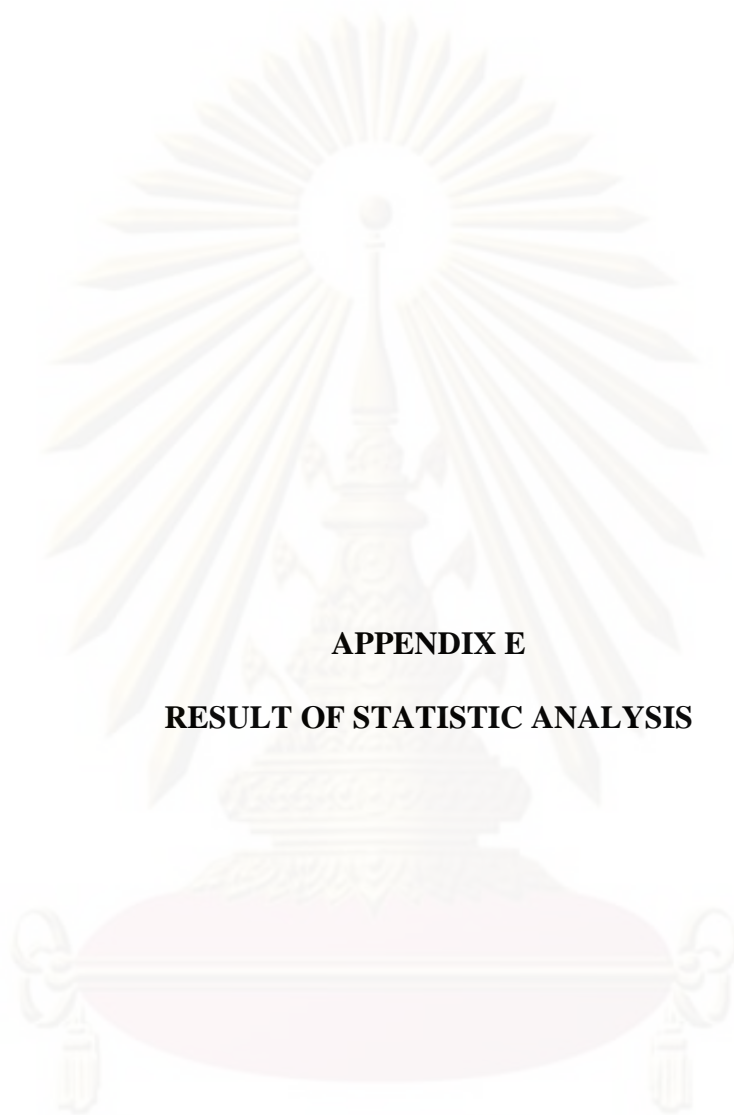
ชื่ออาจารย์ที่ปรึกษา ผู้ช่วยศาสตราจารย์ ดร.ชบทพร จิตปัญญา

ลงนาม  ผู้ยื่นคำร้อง  
( จรรยา อึ้งกุลวง )  
.....  
21 / 11 / 2551

<p>ความเห็นอาจารย์ที่ปรึกษาวิทยานิพนธ์ และเจ้าของเครื่องมือ ชื่อ: จรรยา อึ้งกุลวง</p> <p>ลงนาม:  ( รศ. ร.ศ.ค. ทศ.ว. อ.จ.ว. อ.จ.ว. ) ..... 21 / 11 / 2551</p>	<p>ความเห็นอาจารย์ที่ปรึกษาของนักวิจัยเจ้าของเครื่องมือ ชื่อ: อ.ชบทพร จิตปัญญา</p> <p>ลงนาม:  ( รศ.ดร. ชบทพร จิตปัญญา ) .....</p>
<p>ความเห็นบรรณาคณะคณาจารย์และนักศึกษาคณะ แพทยศาสตร์ มหาวิทยาลัยขอนแก่น</p> <p>ลงนาม:  ( รศ. ร.ศ.ค. ทศ.ว. อ.จ.ว. อ.จ.ว. ) ..... 21 / 11 / 2551</p>	<p>อนุญาต</p> <p>ลงนาม:  ( รศ. ร.ศ.ค. ทศ.ว. อ.จ.ว. อ.จ.ว. ) ..... 24 / 11 / 2551</p>

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย



**APPENDIX E**

**RESULT OF STATISTIC ANALYSIS**

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



## Block 0: Beginning Block

Iteration History<sup>a,b,c</sup>

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	426.655	-.718
	2	426.572	-.751
	3	426.572	-.751

- a. Constant is included in the model.  
 b. Initial -2 Log Likelihood: 426.572  
 c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	58.026	1	.000
	Block	58.026	1	.000
	Model	58.026	1	.000
Step 2	Step	15.701	2	.000
	Block	73.727	3	.000
	Model	73.727	3	.000
Step 3	Step	12.554	2	.002
	Block	86.281	5	.000
	Model	86.281	5	.000
Step 4	Step	11.733	2	.003
	Block	98.015	7	.000
	Model	98.015	7	.000
Step 5	Step	6.759	1	.009
	Block	104.773	8	.000
	Model	104.773	8	.000

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	368.546 <sup>a</sup>	.157	.219
2	352.845 <sup>b</sup>	.195	.273
3	340.291 <sup>b</sup>	.224	.314
4	328.557 <sup>b</sup>	.250	.350
5	321.799 <sup>b</sup>	.265	.371

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

**Classification Table<sup>a</sup>**

Observed			Predicted		Percentage Correct
			logit_insomnia		
			0	1	
Step 1	logit_insomnia	0	191	40	82.7
		1	45	64	58.7
	Overall Percentage				75.0
Step 2	logit_insomnia	0	208	23	90.0
		1	56	53	48.6
	Overall Percentage				76.8
Step 3	logit_insomnia	0	206	25	89.2
		1	51	58	53.2
	Overall Percentage				77.6
Step 4	logit_insomnia	0	210	21	90.9
		1	46	63	57.8
	Overall Percentage				80.3
Step 5	logit_insomnia	0	209	22	90.5
		1	45	64	58.7
	Overall Percentage				80.3

a. The cut value is .500

ศูนย์วิทยุทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
Step 1	severe_dep(1)	1.916	.261	53.899	1	.000	6.791	4.072	11.325
	Constant	-1.446	.166	76.109	1	.000	.236		
Step 2	severe_anx			15.200	2	.001			
	severe_anx(1)	1.201	.332	13.124	1	.000	3.325	1.736	6.369
	severe_anx(2)	2.401	1.114	4.642	1	.031	11.033	1.242	98.009
	severe_dep(1)	1.139	.327	12.122	1	.000	3.123	1.645	5.930
Step 3	Constant	-1.594	.175	82.540	1	.000	.203		
	severe_anx			12.822	2	.002			
	severe_anx(1)	1.135	.341	11.068	1	.001	3.112	1.594	6.074
	severe_anx(2)	2.255	1.135	3.947	1	.047	9.538	1.031	88.265
	severe_dep(1)	.993	.340	8.542	1	.003	2.700	1.387	5.255
	severe_dyspnea			9.856	2	.007			
	severe_dyspnea(1)	.314	.399	.618	1	.432	1.369	.626	2.993
	severe_dyspnea(2)	2.129	.687	9.601	1	.002	8.408	2.187	32.331
	Constant	-1.677	.183	83.639	1	.000	.187		
	Step 4	severe_anx			13.346	2	.001		
severe_anx(1)		1.195	.352	11.556	1	.001	3.304	1.659	6.581
severe_anx(2)		2.322	1.146	4.104	1	.043	10.194	1.078	96.367
severe_dep(1)		.948	.349	7.360	1	.007	2.580	1.301	5.116
severe_dyspnea				10.490	2	.005			
severe_dyspnea(1)		.215	.410	.275	1	.600	1.240	.555	2.770
severe_dyspnea(2)		2.314	.717	10.427	1	.001	10.113	2.483	41.194
marital_group				10.801	2	.005			
marital_group(1)		1.062	.613	2.997	1	.083	2.893	.869	9.627
marital_group(2)		1.882	.655	8.265	1	.004	6.565	1.820	23.679
Step 5	Constant	-2.848	.609	21.886	1	.000	.058		
	severe_anx			11.829	2	.003			
	severe_anx(1)	1.142	.357	10.211	1	.001	3.133	1.555	6.311
	severe_anx(2)	2.213	1.147	3.722	1	.054	9.146	.965	86.648
	severe_dep(1)	.924	.355	6.773	1	.009	2.519	1.256	5.051
	severe_dyspnea			9.540	2	.008			
	severe_dyspnea(1)	.163	.414	.155	1	.694	1.177	.523	2.650
	severe_dyspnea(2)	2.210	.716	9.526	1	.002	9.114	2.240	37.083
	severe_belief(1)	1.424	.636	5.012	1	.025	4.156	1.194	14.462
	marital_group			11.397	2	.003			
marital_group(1)	1.094	.614	3.169	1	.075	2.985	.895	9.952	
marital_group(2)	1.953	.658	8.804	1	.003	7.051	1.940	25.617	
Constant	-4.158	.863	23.202	1	.000	.016			

a. Variable(s) entered on step 1: severe\_dep.

b. Variable(s) entered on step 2: severe\_anx.

c. Variable(s) entered on step 3: severe\_dyspnea.

d. Variable(s) entered on step 4: marital\_group.

e. Variable(s) entered on step 5: severe\_belief.

The overall model was statistically significant ( $\chi^2= 106.415$ ,  $df = 8$ ,  $p = .000$ ).

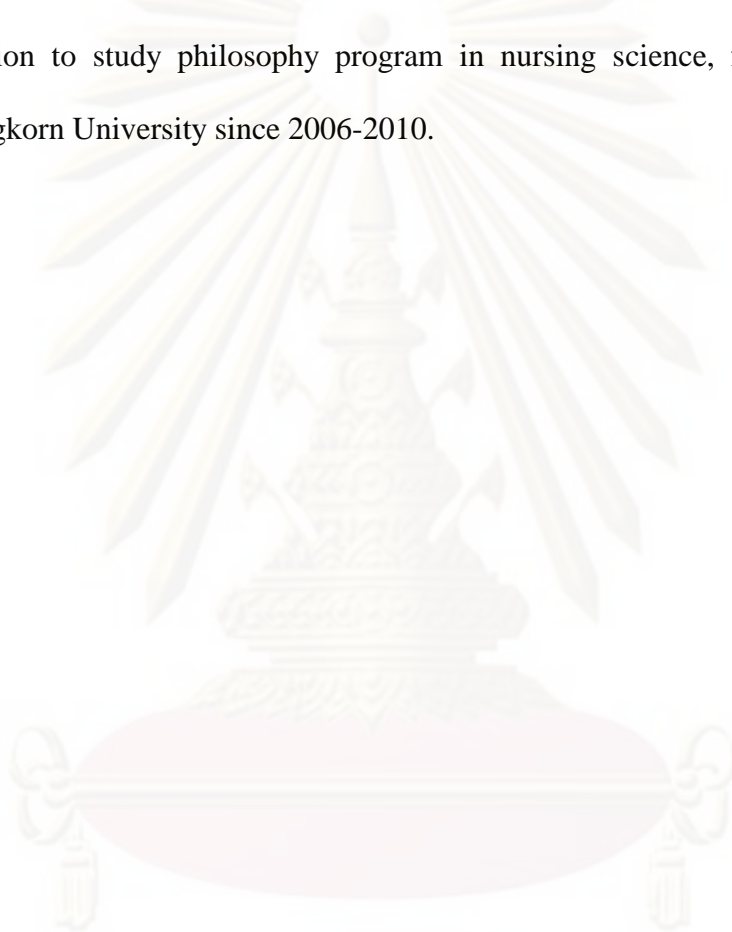
For this study, the goodness of fit of the model was tested by Hosmer-Lemeshow  $\chi^2$ .

The Chi-square values were not significant ( $p = .835$ ) in all steps indicating that the model did fit the data.  $R^2 = 26.50\%$  (Cox & Snell) and  $37.10\%$  (Nagelkerke  $R^2$ )

The model classified insomnia patients correctly 58.70% and classified no insomnia patients correctly 90.50%. The overall percentage correctly 80.3%.

## BIOGRAPHY

Miss Janya Chimluang was born in 1979. She received bachelor degree of nursing science from The Thai Red Cross College of nursing in 2001. She had 5 years of clinical experience in coronary care unit at King Chulalongkorn Memorial Hospital during 2001-2005. She had received the scholarship from the Higher Education Commission to study philosophy program in nursing science, faculty of nursing, Chulalongkorn University since 2006-2010.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย