

**EFFECT OF MUSIC ON QUALITY OF SLEEP  
IN CRITICALLY ILL PATIENTS**



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Thesis  
Entitled

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IN CRITICALLY ILL PATIENTS**

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Supeeda Komenthai

## EFFECT OF MUSIC ON QUALITY OF SLEEP IN CRITICALLY ILL PATIENTS

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### ABSTRACT

The purpose of this study was to determine the effectiveness of music on quality of sleep in critically ill patients. The samples were 30 critically ill patients admitted to the Medical Intensive Care Unit 2 at King Chulalongkorn Memorial Hospital from April 2001 to August 2002.

The instrument used for intervention was a 30 minute cassette tape consisting of soothing music that facilitates relaxation and a portable cassette tape player. The instrument used for data collection consisted of demographic characteristics of the patients, Verran & Snyder-Halpern (VSH) sleep scale and an observation parameter record designed to record heart rate and respiratory rate every 5 minutes for 30 minutes before, during, and after listening to the music. The researcher visited the patient for two days. On the first day, during the daytime, the patients were asked to answer the questionnaires about demographic data and quality of sleep on the prior night. At night, they were asked to listen to the 30-minute tape of soothing music. And the researcher remained at bed side to record the physiological parameters. On the second day, patients were asked to answer the questionnaires about the quality of sleep, feelings about the musical listening and the effect of musical listening of the previous night. The data were analyzed by using frequency, percentage, mean, standard deviation, paired t-test and analysis of covariance.

These findings revealed that:

1. The mean scores of quality of sleep of the critically ill patients after listening to the music was statistically significantly higher than before listening to the music ( $p < 0.01$ ).
2. The mean scores of physiological parameters; heart rate and respiratory rate; 30 minutes during and after listening to the music were statistically significantly different ( $p < 0.05$ ).

These findings suggest that music should be used as an independent nursing intervention to promote quality of sleep in critically ill patients.

KEY WORDS : QUALITY OF SLEEP / MUSIC / CRITICALLY ILL PATIENT

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ผลของดนตรีต่อคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนัก (EFFECT OF MUSIC ON QUALITY OF SLEEP IN CRITICALLY ILL PATIENTS)

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บทคัดย่อ

การศึกษาครั้งนี้เป็นการวิจัยกึ่งทดลอง เพื่อศึกษาผลของดนตรีต่อคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนัก กลุ่มตัวอย่าง คือ ผู้ป่วยหนักที่เข้ารับการรักษาในหอผู้ป่วย MICU 2 โรงพยาบาลจุฬาลงกรณ์ ตั้งแต่เดือนเมษายน 2544 ถึงสิงหาคม 2545 จำนวน 30 คน

เครื่องมือที่ใช้ในการทดลอง ประกอบด้วย เทปดนตรี นาน 30 นาที เครื่องมือในการเก็บรวบรวมข้อมูลประกอบด้วย แบบสอบถามข้อมูลส่วนบุคคล คุณภาพการนอนหลับของ Verran & Snyder –Halpern sleep scale และแบบสังเกตอัตราการเต้นของหัวใจและอัตราการหายใจทุก 5 นาที ในช่วง 30 นาที ก่อน ขณะ และหลังฟังดนตรี วันแรกกลุ่มตัวอย่างตอบแบบสอบถามข้อมูลในเวลากลางวันและฟังดนตรีก่อนนอนในเวลากลางคืน โดยผู้วิจัยสังเกตอัตราการเต้นของหัวใจและอัตราการหายใจของผู้ป่วยตั้งแต่ 30 นาที ก่อน ขณะ และหลังฟังดนตรี วันที่สองผู้วิจัยสอบถาม คุณภาพการนอนหลับภายหลังการฟังดนตรี และความรู้สึกของผู้ป่วยต่อดนตรีที่ฟังก่อนนอน วิเคราะห์ข้อมูลโดยใช้ค่าความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน การทดสอบค่าที และวิเคราะห์ความแปรปรวนร่วม (ANCOVA)

ผลการศึกษาพบว่า

1. คะแนนเฉลี่ยของคุณภาพการนอนหลับของผู้ป่วยหนักหลังฟังดนตรีมีค่าสูงกว่าก่อนฟังดนตรีอย่างมีนัยสำคัญทางสถิติ ( $p < 0.01$ )
2. คะแนนเฉลี่ยของอัตราการเต้นของหัวใจและอัตราการหายใจ ในช่วง 30 นาที ขณะฟังดนตรี และหลังฟังดนตรี แตกต่างกัน อย่างมีนัยสำคัญทางสถิติ ( $p < 0.05$ )

จากผลการศึกษาที่มีข้อเสนอแนะ คือ ดนตรีสามารถนำมาเข้ามามีใช้ในการส่งเสริมคุณภาพการนอนหลับของผู้ป่วยหนัก และพยาบาลในหอผู้ป่วยหนักสามารถนำดนตรีไปใช้เป็นบทบาทอิสระในการส่งเสริมคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนักได้

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## CHAPTER I

### INTRODUCTION

#### **Background and Significance of the Study**

Sleep is the basic life process for rest in which most of the body's physiologic activities slow down to allow renewal of energy for future activity (Roy, & Andrews, 1999:193). For most people, sleep is a time to relax and recover from day's efforts. One third of human life is spent on sleeping (Craven, & Hirnle, 2000:1118). Most people sleep about 8 hours a night (Dexter, & Downey III, In Wilkins, Krider, & Sheldon, Eds., 1995:356). A sufficient amount of sleep promotes health and comfort through its tissue restoration, the immune system, psychological functioning, the process of learning and memory (Hodgson, 1991:1505-1506). The restorative theory has provided evidence in hormonal balance that facilitates physical revival through the process of anabolism (synthesis of cell constituents) during sleep (Oswald, 1987 cited in Craven, & Hirnle, 2000:1120). For example, epidermis has a daily peak in division which appears in normal sleep times (Hodgson, 1991:1506).

Sleep disturbance is a common problem in critically ill patients. More than 50% of all patients in the critical care setting experience some degree of sleep deprivation (Doherty, et al., In Bucher, & Melander, Eds., 1999:69). The altered sleep patterns are associated with the cognitive – behavioral changes previously referred to as “ICU psychosis” (Wilson, 1987 cited in Parker, 1995:341). This term refers to acute delirium or a disturbance of consciousness that can be manifested by restlessness, agitation, combativeness, disorientation or communication impairment (Doherty, et al., In Bucher, & Melander, Eds., 1999:68). Other physiological effects of sleep deprivation that may negatively affect the critically ill patients include decreased body temperature and efficiency of thermo-regulator, change in cardiovascular and respiratory function, change in hormone which relate to stress, change in muscular control, and enhance epileptic – like EEG activity in some people (Hodgson, 1991:1506).

Admission to an intensive care unit, patients will face a new and unfamiliar environment which particularly and negatively affects both the quantity and quality of sleep (Parker, 1995:337). It has been suggested that factors influencing sleep in acute care setting are composed of internal factors; patient characteristics including state of health and illness, symptoms, age, gender, and primary sleep disorder; and external factors; noise, light, and the disruptions by health care personnel; are recommended (Redeker, 2000:32).

Sleep promotion is an important and challenging role of critical care nurses to improve health status and provide well – being of critically ill patients. The interventions for sleep promotion in critical care unit patients include decreasing excessive noise and light, limiting interruptions, providing blocks of uninterrupted time for sleep, educating patients to lower anxiety caused by environmental sounds and other stressful events, providing large clocks and natural lighting, easing visitor restrictions, paying attention to pain control, and providing more comfortable beds and pillows (Richard, 1996:48). Furthermore, relaxation technique; progressive relaxation, imagery, massage and music therapy; were also promote sleep (Appling, 1997:160).

Music therapy is the process of bringing about changes from undesirable, unhealthful, and uncomfortable conditions to more pleasant ones by deliberating use of music. Throughout history, music has therapeutic properties in healing the body and mind (White, 2000:219). Music therapy is a noninvasive intervention that offers a means of creating familiarity and a source of comfortable for ICU patients, ICU nurses can initiate this therapy to support a holistic approach in caring of critically ill patients (Johnston, & Rohaly-Davis, 1996:54). Rhythm, melody, and harmony are a complex blend of organized sound. For example, musical melody results from the sequence of musical pitch and the interval between musical tones. Pitch is a number of cycles the sound vibrates per second, high-pitched music can cause tension while low-pitched music promotes relaxation (White, 2000:219-220). Recent studies, music therapy has been found to be an effective mean for decreasing anxiety, promoting relaxation (Chlan, 1998:169-176) and enhancing sleep in coronary artery bypass graft patients (Zimmerman, et al., 1996:153-170).

The study of white noise (water sounds) and sound of the ocean or rain in influencing sleep perception of postoperative open-heart surgery patients show that white noise leads to a deeper and better quality of sleep, fewer nighttime awakening, quicker return to sleep, and better overall sleep (Williamson, 1992:91-97). The effect of music on physiologic outcomes has been examined in a variety of studies. For example, the result of the studies in the effects of music therapy on critically ill patients in an intensive care setting indicated that music therapy positively affects acute myocardial infarction patients by reducing heart rate and systolic blood pressure (Stone, et.al., 1989: 281) and respiratory rate (White, 1992: 61-62).

There are few studies about the effect of music therapy in intensive care unit patients. Therefore, it is necessary to explore whether music intervention can promote adequate sleep in critically ill patients especially in Thai context.

### **Research Question**

Does music improve quality of sleep in critically ill patients?

### **Purpose of the study**

1. To compare the quality of sleep in critically ill patients before and after listening to the music.
2. To compare the effects of music on physiologic responses including heart rate, respiratory rate during and after listening to the music.

### **Conceptual Framework**

Music can be used therapeutically for sleep promotion. A regular rhythm, predictable dynamic, harmonic consonance, and recognizable vocal and instrument timbre called “sedative music” is appropriate for promoting sleep in critically ill patients. Music with slow, flowing that duplicate pulses of 60 to 80 beats per minute is a characteristic of soothing music for relaxation (Chlan, 1998:170). Music exerts its effect via entrainment or synchronization of body rhythms (respiration, heart rhythm, circadian patterns, gait). The rhythm of the music can be influenced on heart rate. Heart rate can be varied over a certain range by entrainment of the sinus rhythm with external auditory stimulus, and results from neural coupling

in the cardiac centers of the brain. In addition, the effect rhythm is believed to impact changes in moods (White, 2000:220). Entrainment is a process whereby two objects vibrating at similar frequencies tend to interact and come into sync with one another, thereby resonating at the same frequency (Bunt,1994 cited in Chlan,1998:170). The entrainment of body rhythms with relaxing music is thought to decrease sympathetic nervous system activity, resulting in a dampening in arousability of the central nervous system which lead to decreased adrenergic activity, altered states of consciousness, and decreased neuromuscular arousal. It can present by physiological response include decreasing in heart rate, respiratory rate, metabolic rate, oxygen consumption, skeletal muscle tension, epinephrine level, gastric acidity and motility, sweat gland activity, and blood pressure (Chlan,1998:170).

The instrumental music can pass through the auditory nerve as the sound wave to the right hemisphere of the brain, which is involved in intuitive, creative, and imaginative ways of processing information and decode by the cerebral cortex to the limbic systems, the center of emotions, feelings, and sensations, thereby modulating emotional responses such as the sensations of reward, punishment, pleasure, and pain (Chlan, & Tracy, 1999:36). Thus, music can move through the neuroendocrine system by modulation of hypothalamic system to activate pituitary responses, which results in releasing of endorphins, that influence memory and mood state (Updike, 1990:41-43). Music also affects autonomic nervous system, sympathetic nervous system leading to a reduction in releasing of catecholamines which results in a fall of blood pressure and heart rate (Coughlan, 1994:35).

The effects of music on quality of sleep in critically ill patients are supposed to the psychological (emotional) responses of limbic system as the perception of critically ill patients on the sensation of adequate sleep, feel rest, refresh or alert after awaking. It will be measured by using the Verran & Snyder- Halpern (VSH) Sleep Scale (Verran, & Snyder- Halpern,1987:155-163) on four dimensions of sleep include: length of sleep, sleep disturbance, sleep effectiveness, and nap supplementation of sleep and the physiological responses will be measured by mean of heart rate and respiratory rate.

The conceptual framework is shown in Figure 1

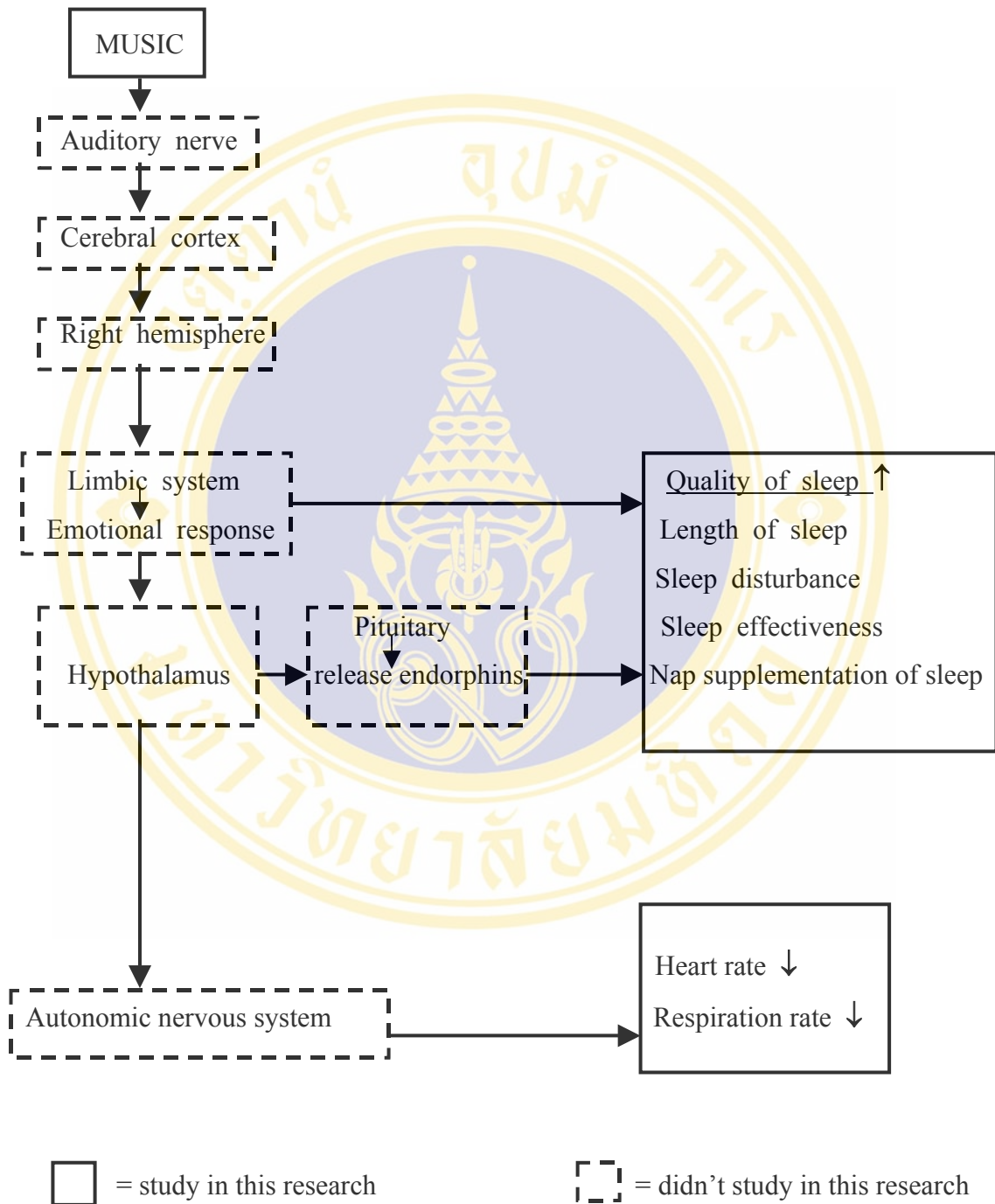


Figure 1. Conceptual Framework

## Hypotheses

1. After listening to the music, the quality of sleep in critically ill patients is significantly higher than that of before listening to the music.
2. The effect of music on physiologic response including heart rate, respiratory rate during and after listening to the music are significantly different.

## Scope of the Study

The study of the effect of music on quality of sleep and physiologic responses in critically ill patients who admitted in Medical Intensive Care Unit 2 at King Chulalongkorn Memorial Hospital. Data collection was conducted from April 2001 to August 2002.

## Definition of terms

**Music** is defined as a set of instrumental music which was selected from Mr. Chamras Saewataporn's CD Music. It is used as the nursing intervention for sleep promotion in critically ill patients. The type of music is relaxing music which has slow and steady rhythms that duplicates pulses of 60 to 80 beats per minute and consists of the symphony of musical instruments.

**Quality of sleep** is defined as the sensation of adequate sleep, feel rest, refresh or alert after awakening. It will be measured by using the Verran and Snyder-Halpern (VSH) Sleep Scale (Verran & Snyder-Halpern, 1987). VSH Sleep Scale consists of four dimensions: length of sleep, sleep disturbance, sleep effectiveness, and nap supplementation of sleep.

*Length of sleep* is defined as the total time from settling down to sleep until awakening in the morning (Verran & Snyder-Halpern, 1987:157).

*Sleep disturbance* is defined as the perception of the degree of bulk sleep period that was disturbed due to fragment and sleep latency which is composed of seven sleep characteristics: mid-sleep awakening, wake after sleep onset, movements during sleep, soundness of sleep, quality of disturbance, sleep latency, and quality of latency (Verran & Snyder-Halpern, 1991, cited in Evans et. al., 1998:382).

*Sleep effectiveness* is defined as the perception of the degree of bulk sleep period that was considered to be effective in terms of sleep quality and sleep length as measured by five characteristics: rest upon awakening, subjective quality of sleep, sleep sufficiency evaluations, total sleep time, and total sleep period (Verran & Snyder-Halpern, 1991, cited in Evans et. al., 1998:382).

*Nap supplementation of sleep* is defined as the perception of the degree to which the bulk day time sleep period was augmented with additional sleep time as measured by four characteristics: day time sleep, morning sleep, afternoon sleep, and wake after final arousal ( Verran & Snyder – Halpern, 1991, cited in Evans et. al., 1998:383 ).

**Heart rate** is defined as the number of heart beats per minute.

**Respiratory rate** is defined as the number of respirations per minute.

**Critically ill patient** is defined as the person who presents real or potential life – threatening, health problems, and requires for continuous observation and intervention to prevent complications to restore health and have been confined in a medical intensive care unit at King Chulalongkorn Memorial Hospital.

### **Expected Outcomes and Benefits**

1. As a guideline for nursing intervention to promote the quality of sleep.
2. As a guideline to manage ICU environment that can improve the quality of sleep and enhance the quality of life in critically ill patients.
3. As a guideline for research study on the promotion of sleep in critically ill patients on the other way.

## CHAPTER II

### LITERATURE REVIEW

This experimental study is aimed to explore the effect of music on quality of sleep in critically ill patients.

The critical literature review was as follows;

- An overview of sleep
- Factors affecting sleep in ICU patients
- An overview of music therapy
- Research applications on music therapy to promote quality of sleep in ICU patients

#### **An overview of sleep**

Sleep is a naturally occurring, readily reversible altered state of arousal, characterized by a decreased responsiveness to the environments (Reimer, In Black, et al., Eds., 1997: 398). Most people when close their eyes asleep and make occasional movements, but are generally still. The face and neck muscles relax, the jaw tends to sag and the mouth falls open. Breathing becomes slower and deeper (Reet, In Mallik, et al, Eds., 1998: 573). A sufficient amount of sleep promotes health and comfort through its effects on tissue restoration, the immune system and psychological functioning (Sheely, 1996: 109). In addition, sleep is closely associated with biochemical and neuroanatomic processes, nerve cell activity, an temperature (Johnson, In Berger & Williams, Eds., 1999: 1088). Sleep deprivation leads to increased feelings of fatigue, mood change, and decreased pain tolerance (Sheely, 1996: 109).

Sleep can be defined by many, and an appropriate definition tends to depend on the context in which it is being studied. For example, Sleep is a state marked by reduced consciousness, diminished activity of the skeletal muscles and depressed metabolism (Mosby's Medical, Nursing & Allied Health,

Dictionary, 1994: 1445). Sleep is the basic life process for rest in which most of the body's physiologic activities slow down to allow for renewal of energy for future activity (Roy, & Andrews, 1999: 193). Sleep is a state of reduced responsiveness to external stimuli, an altered state of consciousness from which a person can be aroused if the stimulus is of sufficient magnitude (Fordham, 1988 cited in Hodgson, 1991: 1503). The other researchers defined sleep as a state of active, heterogenous, neurophysiological function, synchronized with the light – dark cycle of the environment and characterized by cycling of the stage of sleep throughout the sleep period time (Shaver & Giblin, 1989 cited in Jitpunya, 2000: 1).

There are two major theories about the functions of sleep : conservation of energy and recuperation / restoration.

**The conservation of energy theory** this theory suggested that energy is conserved during sleep since metabolism in general is reduced, which helps conserve energy and it is balanced by low – energy demand during slow wave sleep (Long, In Phipps, et al., Eds., 1995: 158). The researchers have found that animals with a high metabolic rate sleep longer than those with slower metabolism (Chokroverty, 1994: 13).

**The restorative theory** this theory suggests that sleep is a recuperation or restoration (Long, In Phipps, et al., Eds., 1995: 158). This theory attributes body tissue restoration to nonrapid eye movement (NREM) sleep and brain tissue restoration to rapid eye movement (REM) sleep (Chokroverty, 1994: 13). Physiologic signs supporting the theory are composed of : decreased catabolism and increased anabolism during slow – wave sleep, growth hormones are released at night during slow – wave sleep and people have more sleep during period of increased growth, protein synthesis and adenosine triphosphate (ATP) concentrations increase during sleep. Therefore, the macromolecular synthesis occur during slow - wave sleep and the preservation of synaptic connections and cognitive functions are occur during rapid eye movement (REM) sleep (Long, In Phipps, et al., Eds., 1995: 158).

Sleep can be divided into two different physiologic states: nonrapid eye movement (NREM ; slow wave) sleep and rapid eye movement (REM ; active)

sleep (Schwab, 1994: 681) or paradoxical sleep by using the polygraph recordings of electrophysiologic changes in brain wave (electroencephalogram [ EEG]) ,eye movements (electrooculogram [EOG]),and muscles (electromyogram [EMG]). These two different physiologic states show five sleep stages (Craven, & Hirnle, 2000: 1118).

**Nonrapid eye movement (NREM) sleep**, is the period of sleep during which no eye movements can be observed and the eyelids are still (Johnson, In Berger & Williams, Eds., 1999: 1089). There are four stages of NREM sleep;

Stage1. Stage1 is the transitional stage between wakefulness and sleep. It is characterized by a shift from alpha wave to low-voltage, fast theta wave on the electroencephalogram (EEG). The person is in the process of falling asleep and becomes drowsy and barely conscious, although any slight sound would arouse him or her and if awakened, the person may say he or she was not asleep. This stage constitutes only about 5% of total sleep (Taylor, Lillis, LeMone, 1997 cited in Hudak, et al., Eds., 1998:34).

Stage2. Stage 2 is still a relative light sleep from which the person is now asleep but easily aroused by calling of their names. There is greater relaxation of muscles and joints and movements are still. Rolling eye movements continue and snoring may occur. The EEG shows the appearance of slow waves called K-complexes, as well as bursts of rapid waves known as sleep spindles (Borbely, 1987 cited in Reet, In Mallik, et al., Eds., 1998: 574). This stage lasts about 50% to 55% of total sleep time.

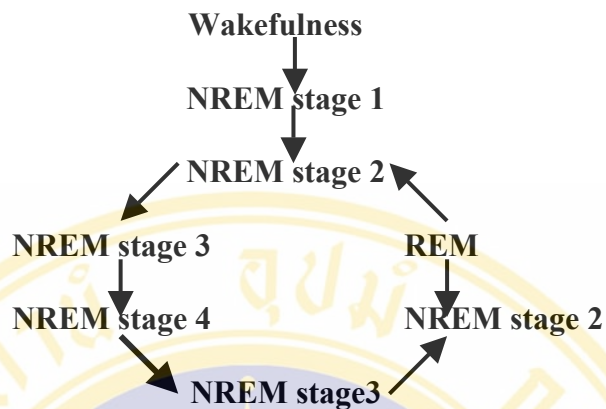
Stage3. Stage3 is a deeper sleep which manifested in further slowing and rounding of the EEG tracing. During this stage muscle tone and some reflexes are diminished. The person is now completely relax and difficult to arouse by familiar noises but they can arouse only by touch. This stage lasts about 10% of total sleep time.

Stage4. Stage4 is the period of the deepest sleep which is characterized by total relaxation and the onset of dreaming. The EEG tracing show as large, slow waves are known as delta waves. The physiological changes in this stage are composed of ; decreasing pulse, respiratory rates, and blood pressure; relaxing muscles ; slowing metabolism and low body temperature.

This stage lasts about 10% of total sleep time and difficult to awaken the person during these stages.

**Rapid eye movement (REM) sleep**, is the period of sleep when eye movement occur and the eyelids twitch. REM sleep is characterized by muscle atonia, and an EEG pattern are similarly to those during the awake stage. Blood pressure and pulse rate show wide variations and may fluctuate rapidly. Respirations are irregular, oxygen consumption increases, and thermoregulation is lost. Dreams during REM sleep have more vividly detailed, colorful, violent or erotic. REM sleep is essential for mental restoration (Hudak, et al., 1998: 34), important for memory, learning, and psychological adaptation ; provides a review of the day's events ; and allows information to be categorized and assimilated into the brain's storage system (Johnson, In Berger & Williams, Eds., 1999: 1089). During this stage of REM sleep are recorded using an electrooculogram (EOG). This stage become longer and more intense in later sleep cycles.

The normal sleep cycle usually takes about 90 minutes but varies from 70 to 120 minutes. The initiation of sleep cycles move though NREM stage 1 to NREM stage 4, back again to NREM stage3 and NREM stage2, and subsequently into REM sleep (Figure 2). During the early part of the night, more time is spent in slow wave sleep (NREM stage3 and 4) whereas the time spent in REM sleep during the first cycle may be only 3 to 4 minutes but toward morning it may be as much as 45 minutes (Reimer, In Black, et al.,Eds., 1997: 399). This may explain why morning naps are frequently composed of REM sleep. On falling asleep it takes about 30-45 minutes to progress to stage 4 sleep which the person may change position in bed at this stage (Parker, 1995: 339). The number of sleep cycles per sleeping period varies from person. The average is 4 to 5 of these sleep cycles per night. The sleep cycle can be shown as figure 2.



**Figure 2 Sleep cycles** (adapted from Lee, K.A., 1997: 617)

There are the various techniques developed for the measurement of sleep. The method chosen tends to depend on the individual objectives and circumstances of each research situation. Sleep can be measured objectively or subjectively in the ICU. Subjective and objective methods may be used for assessing the quality of sleep (John, 1971: 491).

### **Measurement of the quality of sleep**

#### **Objective sleep measurements**

These objective measurements include polysomnography, measuring body movement, and bedside monitor systems.

Polysomnography includes recording of EEG (electroencephalogram), EOG (electrooculogram), and EMG (electromyogram). This method provides the most reliable path of measuring sleep parameters includes the onset, progress, and depth of sleep (Jitpunya, 2000: 3) which claimed to be more accurate than subjective reports such as sleep diaries, questionnaires, and interviews. However, polysomnography are much more expensive, time-consuming, and, in large scale studies, and impractical to be performed.

Body movement the measurements of body movements may provide worthwhile information about the quality of sleep, especially when combined with other measurement (John, 1971 cited in Jitpunya, 2000: 4). It is reported

that normal subject move between about 20 and 60 times during night. The frequency of movements decrease from stage 1 to stage 4 sleep and increase in REM stage (John, 1971: 489). Another instruments such as night cap, wrist actigraph and static charge-sensitive bed may be used (Jitpunya, 2000: 4).

Bedside monitor systems according to indirectly assess sleep in the critical care unit, many physiological parameters have been shown to vary during sleep. Heart rate, blood pressure and respiratory rate all tend to decrease during NREM sleep and show greater variability during REM sleep (John, 1971: 489). These variables are used with other signs of sleep such as closed eyes, lack of movements, and decreased awareness of surrounding (Jitpunya, 2000: 4).

### **Subjective sleep measurements**

The subjective measure of sleep assesses qualitative and quantitative aspects of sleep information from patients perceptions of their experiences (Closs, 1988 cited in Jitpunya, 2000: 5). Since no-one but a given sleeper has accessed to his personal satisfaction with sleep, it is only patient who can say whether he or she has “sleep well” (Closs, 1988: 503). Individual assessments of sleep quality necessitate subjective rating of the perception of adequate sleep and felt rested and refresh or alert after awakening. These subjective measurements include visual analogue scales, sleep rating scales, questionnaires, interviews, sleep diaries, and personal observation.

Visual analogue scales (VAS) This method is the simplest and most effective. A 100 horizontal line with opposing statements at each end of line, for example, best sleep and worst night. The patients are asked to place a mark on the line in a position corresponding to their perceptions about their previous night's sleep. The distance of that mark along the line may then be measured in millimeter, providing a numerical value. For the critically ill patients, visual analogue scales can be very helpful. First, their interval-level scores make it easier for the nurse to track trends. Second, there are easy for the patients to mark (Richardson, 1997: 230). One of these types of scales is the Verran and Snyder-Halpern (VSH) sleep scale that measures patients' perceived sleep quality. It measures four dimensions of sleep quality : length

of sleep, sleep disturbance, sleep effectiveness, and nap supplementation of sleep (Verran & Snyder-Halpern, 1987: 155-163).

Length of sleep is the total time from settling down to sleep until awakening in the morning (Verran & Snyder-Halpern, 1987: 157). The range of normal sleep duration is important, a person requires to task performance, carry out daily activities, and maintain health varies with age and level of health as well as psychologic and environmental stressors (Sims, et.al., 1995: 71). Most young adults sleep approximately 7.5 to 8 hours per night, (Krachman, D'Alonzo, & Criner, 1995: 1714) although some can get along well with only about 5 hours a day (short sleepers); whereas others may require more than 9 hours a day (long sleepers). The persons know how many hours of sleep they require to feel rested and restored of energy. The individual who is sick, overworked, or experiencing severe stress needs much more sleep than usual, since the psychologic and physiologic restoration that takes place during sleep (Sims, et al., 1995: 71). The study of incidence of delirium in 100 patients following cardiac surgery in the ICU was reported a proportion of patients with delirium(27%)in the group has below average sleep compared with the patients who did not develop delirium(11%) (Helton et.al.,1970 cited in Krachman, D'Alonzo, & Criner, 1995: 1716).

Sleep disturbance is the perception of the degree the bulk sleep period disturbed due to fragmentation and sleep latency (Verran, & Snyder-Halpern, 1991 cited in Evan et. al., 1998: 382). Sleep disturbance influenced the patients' quality of life and a correlation between reduced sleep stage 3 and 4 in patients undergoing coronary artery bypass grafting (Edell-Gustafsson, Hetta & Aren, 1999: 1219).

Sleep disturbance is measured by seven characteristics: sleep latency, midsleep awakening, movement during sleep, soundness of sleep, wake after sleep onset, quality of sleep disturbance, and quality of sleep latency (Verran, & Snyder-Halpern, 1991 cited in Evan et. al., 1998: 382).

Sleep effectiveness is the perception of the degree the bulk sleep period was considered to be effective in term of sleep quality and sleep length, as measured by four characteristics: rest upon awakening, subject quality of sleep,

sleep sufficiency evaluations, and total sleep times. In term of sleep quality, it includes total sleep period, which refer to sleep length or a periodicity and duration of nocturnal sleep (Verran & Snyder-Halpern, 1991 cited in Evan, et al.,1998:382).

Nap supplementation of sleep is the perception of the degree to which the bulk daytime sleep period augmented with additional sleep time as measured by four characteristics: daytime sleep, morning sleep, afternoon sleep, and awake after arousal (Verran & Snyder-Halpern, 1991 cited in Evan et. al.,1998: 382). In elderly subject in a study of 24-hour sleep, wake patterns in healthy elderly persons were pleased with their nighttime sleep and reported being refreshed by their daytime naps (Evans & Rogers, 1994:82).

The reliability of the Verran & Snyder-Halpern sleep scale was supported in a variety of samples. It is reported that internal consistency of VSH sleep scale was .82 (Verran & Snyder-Halpern, 1987:159). Other studies reported Cronbach' alpha coefficient in heart failure patients were .86 (Phudphanphaisan, 2001:47) and .72 in abdominal surgical patients (Opanuraks, 2002: 58). It is reported that alpha reliabilities of the subscales in hospitalized cardiac disease were .79 (sleep disturbance), .71 (sleep effectiveness), and .77 (sleep supplementation) (Redeker, Tamburri, & Howland, 1998:31).

### **Sleep in ICU patients**

The intensive Care Unit, the hospital's designated area to care for the most severely ill. This patients required both invasive and noninvasive monitoring to measure the important hemodynamic and respiratory parameter, and the intensification of nursing care. The patients in the ICU were much more susceptible to severe sleep deprivation (Krachman, D'Alonzo, & Criner, 1995: 1713). Frequently disturbed sleep has a negative effect on critically ill patients' rersponses and outcomes. Sleep deprivation has also been associated with the cognitive – behavioral changes previously refers to as "ICU Syndrome". Other physiologic effects of sleep deprivation that have the potential to negatively affect the critically ill include a decrease in body temperature and decrease in efficiency of temperature regulation, changes in

cardiovascular and respiratory function, hormonal changes related to stress, changes in muscular control, and enhanced epileptic – like EEG activity in some people ( Parker, 1995: 341).

### **Factors affecting sleep in ICU patients**

Factors affecting sleep can be divided into two groups. First, internal factors or patient characteristics. Second, external factors or environmental condition.

#### **Patient characteristic**

**States of health and illness and functional status.** Severity of illness was not statistically related to self-reported sleep disturbance in cardiac surgery (Simpson, & Lee, 1996 cited in Redeker, 2000: 32). However 30% of medical and intensive care patients attributed sleep disturbances to their disease (Yinnon, et.al.,1992 cited in Redeker, 2000: 32). Functional status, as measured with the New York Heart Association Functional Classification, was associated with increased duration of awakenings and decreased sleep efficiency in hospitalized cardiac patients which have had poor hospitalization functional status (Redeker, Tumburri, & Howland, 1998: 27-37). The patient's underlying disease, an acute illness can adversely impair sleep in the ICU such as the studied of ten patients ages 34 to 81 years with respiratory failure was significant decreased in total sleep time compared with historical controls (Hilton, 1976: 453-468). Other studied was reported in the initial night post acute myocardial infarction was associated with very disturbed sleep, with a significant ( $p < 0.05$ ) increase in wakefulness and decrease in REM sleep (Broughton & Baron, 1978 cited in Krachman, D'Alonzo, & Criner, 1995: 1716). Heath conditions particularly chronic diseases can interfere with sleep by producing symptoms such as nocturia, incontinence, pain, orthopnea, apnea, muscle clamps, and tremors (Eliopoulos, 2001: 124).

**Symptoms.** Cardiac surgical patients rated pain and uncomfortable the worst two sleep disturbers during and after stay in intensive care unit (Simpson, Lee, & Cameron, 1996: 218) and abdominal surgery patients reported

pain and discomfort were the main causes of nighttime awakening (Closs, 1992 cited in Redeker, 2000: 32). A study of 100 intensive care patients found subjects ranked pain secondly only to the “inability to lie comfortably” as the cause of sleep loss (Jones, et al., 1978 cited in Auvil-Novak, & Novak, 1996: 73). Other symptoms such as fatigue, nausea, and dyspnea also may be related to sleep disturbance in acute care patients (Redeker, 2000: 33). Furthermore, psychological stress and worry may influence sleep during acute illness. Anxiety was rated as moderately sleep disturbing by more than 50% of cardiac surgical patients (Simpson, Lee, & Cameron, 1996 cited in Redeker, 2000: 33). Sleep disturbances were associated with stress and anxiety. As anxiety increases, the lack of sleep increases. In addition, because of enhanced sympathetic activity, patients who are stressed will release increased amount of corticosteroids, which can lead to catabolism, sleeplessness and anxiety (Hodgson, L., 1991:1508). Other researchers found that only 24% of patients who reported that they had a lot of worries also said they got enough sleep, compared with 57% who did not report being worried (Southwell, & Wistow, 1995: 1105).

**Age.** Age is probably one of the most important factors affecting a persons’ sleep and rest needs. Sleep for the adult decreases of percentage with age. NREM stage 4 sleep is the most sensitive to advancing age and begins decreasing after 20 years of age (Honkus, 2003: 180). The sleep patterns of older people can be disturbed by such factors as needing to void frequency during the night (nocturia), sleep apnea (Anderson & Braun, 1995: 283). It is reported that age was inversely correlated with the percentage of sleep occurring during nighttime hours in women CABS patients (Redeker, et al., 1996: 120). The patients over age 65 had longer period of nighttime awakenings and lower sleep efficiency when compared to younger patients (Redeker, 1999 cited in Redeker, 2000: 33). Older persons with greater observed severity of cardiac illness may be risk for decreased sleep efficiency and longer duration of awakenings during hospitalization (Redeker, Tamburi, & Howland, 1998:34). Similar findings were obtained in patients with unstable angina and myocardial infarction (Redeker, Tamburi, & Howland, 1998: 27-37). However, no age differences were found in

self-reported sleep disturbance, supplementation, or efficiency in patients with cardiac surgery (Simpson, Lee, & Cameron, 1996: 213-223).

**Gender.** Gender may also be a factor that influences sleep during acute illness (Redeker, 2000: 33). Woman's sleep disturbance during acute care hospitalization has been reported to be more than men's (Closs, 1992 cited in Redeker, 2000: 33). Other researchers has been reported that men had greater sleep disturbance than women (Redeker, Tamburi, & Howland, 1998: 33).

**Primary sleep disorder.** Primary sleep disorders are the person's sleep problem include insomnia, hypersomnia, narcolepsy, sleep apnea and parasomnias. The patients with this disorder lose the normal atonia seen during REM sleep (Krachman, D'Alonzo & Criner, 1995: 1716). Acutely ill patients with sleep-disorder breathing may develop respiratory failure or have difficult weaning from mechanical ventilation (Noureddine, 1996, Olson, & Simpson, 1996 cited in Redeker, 2000: 33). Cardiovascular problems; dysrhythmias, myocardial ischemia and heart failure; also are associated with sleep-disordered breathing (Bradley, 1993 cited in Redeker, 2000: 34). Primary sleep disorders may result in chronically decreased continuity of sleep, increased sleep deprivation, and associated impairments in daytime functioning, including fatigue, neuro-cognitive deficits, and excessive daytime sleepiness that may continue after acute care hospitalization (Redeker, 2000: 33).

### **Environmental conditioning**

**Noise.** Noise is the most likely to disturb sleep in ICU. ICU is often a noisy environment, with alarm sounding from the monitors (Krachman, & Criner, 1995: 1717). Another sources of noise are other patients, staff talking, and telephones (Redeker, 2000: 33). Discrepancies have been found between patients' and nurses' perception of sources of sleep disturbance, with nurses' reporting less frequently than patients that noise resulted from nurses' activities (Southwell, & Wistow, 1995: 1105-1106). The study of critical care unit noise on quality of sleep was reported negatively affect on subjective sleep including: taking longer to fall asleep, less time sleeping, more awakenings (Topf, Bookman, & Arand, 1996: 549). It is reported that sound levels of medical ICU,

respiratory care unit, and a private room were 83 dB(A) during the day and 79.7 dB(A) at night (Meyers, 1994 cited in Krachman, D'Alonzo & Criner, 1995: 1716). It is recommended that standard of a 24-hour average of the sound levels were 45 dB(A) for adequate rest in the hospital (Topf, 2000: 526).

**Light.** Acute care patients reported that excessive light was a source of sleep disturbance. Normal circadian patterns of light and darkness can be affected by the constant environmental. It is stated that light inside the ward during the night of high and dimmed light or suddenly changed light can disturb the patients sleep (Southwell, & Wistow, 1995: 1106, Hilton, 1976: 453-468).

**Disruptions.** Physicians and nurses can be disturb to sleep patterns. There are frequent diagnostic test consisted of laboratory tests obtained, chest radiographs taken, and procedures performed. Nursing care consists of monitoring vital signs, medication administration bathing and bed changes, all of which frequently arouse patients from sleep (Krachman, D'Alonzo & Criner, 1995: 1716). Measurements of vital signs performed routinely every 2 to 4 hours cause sleep fragmentation. Routine early morning phlebotomy or chest radiographs can disturb sleep patterns (Schwab, 1994: 687). Providing a 6-hour uninterrupted sleep period resulted in improvement of self-reported sleep (Sakallaris, & Orell, cited in Redeker, 2000: 34).

### **An overview of music therapy**

Music therapy is “ the use of music in the accomplishment of therapeutic aims, the restoration, maintenance, and improvement of mental and physical health ” (Buckwalter, et al., In Bulecheck & McCloskey, Eds., 1985: 59).

Music therapy can be defined as the ability to experience an altered state of physical arousal and mood through processing a progression of musical notes of varying tone, rhythm, and instrumentation of pleasing effect (Seaward, 1999: 358).

Since ancient times, music has been used to ease the suffering of people; its influence on history, morals and culture has long been noted. Music has been used as a treatment modality for healing the body and mind (White, 2000: 219). For thousand years ago, the Egyptians reported music would

increased the fertility of woman. The Bible referred to the healing power of music that David used the harp to cure King Saul's depression. Ancient Greeks, including Aristotle, Plato, and Pythagoras, possessed an intuitive understanding of the healing power of music, suggesting that daily exposure could contribute to health. Aristotle held the notion that flute music offered a cathartic release of emotions. Plato indicated that music restored the harmony and contentment in one's soul as well as the moral welfare of the nation at large. "Music is the moral law", he wrote. "It is the essence of order and leads to all that is good, just, and beautiful, passionate and eternal form". Pythagoras credited the rhythm of music with special healing qualities. "All things are constructed of harmonic patterns. It is only when we are out of step with the natural harmonic that disharmony arises" (Merritt, 1990 cited in Seaward, 1999: 358).

The therapeutic attributes of music in nursing were recognized by Nightingale in 1859 (White, 2000: 219) and has been used since then (Guzzetta, In Dossey, et al., Eds., 1995: 679).

Music itself is defined as a complex web of expressively organized sound that contain three elements: rhythm, melody, and harmony (Bunt, 1994 cited in Chlan, & Tracy, 1999: 35). Webster's dictionary defined music as the science or art of ordering tones or sounds in succession, in combination, and in temporal relationships to produce a composition having unity and continuity (Woolf, 1979 cited in Snyder, 1992: 184).

Music used for therapeutic purposes has been called music therapy which can defined in several means such as music therapy is the process of bringing about changes from undesirable, unhealthful, and uncomfortable conditions to more pleasant ones by the deliberate use of music (White, 2000: 219). Music therapy as the control used of music and its influence on the human being to aid in physiologic, psychologic, and emotional integration of the individual during treatment of an illness or disability (Munro, & Mount, 1978 cited in Snyder, 1992: 184). However, the definition of music therapy emphasizes various type of health problems assisted through music therapy, offers a brief historical perspective, and lists some of the health care settings in which music therapists are most often employed.

The character of the music and its effects depend on the qualities of music elements and their relationships to each other.

Rhythm is the pattern of the movement of music. It is one of the most essential structural and organizational elements of music, is the most influential aspect of music, and is a key consideration when selecting musical collections for specific purposes. Musical rhythms can be used to synchronize or entrain inherent body rhythms (heart rate, respiration rate, speech, gait) with the rhythm of the music; that is, heart rate can be varied over a certain range by entrainment of the sinus rhythm with external auditory stimulus, which supposedly acts via the nervous control mechanisms, and result from neural coupling in the cardiac center of the brain. According to the effect of rhythm has on entrainment of body functions, it is believed to impact changes in moods such as the slow, repetitive, steady rhythms are through to effort a relaxing or soothing effect on the listener. After decades of study, it is accepted that music is most relaxing when the tempo is approximately 60 beats per minute (White, 2000: 220). Strong rhythms can awaken feelings of power and control (Snyder, 1992: 185).

Pitch (frequency) is produced by the number of cycles the sound vibrates per second. Faster vibrations produce higher pitched tones, while slower vibrations result in lower tones. High-pitched music can cause tension, while low-pitched music is thought to be conducive to relaxation (White, 2000: 220). Human can be heard the sound when it ranges from 20 to 20,000 times per second (Sungkasopon, 1998: 13).

Intensity creates the volume of the sound. It is related to loudness or amplitude of vibrations. Intensity can be used to produce effects such as intimacy (soft music), protection (loud music), and power (alternating volumes) (Snyder, 1992: 185). High intensity has the effects of emotional, domination and coerciveness, while low intensity has more tranquil and serene (Seaward, 1999: 361).

Tone is an initial sound or vibration (Seaward, 1999: 361).

Tone color (timbre) is a nonrhythmical, purely sensuous property and results from the harmony present (Snyder, 1992: 185). Tone color is that makes

the same notes played on different instruments sound very different (Watson & Drury, 1987 cited in Seaward, 1999: 361).

Harmony is the ratio and relationship between tones (sounds) and their rhythmic patterns. Harmony in music refers to the way pitches are blended, with the combination of sounds being characterized as consonant or dissonant (White, 2000: 220).

Melody in music refers to the results from the sequence of musical pitch and the interval between musical tones. The melody of music can have a direct impact on the listener's emotion or physiologic response to the music (White, 2000: 220).

Interval is the units of musical scale and the vertical distance between two notes giving rise to the structure of melodies and harmonies (Snyder, 1992: 185).

### **Music theory**

Music affects all aspects (physiological, psychological, spiritual) of human being which can explain by using the combination of two or more theories. Music theory used in health care provider are as follow:

#### Biochemical Theory

Music appears to affect human physiology directly through the cerebral cortex and autonomic nervous system. Through the ear's structure, sound stimuli are received by the brain via special nervous tissue of the ear (organ of Corti, or hair cells) where vibrations are converted to electrical nerve impulses. It is concerning to note that these hair cells are only a membrane away from lymph fluid of the inner ear, which relating to the immune system. Moreover, the ear drum seem to have a liaison with the parasympathetic nervous system via the vagus nerve. The impulses are through the first decoded by the cerebral cortex, then deciphered by the subcortex, and subsequently directed from the limbic system through the autonomic nervous system, potentially throughout the entire body. Elements involved with these auditory sensations include pitch, rhythm, tone, tempo, volume, and perhaps most importantly, perceptual quality, or emotional effects of deciphered sounds. Depending on

interpretation (like or dislike), either the sympathetic or parasympathetic nervous system may be activated.

Music appreciation is thought to be a right brain function; it is the right hemisphere of the brain that recognizes and processes auditory stimulation in the form of musical note and chord progressions. This seem especially true when music is instrumental, or without lyrics. The left cerebral hemisphere, proficient in verbal acuity, is thought to intercept auditory stimulation of music with lyrics, if analysis of musical composition and instrumentation is initiated. For the reason, instrumentals are thought to promote a greater sense of relaxation than music combined with lyrics. Furthermore, music that consists of a series of repetitive notes or beats may act much like mantra, inducing a meditative state of relaxation. Although yet unproven, it has been speculated some that music may release endorphins (neuropeptides and chemical opiates) from the brain and other body tissues, which create a sensation of euphoria or inspiration high. Another neurotransmitter, melanin, has been researched to determine its effects as an electrical semiconductor. Melanin is capable of converting light energy to sound energy through neurochemical messages (Seaward, 1999: 361-363).

#### Entrainment Theory

Entrainment is a process whereby two or more objects vibrating at similar frequencies will tend to interact and come into sync with one another, thereby resonating at the same frequency (Bunt, 1994 cited in Chlan, 1998: 170).

The entrainment theory, first purposed by Dutch physicist; Christian Huygens; in 1665. It is defined as the “mutual phase-locking oscillation of like frequencies in the same environment” which is thought to be attempt to conserve energy. It is suggested that if one organ; the heart; say-increases its oscillations as a result of heightened metabolic activity, adjacent organs will entrain to that frequency (Seaward, 1999: 363).

The entrainment of body rhythms with relaxing music is thought to decrease sympathetic nervous system activity, resulting in a reduction in the arousability of the central nervous system. These responses, inturn, lead to decreased adrenergic activity, alter states of consciousness, and decreased

neuromuscular arousal, all appeared as physiological indicators of the relaxation response by decreases heart rate, respiratory rate, metabolic rate, oxygen consumption, skeletal muscle tension, epinephrine level, gastric acidity and motility, and sweat gland activity, with decreased blood pressure in hypertensive individuals (Everly & Benson, 1989, Benson, 1975 cited in Chlan, 1998: 170).

Relaxing music has a calming effect because elevate body rhythms entrain with a slower, more natural homeostatic rhythm produced by a musical composition. Quite literally, relaxation occur when the body is in harmony with itself and the natural world. This theory was indicated that many people who listen to up-beat music to relax may in effect throw off their natural body rhythm (Seaward, 1999: 365).

#### Metaphysical Theory

This theory as the most intuitively true theory suggests that music has a divine quality. Music is a gift from God, or so Orpheus thought which Greek legend has it that Orpheus was given a lyre by Appllo, the god of music, to offer songs of praise. While neurophysiologists theorize that music is a holy gift communicating through the soul or human spirit. Stephanie Merritt, music therapist, suggests that music has the divine ability to unite or connect the human spirit of all individuals (Merritt, 1990 cited in Seaward, 1999: 365).

#### **Music Therapy Application**

Music has been used to foster a variety of desired outcome. For example it enhances creativity, the development of new ways of association. The playing of appropriate music produce alpha and theta brain waves, which are known to stimulate creativity (Guzzetta, In Dossey, et al., Eds., 1995: 677).

The major populations served by music therapists based on a 1998 survey conducted by the American Music Therapy Association (AMTA) including elderly, developmentally disabled, school-age, early childhood, substance abuse, neurologically impaired, and terminally ill (Gfeller&Davis, In Davis, et al, Ed., 1999: 8).

#### **Music Therapy in Clinical Setting**

Music has been prescribed as a therapeutic intervention for a variety of clinical populations. Music has potentially usefulness in the cardiovascular

disease, hypertension, migraine headaches, gastrointestinal ulcers, Raynaud's disease, AIDS, cancer, and pain. It has also been shown to be effective for patients with head trauma, for elderly and demented patients, for patient with Alzheimer's disease, and for patients undergoing general anesthesia.

Several hospitals are using relaxation music to reduce stress and pain in hospitalized patients. Music has been used in birthing, counseling, and massage rooms (Guzzetta, In Dossey, et al., Eds., 1995: 678-679). Thus, music therapy studies in the field of nursing has been grouped according to the purposes for which they were implemented including anxiety/stress reduction, pain reduction, improved performance, decrease in aggressive/agitation behaviors, desire outcomes, and impact on psychoneuroimmunological variables (Snyder, & Chalan, 1999: 4-16).

### **Music Therapy for sleep promotion in critically ill patient**

The admission of an individual to critical care unit have a particularly negative effect on both the quantity and quality of sleep. The interventions for sleep promotion in critical care unit, patients were composed of decreasing excessive noise and light, limiting interruptions, providing blocks of uninterrupted times for sleep. In addition, relaxation technique such as progressive relaxation, imagery, massage and music therapy were also promoting sleep.

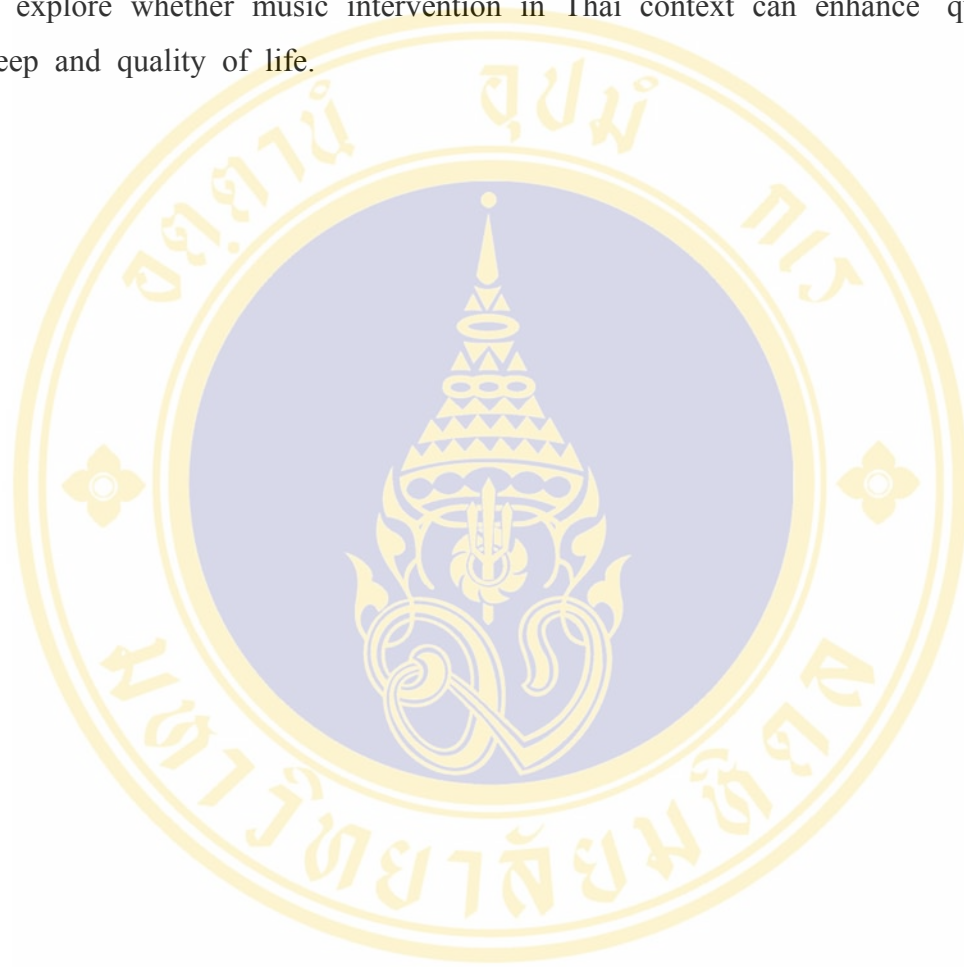
A tapes of music therapy was first created and played in 1973. The reduction in both physiological parameters, including blood pressure, heart rate, ventilations, and muscle tension, and increased ability to sleep; as well as reduction in psychological factors including anxiety and depression has been demonstrated (Bonny, 1973 cited in Seaward, 1999: 366).

It is reported that music interventions on sleep in coronary artery bypass graft patients had significantly better sleep (Zimmerman, et.al., 1996: 153-170).

It is reported twenty-four (96%) of the patients felt that their sleep problems were reduced by the music. They believed that the music helped them fall asleep, return to sleep quicker if awakened during the night, or sleep longer

in the morning and music allowed them to “turn off” their mind so that they could relax enough to fall asleep (Mornhinne & Voignier, 1995: 251).

Overall, there is an evidence that music therapy is an effective intervention for promoting sleep in intensive care unit patients. It is necessary to explore whether music intervention in Thai context can enhance quality of sleep and quality of life.



## CHAPTER III

### MATERIALS AND METHODS

This chapter presents the research materials and methods, which are organized into the following topics. First, the design of this research, the patients population and the research setting are described. Secondly, the research instruments and the process of data collection are described. Finally, the statistical analysis of the data is described.

#### **Research Design**

A quasi-experiment; one group; pre-test and post-test design was used to determine the effect of music on quality of sleep in critically ill patients.

#### **Population and Sampling**

The population in this research were patients admitted in the Medical Intensive Care Unit 2 at King Chulalongkorn Memorial Hospital. The purposive sampling consisted of 30 adult critically ill patients.

Criteria for eligibility were:

1. Age over 18 years.
2. Good consciousness, please to listening the music at bedtime and well cooperative.
3. Absent of neurological pathology.
4. No problem of hearing.
5. Able to read and write.
6. No severe complications such as shock.

- MAP as normal range 70 – 105 mmHg.

Exclusion criteria was:

- Receiving continuous intravenous sedation.

## Research Setting

The study was conducted at King Chulalongkorn Memorial Hospital which was a charity organization hospital and was a place for training of nursing and medical students. There are 9 intensive care units for adult patients. There are four intensive care units for critically ill patients with severe medical problems, four intensive care units for critically ill patients with severe surgical problems, and one intensive care unit for critically ill patients with severe obstetrical & gynecological problems. The four intensive care units for medical problem patients are CCU and ICCU that for the patients with cardiovascular problem. The other 2 intensive care units for general medically ill patients are MICU1 and MICU2. MICU2 was selected for the setting of this study. It is a new intensive care unit developed from the medical intermediate care unit. There were 8 ordinary beds in this unit which 728 patients were admitted in 2000.

## Instrumentation

Research instruments were consisted of two parts.

1. The instruments used in undertaking research intervention.

1.1 The portable cassette tape player .

1.2 A 30 -minute cassette tape consisted of a soothing type of music that facilitates relaxation. The process for select a music was as follows:

- Studied the component of music, type of music, its elements and their influence on the human being to aid in the physiologic, psychologic and emotional. Textbooks, journal, and the musical expert are resources of the study.

- Selected the music that facilitates relaxation and makes the patient calm down then recorded on to a cassette tape.

1.3 An average noise level in MICU2 around the experimental time in the evening was measured with the noise level analyzer giving 65 decibels.

1.4 The noise level analyzer is used to maintain 10 decibels higher than the level of music throughout the intervention in order to overcome the level of noise of ICU environment.

2. The instruments for collecting data were consisted of.

2.1 The demographic data questionnaire developed by the researcher

2.1.1 Personal data including gender, age, marital status, educational level, occupation, and economic status.

2.1.2 Prior sleep pattern including bedtime and wake-time, total sleep period, number and mid -sleep awakening, feeling enough total sleep period, and habit before sleep.

2.1.3 Illness information questionnaire including length of illness, history of admission, total amount of admission, length of stay in ICU, and factor affecting sleep during admission in ICU.

2.1.4 Prior music listening information including musical habit, type of favorably music, feeling of music listening, and effect of music listening.

2.2 Quality of sleep

In this study, sleep quality is the sensation of adequate sleep, feel rest, refresh or alert after awakening. It was measured by using the Verran and Snyder-Halpern (VSH) Sleep scale (Verran, & Snyder-Halpern, 1987; Verran,& Snyder-Halpern, 1991 cited in Evans, et.al.,1998:382-383) that was received permission and allowed to translate into Thai language. The instrument was applied to appropriate for subjects by the researcher. There are 16-items of original instrument. One of the original item “total sleep time” was omitted from the sleep effectiveness sub-scale because it consisted of a mathematical calculation of two items “total sleep period” minus “wake after sleep onset” that were already included in the sleep scale (Simpson, et.al.,1996:215). Therefore, there are 15-items of quality of sleep instrument using in this study. The scale was designed to be a visual analogue instrument. It is a 15-item scale on which each item consisted of a pair of word descriptors separated by a 10-cm.(line) unmarked horizontal line. Subjects responded by making a vertical mark across the horizontal line at the point that best reflected their subjective recalling of the characteristics (quality) of their sleep on the previous day. The VSH was used to describe the quality of sleep that composes of four dimensions: length of sleep, sleep disturbance, sleep effectiveness, and nap supplementation of sleep.

Length of sleep was defined as the perception of the patients about total sleep period which fell asleep to the time they awake in the morning.

Sleep disturbance was defined as the perception of the bulk sleep period which was disturbed due to fragmentation and sleep latency which measured by seven sleep characteristics including; mid-sleep awakening, wake after sleep onset, movement during sleep, soundness of sleep, quality of disturbance, sleep latency, and quality of latency (Verran & Snyder-Halpern, 1991 cited in Evan, et. al. 1998:382).

Sleep effectiveness was defined as the perception of the degree the bulk sleep period was considered to be effective in term of sleep quality and sleep length which was measured by five characteristics including; rest upon awakening, subjective quality of sleep, sleep sufficiency evaluations, total sleep time, and total sleep period (Verran & Snyder-Halpern, 1991 cited in Evan, et. al. 1998:382).

Nap supplementation of sleep was defined as the perception of the degree to which the bulk sleep period was augmented with additional sleep time which was measured by four characteristics including; daytime sleep, morning sleep, afternoon sleep, and wake after final arousal (Verran & Snyder-Halpern, 1991 cited in Evan, et. al. 1998:383).

Separated scores were computed for each subscale. The distance from the left end of the line to the mark made by each subject was measured in centimeters, and the centimeter reading was scored for each item. The score for each subscale is an average of the reading for all item in each subscale. The higher score on each item was, the greater the value of each dimension of sleep disturbance, effectiveness, and nap supplementation was. The higher the score for the summed items in each dimension was, the more disturbance, the more effectiveness, and the more nap supplementation of the sleep of each dimension was.

### 2.3 Observation Form

The observation form was designed by the researcher for recording the physiological parameters; heart rate and respiratory rate; 30 minutes before, during, and after listening to the music at every five minutes.

## **Validity and Reliability of the Instruments**

### **Content Validity**

The characteristic and type of music of the music recorded in a cassette tape were confirmed by two music expertists.

In addition, all of the data collection instruments were tested by five experts. The first one is a medical doctor who is a specialist in critical medicine. The second one is a medical doctor who is a specialist in sleep and respiratory medicine. The third one is a faculty member of the faculty of Nursing, Mahidol University . The fourth and the fifth ones are the ICU registered nurses. One of them is an expert in critical medical nursing, and the other is an expert in critical surgical nursing. After being reviewed by the experts, the questionnaires was improved by cooperating suggestion in order to 1) improve the context and the clarity of the questions; 2) provide more appropriate order of the questions; and 3) to ensure appropriate language usage.

### **Reliability**

The instruments were tried out at King Chulalongkorn Memorial Hospital on 30 critically ill patients admitted to MICU1, MICU2, CCU, and ICCU who had the same characteristics as the sample.

Cronbach's Alpha Coefficient (Polit & Hungler, 1999:415) was used to calculated the reliability of the VSH Sleep Scale giving 0.78, 0.78, 0.77, for sleep disturbance, sleep effectiveness, and nap supplementation of sleep respectively.

### **Data Collection Procedure**

Data collection were performed by the researcher step by step as follows:

1. The researcher requested a permission form to collect data from the Faculty of Graduate Studies, Mahidol University and sent it to the Director of King Chulalongkorn Memorial Hospital. After obtaining permission, the researcher met the nurse supervisors and head nurses of critical care unit for their collaboration.

2. The researcher explained the nature of the study procedure to the head nurse, staff nurses, and physicians in MICU2 and request for their collaboration.

3. The researcher selected the subject based on the criteria previously identified from OPD cards and charts.

4. The researcher then approached to the subject, introduced herself and explained about the purpose of the study, the method and characteristic of the instruments. The protection of human rights was given to the subject and asked to indicate their willingness to participate by signing a consent form.

5. When the subjects assented to participate in this study, the researcher made an appointment with the subjects as follow:

*Day 1*

The subjects were asked to answer questionnaires about, the demographic data and the quality of sleep on the prior night (before experiment ) by using VSH Sleep scale. If the subjects didn't understand the questionnaires, the researcher described to them. The researcher checked all the questionnaires for missing items. If there were any missing one, the subjects were asked to complete.

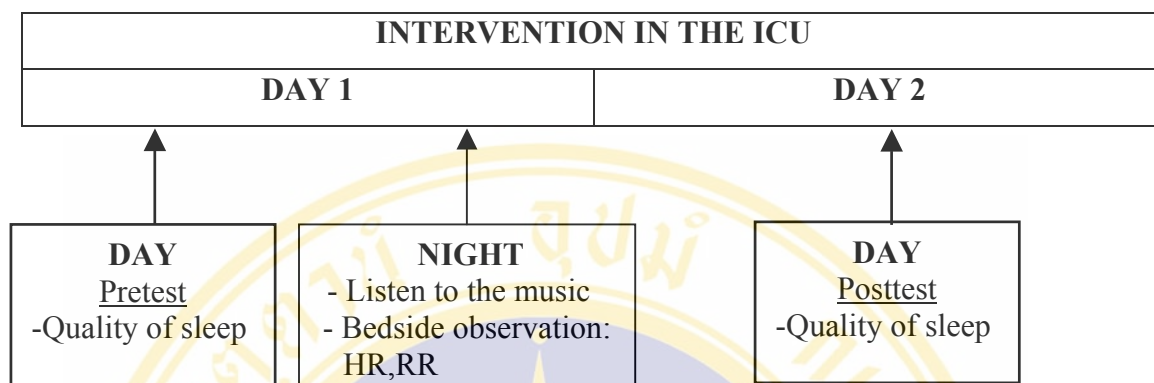
At night, the researcher was with the subjects and allow the subjects pointing the time of listening to the music whenever they wanted to sleep. The subjects were listened to the 30-minute tape of soothing music until they fall asleep. The researcher remained at bedside for 90 minutes; 30 minutes of before, during, and after listening to the music; to recorded the physiological parameters at every 5 minutes.

*Day 2*

The subjects were asked to answer the same questionnaires about the quality of sleep on the previous night(after experiment) by using VSH Sleep scale.

The protocol is shown in figure 3.

6. Lastly, when finished collecting data, the subjects were thanked for their participation.



**Figure 3. The protocol of the music intervention**

### **Protection of Human Subjects**

The consent form was explained in detail and so were the objectives of the study and the data collections procedure. The researcher apprised subjects of their rights and the subjects could request information from the researcher at anytime if they did not understand anything about the study. The subjects could cancel or withdrawn from the study at anytime without any affected on the treatment or nursing care if they wanted. The data, which was taken from the subjects would be kept strictly confidential. Each subjects would be coded for the identification number that match the patient's code in the data form. No personal identification markers were recorded on the data forms. The patient's identity didn't be mentioned or discussed with anyone. Results of this study were reported in a group form only.

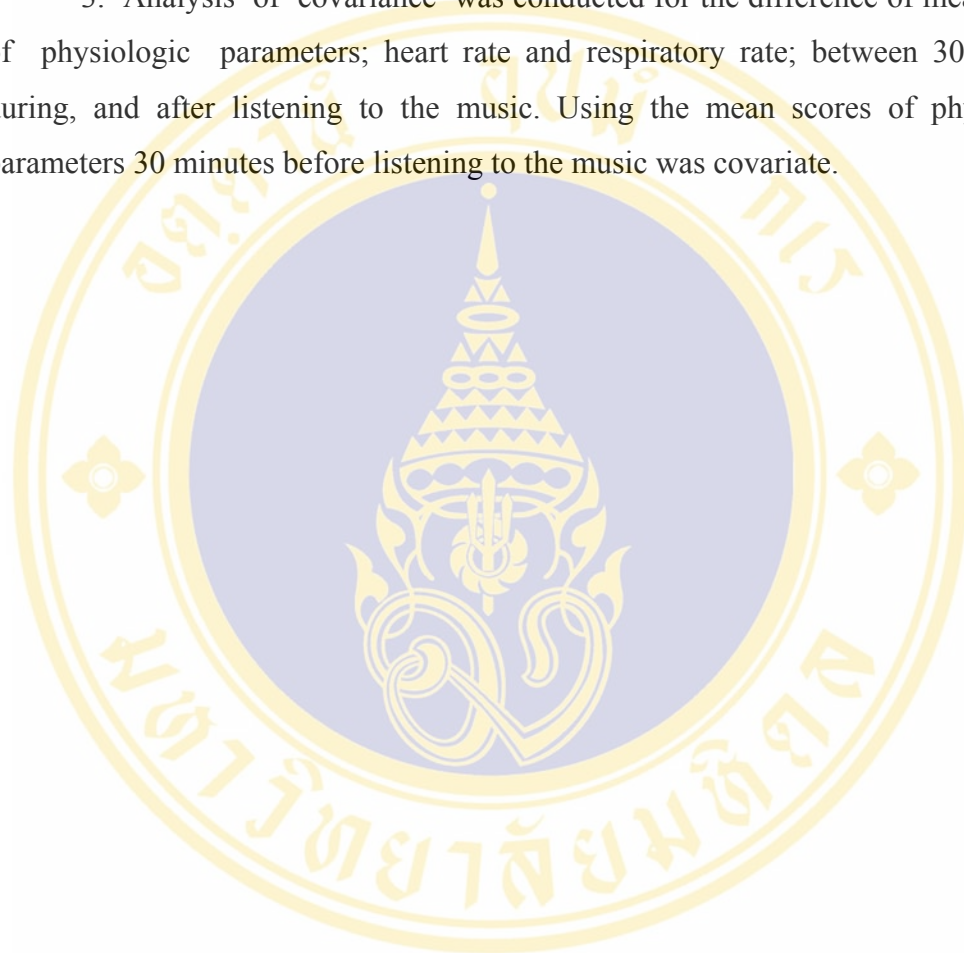
### **Data Analysis**

Data obtained were analyzed by using the Statistical Package for the Social Sciences for windows (SPSS/FW) as follows:

1. Frequency distribution and percentages were conducted to describe demographic data.

2. The paired T-test was conducted to compare the difference in mean quality of sleep scores between before and after experiment. Before analyzing the quality of sleep, the scores of each items in sleep disturbance (7items) were reversed in order to get the same direction of the samples' perception.

3. Analysis of covariance was conducted for the difference of mean scores of physiologic parameters; heart rate and respiratory rate; between 30 minutes during, and after listening to the music. Using the mean scores of physiologic parameters 30 minutes before listening to the music was covariate.



## CHAPTER IV

### RESULTS

This study aimed to compare quality of sleep in critically ill patients between before and after listen to music. It was be measured by using Verran and Snyder-Halpern (VSH) Sleep scale that composes of four dimensions: length of sleep, sleep disturbance, sleep effectiveness, nap supplementation of sleep and observation parameters such as HR, RR, 30 samples were critically ill patients who was admitted in the medical-surgical intensive care unit at King Chulalongkorn Memorial Hospital. The findings of this study was presented as follows:

Part 1. Demographic data of samples. (table 1, 2, 3, 4)

Part 2. Quality of sleep

2.1 compare mean, standard deviation, and t-value of quality of sleep from Verran and Snyder-Halpern (VSH) Sleep scale between before and after experiment. (table 5)

2.2 compare mean score of heart rate by heart rate between 30 minutes during and after listening to the music used statistical ANCOVA. Using the mean scores of heart rate before listening to the music. (table 6)

2.3 compare mean score of respiratory rate by respiratory rate between 30 minutes during and after listening to the music used statistical ANCOVA. Using the mean scores of respiratory rate before listening to the music. (table 7)

## Part 1. Demographic data

Table 1: Frequency and percentages of the patients categorized by personal data(n=30)

Characteristics	Frequency	Percentage
<b>Gender</b>		
Male	12	40
Female	18	60
<b>Age (years) (Mean = 51.67, SD = 14.42, Range = 27-80 years)</b>		
21-30	3	10
31-40	3	10
41-50	9	30
51-60	7	23.3
61-70	5	16.7
71-80	3	10
<b>Marital status</b>		
Single	3	10
Married	25	83.3
Divorced	2	6.7
<b>Education level</b>		
No	3	10
Primary school	13	43.3
Secondary school	8	26.7
Bachelor	6	20.0

Table 1: Frequency and percentages of the patients categorized by personal data(n=30)(continued).

Characteristics	Frequency	Percentage
<b>Occupational</b>		
Government service	2	6.7
State enterprise	2	6.7
Employment	5	16.7
Business	5	16.7
None	8	26.7
Other	8	26.7
<b>Income(Bath/month)</b>		
None	2	6.7
<3,000	7	23.3
3,000-6,000	8	26.7
6,000-9,000	5	16.7
>9,000	8	26.7
<b>Income sufficiency</b>		
Adequate	8	26.7
Adequate and reserve	11	36.7
Inadequate	11	36.7

Table 1: Frequency and percentages of the patients categorized by personal data(n=30)(continued).

Characteristics	Frequency	Percentage
<b>Payment</b>		
Owner	15	50
Welfare	12	40
Social insurance	3	10
<b>Problem of payment</b>		
No	21	70
Little	6	20
More	3	10

Table 1 showed that most of the patients were female 60%, 30% in the age group 41-50 years and 83.3% of them were married. The education level was Primary school 43.3%, 26.7% of them were unemployed. The incomes was 3,000-6,000 Bath/month 26.7% and more than 9,000 Bath/month 26.7%. The income sufficiency of adequate & reserve and inadequate was equal of 36.7%. Half of the patients pay by themselves and 70% had no problem for payment.

Table 2: Frequency and percentages of the patients categorized by prior sleep pattern (n=30)

Characteristics	Frequency	Percentage
Habit before sleep		
Watch TV	23	76.7
Listening radio	6	20
Read	5	16.7
Pray	4	13.3
Drink	3	10
Meditation	2	6.7
Undoing	1	3.3
Sleeping pill (used)		
None	27	90
Sometime	2	6.7
Everyday	1	3.3
Bedtime (pm.)		
07.00	1	3.3
08.00	3	10
09.00	8	26.7
10.00	11	36.7
11.00	4	13.3
12.00	3	10

Table 2: Frequency and percentages of the patients categorized by prior sleep pattern  
(n=30) (continued).

Characteristics	Frequency	Percentage
Wake-time (am.)		
04.00	5	16.7
05.00	10	33.3
06.00	5	16.7
07.00	4	13.3
08.00	5	16.7
09.00	1	3.3
Mid-sleep awakening(time)		
One	12	40.0
Two	12	40.0
Three	4	13.3
Four	2	6.7
Causes of wake		
Toilet	24	80.0
Unspecify	4	13.4
Uncomfort	1	3.3
Smoking addiction	1	3.3

Table 2: Frequency and percentages of the patients categorized by prior sleep pattern (n=30) (continued).

Characteristics	Frequency	Percentage
Feeling enough total sleep period (hour)		
3 - 5	7	23.3
6 - 8	19	63.3
9 -11	4	13.3

Table 2 showed that the most of habit before sleep was watching TV 76.7%, 90% did not use sleeping pill and go to bed at 10.00 pm. 36.7% and get up at 5 o'clock in the morning 33.3%. Mid-sleep awakening (time) of one and two times was equal of 40%. The majority cause of awakening was went to toilet 80% and 6-8 hours sleep was the enough total sleep periods of 63.3%.

Table 3: Frequency and percentages of the patients categorized by illness information  
(n=30)

Characteristics	Frequency	Percentage
<b>Illness period</b>		
Chronic	17	56.7
Acute	13	43.3
<b>Admission</b>		
No	7	23.3
Yes	23	76.7
- One time	12	40.0
- Two times	4	13.3
- Three times	4	13.3
- Four times	1	3.3
- Five times	1	3.3
- Ten times	1	3.3
<b>History of ICU admission</b>		
No	19	63.3
Yes	11	36.7
- One time	8	26.7
- Two times	2	6.7
- Three times	1	3.3

Table 3: Frequency and percentages of the patients categorized by illness information (n=30) (continued).

Characteristics	Frequency	Percentage
<b>Chief complaint</b>		
Cardiovascular	12	40.0
Infectious	7	23.3
Gastrointestinal	3	10.0
Respiratory	3	10.0
Hematology	2	6.7
Toxicology	1	3.3
Gynecology	1	3.3
CNS	1	3.3
<b>Past illness</b>		
No	19	63.3
Yes*	11	36.7
- HT	5	16.7
- DM	5	16.7
- Asthma	2	6.7
- Rheumatic heart	2	6.7
- Thalassemia	1	3.3

\* Some patients had more than one past illness.

Table 3: Frequency and percentages of the patients categorized by illness information (n=30) (continued).

Characteristics	Frequency	Percentage
Length of stay in ICU (days)		
Two	10	33.3
Three	6	20.0
Four	6	20.0
Five	5	16.7
Six	1	3.3
Seven	1	3.3
Eight	1	3.3
Factors disturb sleep*		
Illness	15	50.0
Noise	14	46.7
Anxiety	13	43.3
Light	10	33.3
Nursing activity	10	33.3
Cold	7	23.3
Unfamiliar place	3	10.0
Mosquito	1	3.3
Fear	1	3.3
Void	1	3.3

\* Some patients had more than one factor disturb sleep.

Table 3 showed that 56.7% of the patients were admitted with chronic illness. 76.7% had been admitted before, 40% of the patients were once hospitalized, and 63.3% have no history of ICU admission. Previous ICU admission was one time 26.7%, cardiovascular was the most of chief complain of 40%. 36.7% have had past illness, with 16.7% DM and HT. The most of length of stay in ICU was two days 33.3%. Illness was the most factors that disturb sleep 50% and noise was the second factor that disturb sleep 46.7%.

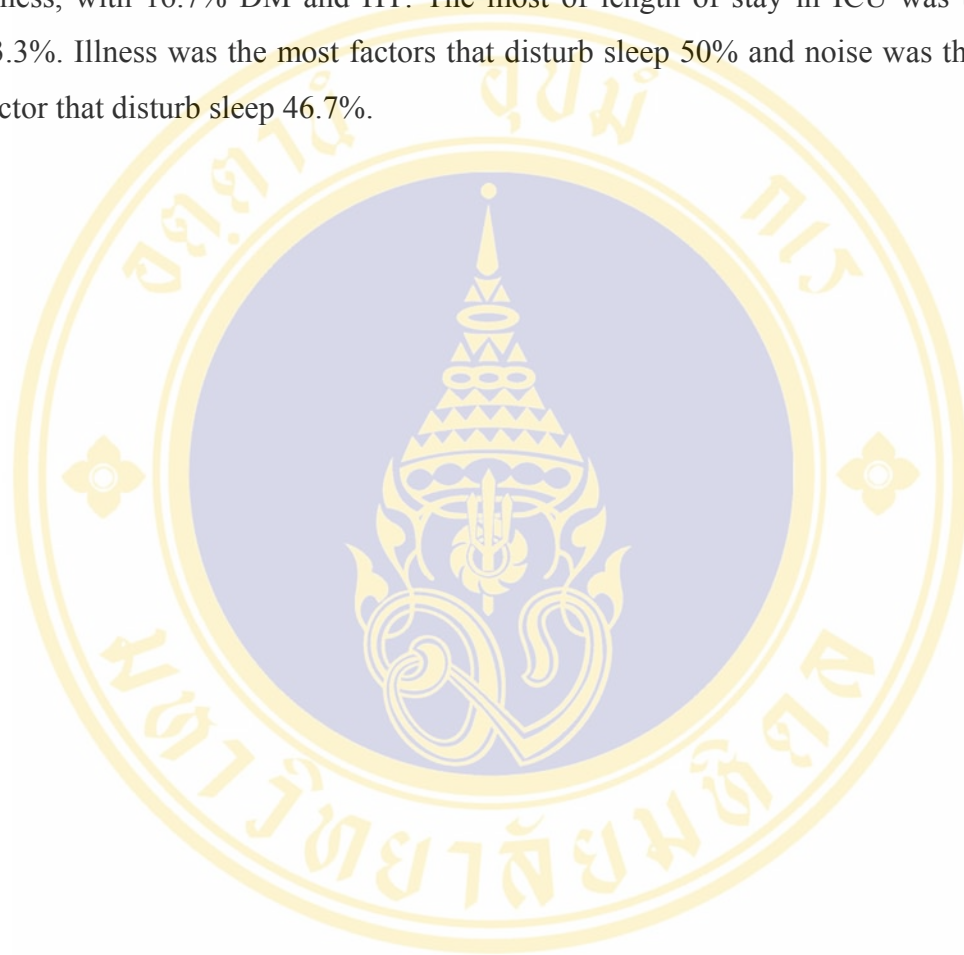


Table 4: Frequency and percentages of the patients categorized by prior music listening (n=30).

Characteristics	Frequency	Percentage
<b>Musical habit</b>		
Everyday	12	40.0
Seldom	10	33.3
2 day/week	5	16.7
5 day/week	2	6.7
No	1	3.3
<b>Kind of favourite song</b>		
Thai classic.	18	60.0
Thai inter.	17	56.7
International	4	13.3
Thai country	2	6.7
No	1	3.3
<b>Type of favourite music</b>		
Text	14	46.7
Both	14	46.7
Instrument	1	3.3
No	1	3.3

Table 4 showed that 40% of the patients listen music everyday, only one subjects didn't listen to music,60%Thai classic song is the most favorite song that equal the type of favorite music of Text an Both (Text&Instrument) of 46.7%.

## Part 2. Quality of sleep

Table 5: Compare mean, standard deviation, and t-value of quality of sleep from Verran and Snyder- Halpern (VSH) Sleep scale between before and after listening to the music (n=30).

Quality of sleep	Before		After		t-value
	$\bar{X}$	SD	$\bar{X}$	SD	
Total	74.88	27.12	98.82	25.76	-4.778**
Sleep disturbance	34.08	14.22	50.12	14.47	-5.340**
Sleep effectiveness	24.37	9.73	31.24	8.05	-3.198**
Nap supplementation	16.43	8.69	17.46	9.37	-0.668 <sup>NS</sup>

\*\*p< .01, NS= no significant

Table 5 showed that quality of sleep after listening to the music was statistically significant higher than that of before listening to the music. Dimension of quality of sleep; sleep disturbance and sleep effectiveness was statistically significant higher than that before listening to the music whereas nap supplementation of sleep was no statistically significant higher than that before listening to the music.

Table 6: Mean and standard deviation of heart rate and respiratory rate 30 minutes before, during, and after listening to the music (n=30).

Physiological parameters	Before		During		After	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
HR	85.37	19.90	78.33	21.26	76.48	21.30
RR	24.63	3.90	21.03	4.31	19.47	4.07

Table 6 showed that the mean scores of heart rate and respiratory rate 30 minutes during and after listening to the music was lower than before listening to the music.

Table 7: Compare mean scores of heart rate by heart rate between 30 minutes during and after listening to the music used statistical ANCOVA. Using the mean scores of heart rate before listening to the music was Covariate Variable. (n=30)

Source of variance	df	SS	MS	F	Sig
HR					
Covariates	1	4.394	4.394	.523	.510
Main Effects	24	1710.625	71.276	8.486	.025*
Residual	4	33.597	8.399		
Total	29	13163.319	453.908		

\*p<.05

Table 7 showed that the mean scores of heart rate by heart rate between 30 minutes during and after listening to the music was statistically significant difference.

Table 8: Compare mean scores of respiration rate by respiration rate between 30 minutes during and after listening to the music used statistical ANCOVA. Using the mean scores of respiration rate before listening to the music was Covariate Variable. (n=30)

Source of variance	df	SS	MS	F	Sig.
RR					
Covariates	1	6.083	6.083	2.265	.152
Main Effects	12	172.254	14.355	5.344	.001*
Residual	16	42.977	2.686		
Total	29	480.449	16.567		

\*p<.05

Table 8 showed that the mean scores of respiratory rate by respiratory rate between 30 minutes during and after listening to the music was statistically significant difference.

## CHAPTER V

### DISCUSSION

The purpose of this study was to evaluate the effects of music on quality of sleep and physiological responses; heart rate and respiratory rate; during and after listening to the music in critically ill patients.

The result of this study were reported in two parts.

Part I : Discussion related to the purpose of study 1: To compare the quality of sleep in critically ill patients before and after listening to the music.

Part II : Discussion related to the purpose of study 2: To compare the effect of music on physiological responses; heart rate and respiratory rate; during and after listening to the music.

**Part I : Discussion related to the purpose of study 1: To compare the quality of sleep in critically ill patients before and after listening to the music:**

**Hypothesis 1:** After listening to the music, the quality of sleep in critically ill patient is statistically significant higher than before listening to the music.

It was found that after listening to the music mean scores of quality of sleep is higher than before listening to the music (Table 5). Considering each dimension of mean scores of quality of sleep after listening to the music presented higher mean scores than that before listening to the music (Table 5). Considering two dimensions of mean scores of quality of sleep; sleep disturbance & sleep effectiveness; after listening to the music presented statistically significant higher mean scores than that before listening to the music. The mean scores of each items of sleep disturbance; sleep latency, midsleep awakening, movement during sleep, soundness of sleep, wake after sleep onset, quality of sleep disturbance, and quality of sleep latency; and sleep effectiveness; rest upon awakening, subjective quality of sleep, sleep efficiency evaluation, and total sleep period; after listening to the music was higher than before

listening to the music (Appendix D). The mean scores of most of these items; 9 of 11; were statistically significant (Appendix D). While only one dimension of mean scores of quality of sleep; nap supplementation of sleep; after listening to the music presented no significant (Table 5). This can be explained that in conducting this study, the subjects listened to the music only at night before bed time not day time which was the time of nap supplementation. This can conclude that the quality of sleep of the subjects after listening to the music was better than that before listening to the music. These can explain that the music used in this study was the soothing type of music without words which 60-80 beat per minute of tempo. It is stated that this type of music can improve the quality of sleep as facilitating relaxation (White, J.M., 2000: 220). In addition, the tempo which is the essential structural and organization element of the music of 60-72 beats per minutes is the part that most relaxing and reducing anxiety (Lane, D., 1992: 864).

The wordless music used in this study allow the patient to concentrate and flow with the music rather than the words and meaning in case of using the music with lyrics (Guzzetta cited in Keegan et.al., 1995: 679). The regular rhythm of the music is a sedative music (Updike, P. 1990: 40). Eighteen patients (60%) of the subjects (Appendix D) reported that after listening the music they had better sleep than that before listening to the music. This can be explained that as the patients listening to the music, music can evoke intense emotions thereby affecting autonomic nervous system, which triggers the releasing of hormone and endorphins; the body own morphine (Lane, D. 1992: 864, Fontanine 1994, cited in Almerud, S. & Peterson, K., 2003: 32). This specific type of morphine was released while listening to the specific music which is quality and calming.

It is suggested that during acute care hospitalization women and patients over the age of 65 had more sleep disturbance (Closs, 1992; Redeker & Wykpisz, 1999; Simpson & Lee, 1996, cited in Redeker N.S. 2000: 33) whereas, another study stated that man had greater sleep disturbance than woman (Redeker et.al., 1998: 33) and no different between age (Simpson, Lee & Cameron, 1996: 217). In this study, it was found that 60% of the patients were female and 60 years of age and over were 26.7% (Table 1). Therefore, this study could not support neither study.

The patients in this study went to bed at 22.00 hour (36.7%), get up at 5 o'clock in the morning (33.3%), over one times of mid-sleep awakening (60%), and a cause of wake was to go to toilet (80%) (Table2). After wakening that older adult take longer time to fall asleep again, and awakening more frequently (Craven & Hirnle, 2000:1124). In older adult; both men and women; would develop urinary problem, as decreasing the capacity of the bladder (Timby & Smith, 2003:79).

Income sufficiency of adequate & reserve and inadequate was equal of 36.7%. The payment for hospitalization of the sample was 50% by themselves and 10% had problem of payment. The prior sleep pattern of the patients were watching TV (76.7%) but during hospitalization the patients did not watching TV as they did at home. Although, these factors can induced anxiety and reduced sleep quality, the quality of sleep after listening to the music of the subjects was better than before listening to the music. It can be concluded that quality of sleep that increased after listening to the music caused by the music used in this study.

Cardiovascular (40%), infectious (23.3%), respiratory (10%), gastrointestinal (10%), hematology (6.7%), toxicology (3.3%), gynecology (3.3%), and CNS (3.3%) were chief complaints of the samples (Table 3). It is demonstrated that poor sleep quality was associated with COPD and congestive heart failure patients who were admitted in ICU (Krachman S.L.,D'Alonzo,G.E. & Criner,G.S.,1995:1714). They have had past illness disease of HT 16.7%, DM 16.7%, asthma 6.7%, rheumatic heart 6.7%, and thalassemia 3.3% (Table 3). It is stated that chronic illness can interfere sleep by producing symptom such as nocturia, incontinence, pain, orthopnea, apnea, muscle cramps, and tremors (Eliopoulos,C., 2001:124). Sixty three point three patients (Table 3) were no history of ICU admission that may cause sleep disturbance as they faced a new and unfamiliar environment which particularly and negatively affect both the quantity and quality of sleep (Parker, 1995:377).

Moreover, the result of this study showed that the factors disturb sleep were illness(50%), noise(46.7%), anxiety(43.3%), light(33.3%), nursing activity(33.3%), cold(20%), unfamiliar place (10%), mosquito(3.3%), fear(3.3%), and void(3.3%) (Table 3).

Illness, it was found that the patients complained that pain and discomfort were the causes of poor sleep. It is a similarly found in cardiac surgical patients who

rated pain and discomfort as the worst two causes of sleep disturbance before, during, and post staying in intensive care unit (Simpson, Lee, & Cameron, 1996 cited in Redeker N.S., 2002:32). After listening to the music, the patients said this music made them more comfortable and calm. It found resemble that music therapy had positively affected the critically ill patients in the intensive care unit by reducing pain (Stone et.al., 1989:291). These findings were consistent that comfort had positive relationship with quality of sleep (Opanuraks.S, 2002:77).

Noise, the patient said that they couldn't sleep because of very loud noise in the unit while hospitalization. The majority cause of noise in MICU2 was the alarm from the electrical equipments as others intensive care unit. It is stated that alarm from cardiac monitor, pulse oximeter, and ventilators were caused noise pollution (Honkus, V.L., 2003: 183). Particularly disturbing noise are ventilator alarms not being silenced while patients are being suctioned. It is pointed that patients in the noisy condition in intensive care unit as CCU had poorer sleep (Topf.M., 1992:19-28). While white noise; ocean sound; was recommended that patients who exposed to white noise had deeper and better quality of sleep (Williamson, J., 1992:91-97).

Anxiety, 13 patients (43.3%) stated that anxiety was the factor disturbed sleep. Anxiety has been shown as a significantly and negatively impact on sleep. It is suggested that sleep disturbance were associated with stress and anxiety (Karacan et.al. 1993 cited in Parker, K.P., 1995:343). As anxiety increases, the sleepless increases which further enhances anxiety because of increasing sympathetic activity. Patients who are stressed will release more amount of corticosteroids which can lead to catabolism, sleeplessness and more anxiety (Hodgson L., 1991:1508). The soothing type of music used in this study can reduce anxiety as stated earlier. It is reported that music therapy was an effective treatment for decreasing anxiety and promoting relaxation in the patients receiving ventilatory assistance (Chlan, L., 1998:169-176). It is also suggested that music may be an effective intervention to reduce state anxiety levels in the acute myocardial infarction patient (White, J.M., 1992:58-63). Finally, as anxiety decreased, the quality of sleep increased.

Moreover music therapy is most commonly & the highest incident used to reduce anxiety in intensive care unit. It is also ranked as the independent therapeutic

nursing intervention used most often to enhance sleep and decrease distraction, agitation, aggression and depression (Gagner-Tjellesen,D.,et.al, 2001:26-37).

Light, light in ICU frequently are on for 24 hours; day and night long. It was pointed by 33% of the subjects as sleep disturbing factor. Normal circadian patterns of light and darkness can be affected by the constant environmental light (Bowden P.:1983 cited in Schwab R.J.,1994:687). It is said that the patients were unable to distinguish night from day because of bright light (Parker,K.P.,1995:347).

Nursing activity was a factor disturb sleep only 32.3% (Table 3). This result can be explain that nursing activities were the external environment factor (Parker,K.P.,1995:341). These finding were also consistent with the other researcher which reported that indicated nursing activities in 24 hours had negative effect on the quality of sleep of patients with congestive heart failure (Phudphanphisan,C.2001:75). It is pointed that checking of vital sighs and phlebotomy were perceived as significantly disruptive to sleep (Freedman,N.S., Kotzer,N.,& Schwab,R.J.,1999: 1155-1162). Although nursing activities had a negative affect on sleep in critically ill patients. While they were in crisis, close monitoring and nursing care are required. The patients perceived that nursing activities keep them safe from severe conditions and complications.

Cold, it was stated by 23.3% of the subject as a factor disturb sleep. It might be because the ICU was an air conditioning unit. Being too cold, REM sleep is decreased (Glottzbach & Heller, 1994 cited in Lee K.A., 1997: 619) and marked increased in the number and duration of wakefulness (Closs, 1988: 50; Libert, et al., 1991: 24; cited in Prasertphol, P.,2001: 67).

Unfamiliar place, this study found that 3 patients (10%) stated unfamiliar place was the factors disturb sleep. And from table3, 7 patients (23.3%) had not been hospitalized before. The unfamiliar environment causes sleep disturbance (Black, Matassarin-Jacobs & Luckmann, 1997:400). When the patients were admitted in MICU2 they face unfamiliar environment. First, MICU2 is not a single room; an open unit of 8 beds arrange consecutively as U shape. Secondly, as an intensive care unit many electrical machines used could be frighten the patients. Thirdly, medical personal both physicians and nurses are unfamiliar person. Fourthly, the size of the bed is as a single bed and about 1 meter height. Lastly, the mattress is usually hard

and several pillows are used to support and arrange for positioning the patient in one bed. These were the causes of unfamiliarity.

Lastly, mosquito, fear and void were the factor disturbed sleep in only one patient (3.3%) of this study. It is stated that fear, anxiety, and psychological stress; the common reactions of patients in the ICU; can contribute to sleep disruption (Brewer, 1985 cited in Schwab, 1994:686). Night awake to empty bladder is common in old age (36.7% of the samples) and cause sleeplessness (St.John Ambulance. Association and Brigade II, 1988:101).

Nevertheless, the patients' demographic data; personal data, prior sleep pattern, illness information and prior music listening information (Table 1,2,3&4); were not affect the quality of sleep as the experiment was one group; pre-test and post-test.

Although, sleep was disturbed by these factors, the quality of sleep after listening to the music of the subjects was better than before listening to the music. These finding was congruented with other investigators who reported that the effect of music intervention on sleep in coronary artery bypass graft patients is significantly better than the control group. (Zimmerman,L., et.al., 1996: 153-170). It is also strongly supported that sleep problem can be reduced by the music in 96% of elderly patients (Mornhinweg,G.C. & Voignier,R.R., 1995: 251). Furthermore, this study showed only one patient usually had sleeping pill at bedtime and two patients used it for sometimes. However, during hospitalized they didn't use it but they showed better quality of sleep after listening to the music. It is demonstrated of decreasing in sedative administration in music group patients (Kock et.al., 1998 cited in Evan. D., 2002: 15). And it is also reported that the patients asked for sedation in the music group less than in the no music group (Walther-Larsen et.al., 1988 cited in Evan D., 2002: 15).

**Part II : Discussion related to the purpose of study 2 : To compare the effect of music on physiological responses including heart rate and respiratory during and after listening to the music.**

**Hypothesis 2 :** The effect of music on physiological responses including heart rate and respiratory rate during and after listening to the music was statistically significant difference.

It was found that the mean scores of heart rate and respiratory rate between 30 minutes during and after listening to the music is lower than before listening to the music (Table 6,7&8). This supporting the hypothesis 2 can explain that the music administered in this study was the soothing type of music without lyrics of 60-80 beats per minutes of tempo. Tempo is the major cause of physiology response to music (Johnson, K. & Rohaly. Davis, J., 1996: 58). Music with slow, flowing rhythm of 60 to 80 beat per minutes is a characteristic of music for relaxation that exerts its effect via entrainment or synchronization of body rhythm (Chlan, L., 1998: 170). The patient's heart rate and respiratory rate entrained or synchronized with that of the music's relaxing rhythm.

Admission to critical care unit exposes patients to multiple psychological and physiological stressors when the stress response which stimulates the release of epinephrine and norepinephrine, resulting in increases in heart rate, respiratory rate, arterial blood pressure, myocardial oxygen demand and state anxiety level (White J.M., 1999: 221). When they were listening to the music, music also affected autonomic functions. It caused a reduction in releasing of catecholamine which may result in reducing blood pressure and heart rate (Coughlan,A., 1994: 35). The entrainment of body rhythms with this relaxing music is thought to decrease sympathetic nervous system activity (Chaln, L., 1998: 170). When a relaxation response occurs, the stress response is interrupted and anxiety levels are decreased while vagal outflow increased and diminished activity of the sympathetic nervous system then heart rate decreased (White J.M, 1999: 221). It is suggested that music therapy lead to slower heart rate, calmer and more regular respiratory rate and lower blood pressure (Bonny 1978; Chlan 1998; Updike 1990 cited in Almerud S. & Petersson K., 2003: 2).

Finding from this study on the physiological change was congruent with other investigators in decreasing heart rate and respiratory rate which was the response to music therapy intervention on critically ill patients. It is demonstrated the use of relaxing music in reducing the autonomic nervous system; heart rate slow down as well as respiratory rate and decrease state anxiety scores, in patients who suffered from acute MI (White, J.M., 1992: 62). It is also reported the decreasing in heart rate and respiratory rate overtime for those mechanically ventilated patients in the music group as compared to the control group (Chlan,L., 1998: 169-176). It is proved that the effect of relaxing music on cardiac autonomic balance and anxiety after acute myocardial infarction were significantly greater reduction in heart rate, respiratory rate and myocardial oxygen demand (White, J.M. 1998: 220-230). It is indicated that mean heart rate, blood pressure, pain and anxiety score significantly decreased following the music intervention in critically ill patients (Stone S.K. et.al.,1989: 291). Therefore, music therapy will lead to affect the physiological responded when the patients were entering stage 4(NREM) or deep sleep (Appling, S.E., 1997: 159).

### **Summary**

This study focused on music therapy that can promote quality of sleep in critically ill patients based on application of the concept of entrainment theory and physiological response. The significant finding of the study is simple that reflected the effectiveness of music on quality of sleep in critically ill patients. Music therapy is an inexpensive and reliable tool which can be applied with advantages critically ill patients without risking unwanted side-effect.

## CHAPTER VI

### CONCLUSION

This study aimed to compare quality of sleep in critically ill patients between before and after listening to the music. It was measured by using Verran and Snyder-Halpern (VSH) Sleep scale that is composed of four dimensions: length of sleep, sleep disturbance, sleep effectiveness, and nap supplementation of sleep. The observation of physiological parameters; heart rate and respiratory rate; were also obtained. Thirty samples were critically ill patients who were admitted in the Medical Intensive Care Unit at King Chulalongkorn Memorial Hospital. The data collection was conducted from April 2001 to August 2002. Patients were selected by a purposive sampling. One group pre-test and post-test design was used.

The research instruments used for intervention were the 30-minute cassette tape consisting of a soothing type of music that facilitates relaxation and the portable cassette tape player. The instruments for data collection consisted of demographic characteristics of the patients and Verran & Snyder-Halpern (VSH) Sleep scale.

The patients were informed about the purpose, procedure, and benefits of the study. When they agreed to participate in this study, the consent form was signed. In this study, the researcher visited the patients for two days. On the first day, during the daytime the patients were asked to answer the questionnaires about the demographic data and the quality of sleep on the prior night. At night, the patients were asked to listen to the 30-minute tape of soothing music and the researcher remained at bedside to record the physiological parameters. On the second day, the patients were asked to answer the questionnaires about the quality of sleep, feelings about the musical listening and the effect of musical listening of the previous night.

The data was analyzed by computer using the Statistically Package for the Social Science for Window (SPSS/FW). The demographic characteristics were analyzed by descriptive analysis including frequency and percentage. Pair T-test was used to compare the difference in mean scores of quality of sleep before and after

intervention. ANCOVA was used to compare the difference in mean scores of physiological parameters; heart rate and respiratory rate; between 30 minutes during and after listening to the music and the mean scores of physiologic parameters 30 minutes before listening to the music as covariate variables were. The result from this study can be summarized as follows:

1. The mean scores of quality of sleep of the critically ill patients after listening to the music was statistically significantly higher than before listening to the music ( $p < 0.01$ ).

2. The mean scores of physiological parameters; heart rate and respiratory rate; 30 minutes during and after listening to the music was statistically significantly different ( $p < 0.05$ ).

## **Implications and Recommendations**

### **Implications and Applications of Research Findings**

1. The results of this study show that after listening to the music, the quality of sleep in the critically ill patient was significantly higher than before listening to the music. Eventhough the critically ill patients who were difficultly in falling asleep due to the internal and external factors that disturb sleep such as their illness, anxiety, fear and the extraneous sounds of the unfamiliar environment or during special procedure that were carried out in the critical care unit, can get enough sleep after listening to this music. Therefore, an instrumental music should be used to promote the quality of sleep in the critically ill patients. The instrumental music with 60-72 beats/minute was preferable among the patients, it should be even effective in promoting the quality of sleep in critically ill patients. In addition, nurses in the intensive care unit can applied the music therapy as an independent nursing intervention to promote sleep quality of the patients.

2. The finding of this study demonstrate that the quality of sleep of the critically ill patients were disturbed by internal and external factors; their illness, anxiety, fear, and unfamiliar environment; therefore nurses should arrange suitable environment to enhance sleep quality of the critically ill patients by the following ways:

- Sound-proofing of nurses' shoes such as latex shoes should be considered and carefully step is recommended.

- Unnecessary conversation (especially at night) should be minimized especially at the area that close to the patients.

- Ringing tone of telephones at night should be turn off or minimized and replace with a flashing light.

- Provide dimming lights during the night and turn on only at the necessity area.

- As an air conditioning unit, the direction of airflow of an air-conditioner should not directly to the patients. More or extra blankets should be provided for the patients who feel cold.

3. From the finding, illness and anxiety were the factors disturbing sleep. Therefore, decreasing anxiety of the patients should be intervened. These are the suggestion.

- Giving information of in ICU surrounding, the electrical equipments, their prognosis, treatment, and discharge plan needed to explained.

- Physicians and nurses should informed the patients what will be done before performing treatment and care.

4. Nursing activity also disturbed the quality of sleep in critically ill patients. Therefore, nurses and health care personnel should encouraged to understand the importance of good quality of sleep. Moreover, health care personnel should be encouraged to plan the appropriate care for each patient. These are the suggestion.

- The routine practice of measuring vital signs throughout the night and early morning should be postponed in case of stable condition.

- Diagnostic procedures and nursing intervention including baths and linen changes should be planned to minimize interrupted sleep time.

- Voiding at night was another factor disturbed sleep especially in elderly due to decreasing the capacity of the bladder thus nurses should asked patients to empty bladder before bedtime.

### **Recommendations for Further Studies**

Future study are recommended as follows:

1. Replication of this study with larger samples size and longer follow up should be conducted to confirm this study.
2. Patient self selected instrumental music is an interesting point of research.
3. Music intervention to promote sleep in other specifically patients such as cardiovascular system patient is a intently project.

### **Limitation of the study**

There were several limitations of this study

- 1 Only 30 minutes after listening to the music was performed for post-test.
- 2 Environmental atmosphere such as noise, light and temperature in the setting at the experimental time were uncontrollable.

### **Problem causing drop out samples and delayed collecting data**

1. After finishing the pre-test in the morning, the intervention and post-test were canceled, as developing uncontrollable critically conditions of the samples. There were 10 cases.
2. After completing the pre-test in the morning and listening the music at that night, in the day after that post-test was supposed to be done, 5 samples were not able to complete the quality of sleep questionnaires because of developing uncontrollable critical condition.

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### คำชี้แจงและการพิทักษ์สิทธิของผู้ป่วยในการเข้าร่วมศึกษา

ในปัจจุบันการบริการสาธารณสุขเน้นคุณภาพการบริการ โดยมุ่งเน้นในการดูแลผู้ป่วยเป็นองค์รวม เพื่อตอบสนองความต้องการของผู้ป่วยทั้งทางด้านร่างกายและจิตใจ การเข้ารับการรักษาในหอผู้ป่วยหนักทำให้ผู้ป่วยต้องเผชิญกับสภาพแวดล้อมที่แปลกใหม่ ก่อให้เกิดอาการนอนไม่หลับ ซึ่งจะส่งผลกระทบต่อทางด้านร่างกายและจิตใจของผู้ป่วย พยาบาลในฐานะที่เป็นบุคคลที่มีความใกล้ชิดผู้ป่วย ต้องสามารถตอบสนองความต้องการของผู้ป่วย เพื่อให้ผู้ป่วยสุขสบายและปลอดภัยจากภาวะแทรกซ้อน โดยค้นหาวิธีที่ปลอดภัย ไม่ก่อให้เกิดอันตรายใดๆ แก่ผู้ป่วย และไม่สิ้นเปลืองค่าใช้จ่าย เพื่อช่วยในการส่งเสริมการนอนหลับให้แก่ผู้ป่วย ดังนั้นผู้วิจัยจึงมีความสนใจที่จะนำคนตรีมาช่วยในการส่งเสริมคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนัก การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อต้องการทราบว่า การฟังดนตรีมีผลช่วยเพิ่มคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนักหรือไม่ เพื่อจะนำผลที่ได้ไปใช้ในการวางแผนการให้การพยาบาลในการส่งเสริมการนอนหลับแก่ผู้ป่วยต่อไป ท่านเป็นผู้ที่มีความสำคัญยิ่งในการวิจัยครั้งนี้

เนื่องด้วยดิฉัน นางสาวสุกิดา โกเมนไทย เป็นนักศึกษา กำลังศึกษาในหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล ได้ทำวิจัยโดยการให้ท่านฟังดนตรีก่อนนอน เป็นเวลานาน 30 นาที การเข้าร่วมวิจัยเป็นไปตามความสมัครใจของท่าน ไม่มีการบังคับ หากท่านเปลี่ยนใจท่านมีสิทธิถอนตัวได้โดยไม่มีข้อแม้ใดๆ ข้อมูลที่ได้จากท่านทั้งหมดจะเป็นความลับและนำเสนอผลการวิจัยโดยรวมระหว่างเข้าร่วมการวิจัยหากท่านมีข้อสงสัยใดๆ ดิฉันยินดีตอบข้อสงสัยของท่านตลอดเวลาและขอขอบคุณที่ให้ความร่วมมือในการทำวิจัย ณ โอกาสนี้

นางสาวสุกิดา โกเมนไทย  
นักศึกษาพยาบาลศาสตรมหาบัณฑิต  
มหาวิทยาลัยมหิดล

**แบบยินยอมเข้าร่วมการศึกษา**

วันที่ ..... เดือน ..... พ.ศ. ....

ข้าพเจ้า ..... อายุ ..... ปี อาศัยอยู่บ้านเลข  
ที่ ..... ถนน ..... ตำบล ..... อำเภอ .....  
จังหวัด ..... ได้รับทราบรายละเอียดของโครงการวิทยานิพนธ์ เรื่อง “ ผลของดนตรีต่อ  
คุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนัก ”

ข้าพเจ้ามีสิทธิ์ที่จะของดการเข้าร่วมการศึกษาคั้งนี้ และการงดการเข้าร่วมการศึกษานี้จะไม่  
มีผลกระทบต่อ การได้รับบริการ หรือการรักษาที่ข้าพเจ้าหรือผู้เกี่ยวข้องมีสิทธิ์ที่จะได้รับแต่  
ประการใด อีกทั้งได้รับทราบจากผู้ศึกษาว่า จะไม่เปิดเผยข้อมูลของข้าพเจ้าหรือผู้เกี่ยวข้องกับ  
ข้าพเจ้าเป็นรายบุคคลต่อสาธารณชน

ข้าพเจ้าและผู้เกี่ยวข้องกับข้าพเจ้าได้รับทราบข้อมูลจากผู้ศึกษาจนหมดข้อสงสัยโดยตลอด  
และยินดีเข้าร่วมการศึกษาคั้งนี้ จึงได้ลงลายมือชื่อไว้เป็นหลักฐาน

ลงชื่อ ..... ผู้ยินยอมหรือผู้ยินยอม  
โดยชอบธรรม  
(.....)

ลงชื่อ ..... หัวหน้าโครงการ  
วิทยานิพนธ์  
(.....)



**แบบสอบถาม****เรื่อง “ ผลของคนตรีต่อคุณภาพการนอนหลับของผู้ป่วยในหอผู้ป่วยหนัก ”**

**คำชี้แจง** แบบสอบถามชุดนี้มีวัตถุประสงค์เพื่อศึกษาผลของคนตรีต่อคุณภาพการนอนหลับของท่าน ในขณะที่เข้ารับการรักษาในหอผู้ป่วยหนัก ซึ่งแบ่งออกเป็น 4 ส่วน ดังนี้

**ส่วนที่ 1** แบบสอบถามข้อมูลทั่วไป มีลักษณะแบบให้เลือกตอบและเติมข้อความ ประกอบด้วย

- |     |                                                                      |             |
|-----|----------------------------------------------------------------------|-------------|
| 1.1 | ข้อมูลส่วนบุคคล                                                      | จำนวน 9 ข้อ |
| 1.2 | ข้อมูลเกี่ยวกับการนอนหลับในภาวะปกติ (ก่อนเข้ารับการรักษาในโรงพยาบาล) | จำนวน 5 ข้อ |
| 1.3 | ข้อมูลเกี่ยวกับปัญหาสุขภาพและการรักษา                                | จำนวน 7 ข้อ |
| 1.4 | ข้อมูลเกี่ยวกับการฟังดนตรี/เพลง                                      | จำนวน 3 ข้อ |

**ส่วนที่ 2** แบบประเมินคุณภาพการนอนหลับ มีลักษณะเป็นมาตรวัดโดยการเปรียบเทียบด้วยสายตา บนเส้นตรงตามแนวนอนที่มีความยาว 10 ซม. ซึ่งมีคะแนนตั้งแต่ 0 – 10 คะแนนในแต่ละข้อคำถาม คะแนนคุณภาพการนอนหลับของท่านคือคะแนน ณ ตำแหน่งที่ท่านทำเครื่องหมาย X ลงบนเส้นตรง แบบประเมินมีจำนวน 15 ข้อ

**ส่วนที่ 3** แบบบันทึกอาการเปลี่ยนแปลง ก่อน ขณะ หลังการฟังดนตรี โดยผู้วิจัยทำการบันทึกเอง ซึ่งบันทึกอาการทุก 5 นาที เป็นเวลา 30 นาที ทั้ง 3 ช่วงเวลาของการฟังดนตรี

**ส่วนที่ 4** แบบสอบถามความรู้สึของผู้ป่วยภายหลังการฟังดนตรี/เพลง มีลักษณะให้เลือกตอบ และเติมข้อความ จำนวน 3 ข้อ

## ส่วนที่ 1 ข้อมูลทั่วไป

กรุณาเติมข้อความในช่องว่าง หรือ ทำเครื่องหมาย  $\surd$  ลงในช่อง ( ) ตามความเป็นจริง

### 1.1 ข้อมูลส่วนบุคคล

1. เพศ

( ) ชาย ( ) หญิง

2. อายุ ..... ปี

9. ปัญหาการรักษาพยาบาล

- ( ) ไม่มีปัญหา  
( ) มีปัญหาเล็กน้อย  
( ) มีปัญหามาก

### 1.2 ข้อมูลเกี่ยวกับการนอนหลับในภาวะปกติ ( ก่อนเข้ารับการรักษาในโรงพยาบาล )

1. กิจกรรมที่ท่านต้องทำก่อนนอน ( เลือกได้มากกว่าหนึ่งข้อ )

- ( ) ดื่มน้ำ / เครื่องดื่มอุ่น ๆ ( ) อ่านหนังสือ  
( ) ดูโทรทัศน์ ( ) ฟังเพลง / ฟังเทปธรรมะ  
( ) นั่งสมาธิ ( ) อื่น ๆ ระบุ .....

5. ท่านรู้สึกว่าจะต้องนอนหลับ ..... ชั่วโมง/วัน ถึงจะถือว่าได้นอนอย่างเพียงพอ

### 1.3 ข้อมูลเกี่ยวกับปัญหาสุขภาพและการรักษา

1. ท่านเจ็บป่วยมาเป็นระยะเวลานาน .....

6. จำนวนวันที่ท่านเข้ารับการรักษาในหอผู้ป่วยหนักถึงปัจจุบัน .....วัน

7. ขณะอยู่ใน ICU มีสิ่งใดที่รบกวนการนอนหลับของท่าน(ตอบได้มากกว่า1ข้อ)
- ( ) อาการเจ็บป่วย                      ( ) เสียงดังรบกวน
  - ( ) แสงสว่างรบกวน                      ( ) การปฏิบัติงานของเจ้าหน้าที่
  - ( ) ความวิตกกังวล                      ( ) อื่น ๆ ระบุ .....

1.4 ข้อมูลเกี่ยวกับการฟังดนตรี / เพลง

1. ตามปกติท่านฟังดนตรี / เพลง

- ( ) ทุกวัน                                      ( ) 5 วัน / สัปดาห์
- ( ) 2 วัน / สัปดาห์                              ( ) นาน ๆ ครั้ง
- ( ) ไม่ฟังเลย

2. ท่านชอบฟังดนตรี / เพลงประเภท

- ( ) เพลงไทยสากล                              ( ) เพลงลูกทุ่ง
- ( ) เพลงสากล                                      ( ) เพลงพื้นบ้าน
- ( ) อื่นๆ ระบุ.....                              ( ) ไม่ฟังเลย

3. ดนตรี / เพลงที่ท่านชอบฟังเป็นแบบใด

- ( ) มีเนื้อร้อง                                      ( ) เพลงบรรเลง (เฉพาะทำนอง)
- ( ) ทั้งสองแบบ                                      ( ) ไม่ฟังเลย

## ส่วนที่ 2 แบบประเมินคุณภาพการนอนหลับ

แบบประเมินต่อไปนี้มีจำนวน 15 ข้อ แต่ละข้อคำถามถึงการนอนหลับขณะอยู่ในหอผู้ป่วยหนัก ในคืนที่ผ่านมา ความรู้สึกของท่านในแต่ละข้อจะอยู่ในช่วง 0 – 10 คะแนน บนเส้นตรง ข้อความที่ปรากฏที่ปลายของเส้นตรงทั้งสองข้างเป็นข้อความที่ตรงข้ามกัน ให้ทำเครื่องหมายกากบาท ( X ) ลงบนเส้นตรง ในตำแหน่งที่ท่านพิจารณาแล้วว่าตรงกับความรู้สึกของท่าน

### ความแปรปรวนของการนอนหลับ

1. หลังจากล้มตัวลงนอน ท่านใช้เวลานานานเพียงใดก่อนหลับได้จริง



2. เมื่อนอนหลับแล้วท่านตื่นนอนระหว่างนอนหลับมากน้อยเพียงใด



3. ขณะหลับ ท่านรู้สึกว่าได้พลิกตัวหรือมีการเคลื่อนไหวร่างกายบ่อยครั้งเพียงใด



.  
.
   
.

15. ท่านตื่นจากการงีบหลับ เนื่องจากสาเหตุใด



### ส่วนที่ 3 แบบบันทึกอาการเปลี่ยนแปลง (ผู้วิจัยเป็นผู้บันทึกเอง)

#### แบบบันทึก

แบบบันทึกอาการเปลี่ยนแปลง ก่อนการฟังดนตรี ขณะฟังดนตรี และภายหลังการฟังดนตรี โดยบันทึกอาการเปลี่ยนแปลง ทุก 5 นาที เป็นเวลา 30 นาที ทั้งในช่วง ก่อน ขณะ และ ภายหลังการฟังดนตรี

เวลาที่เริ่มฟังดนตรี ..... น.

เวลาที่ผู้ป่วยเริ่มหลับ ..... น.

ระยะเวลาตั้งแต่เริ่มฟังดนตรีจนกระทั่งผู้ป่วยหลับ ..... นาที

เวลาที่ผู้ป่วยตื่นนอนเวลาเช้า ..... น.

ระยะเวลาตั้งแต่ผู้ป่วยหลับจนกระทั่งตื่นนอนเวลาเช้า ..... ชั่วโมง

แบบบันทึกอาการเปลี่ยนแปลง ก่อนการฟังดนตรี ขณะฟังดนตรี และหลังการฟังดนตรี (บันทึกทุก 5 นาที)

รายการ	ก่อนฟังดนตรี (นาที)						ขณะฟังดนตรี (นาที)						หลังฟังดนตรี (นาที)						หมายเหตุ
	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	
HR																			
RR																			

ส่วนที่ 4 ข้อมูลเกี่ยวกับความรู้สึกของผู้ป่วยภายหลังการฟังดนตรี/เพลง

กรุณาเติมข้อความในช่องว่าง หรือ ทำเครื่องหมาย ✓ ลงในช่อง ( ) ตามความเป็นจริง

1. ภายหลังการฟังดนตรี / เพลง ท่านรู้สึกว่าการนอนหลับของท่านเป็นอย่างไร เมื่อเปรียบเทียบกับก่อนการฟังดนตรี/เพลง

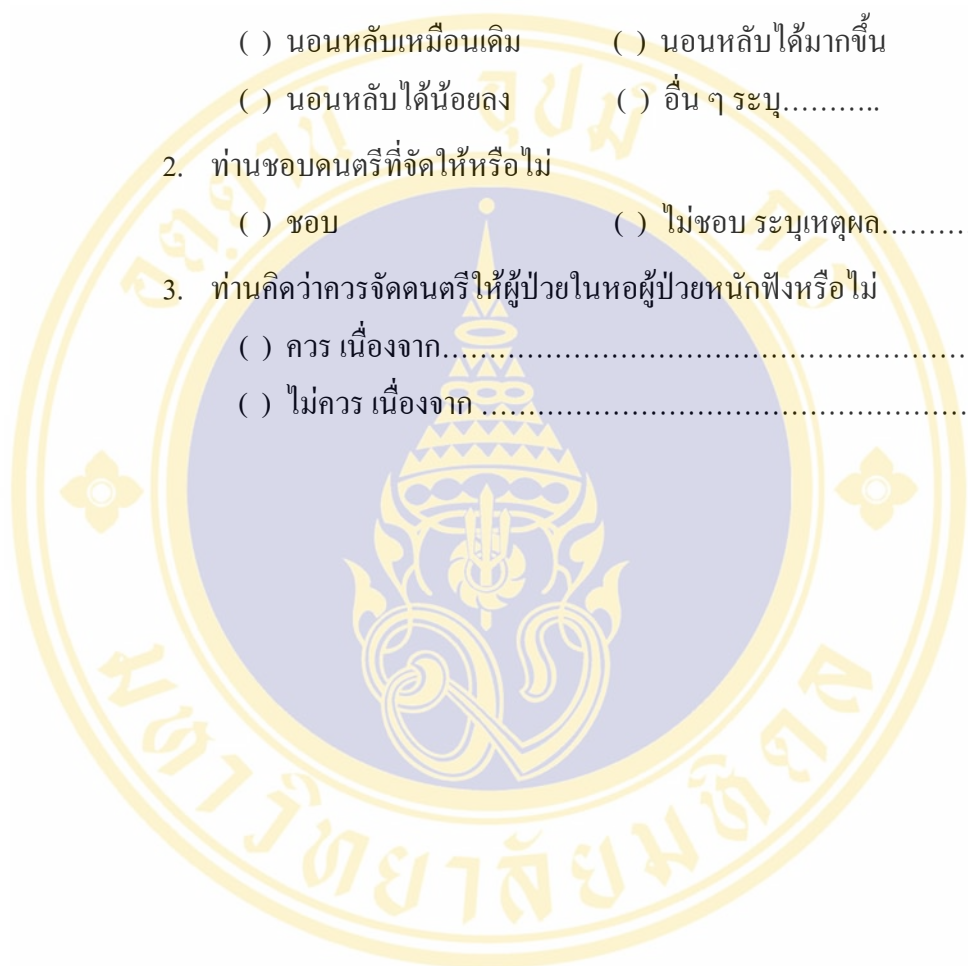
- ( ) นอนหลับเหมือนเดิม                      ( ) นอนหลับได้มากขึ้น  
 ( ) นอนหลับได้น้อยลง                      ( ) อื่น ๆ ระบุ.....

2. ท่านชอบดนตรีที่จัดให้หรือไม่

- ( ) ชอบ                                              ( ) ไม่ชอบ ระบุเหตุผล.....

3. ท่านคิดว่าควรจัดดนตรีให้ผู้ป่วยในหอผู้ป่วยหนักฟังหรือไม่

- ( ) ควร เนื่องจาก.....  
 ( ) ไม่ควร เนื่องจาก .....



### List of Music

1. Cold wind
2. Memories
3. ผูกพัน
4. Poem
5. Childhood
6. Whisper of the wind





Table 9: Frequency and percentages of the patients categorized by the feeling after listening to the music. (n=30)

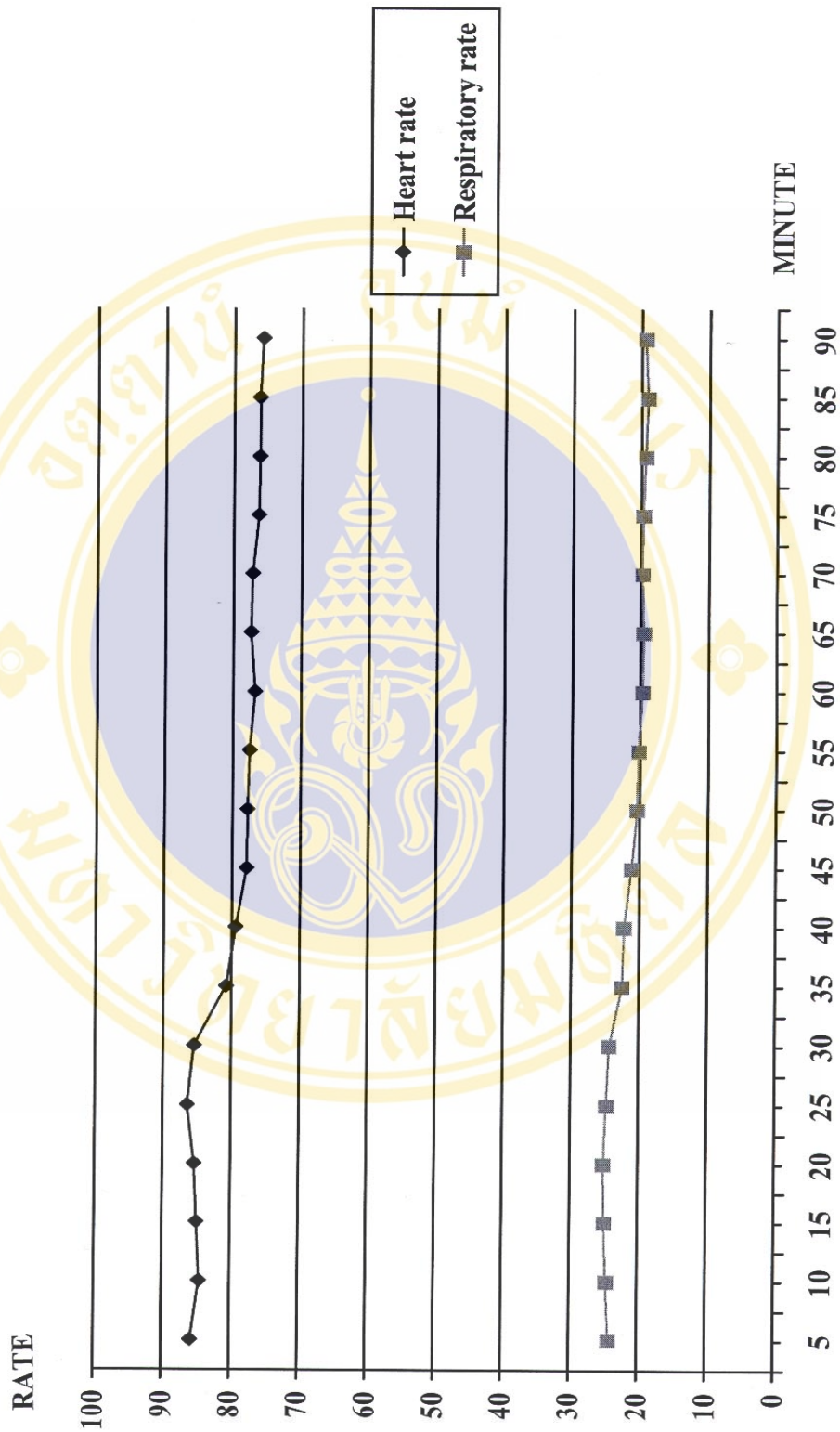
Characteristics	Frequency	Percentage
Feeling about sleep		
Increase	18	60.0
Unchangeable	11	36.7
Decrease	1	3.3
Feeling about music		
Like	26	86.7
Dislike	4	13.3
Feeling about music program in ICU		
Agree	29	96.7
Disagree	1	3.3

Table 10: Compare mean, standard deviation, and t-value of the dimension of quality of sleep from Verran and Snyder- Halpern (VSH) Sleep scale between before and after listening to the music (n=30).

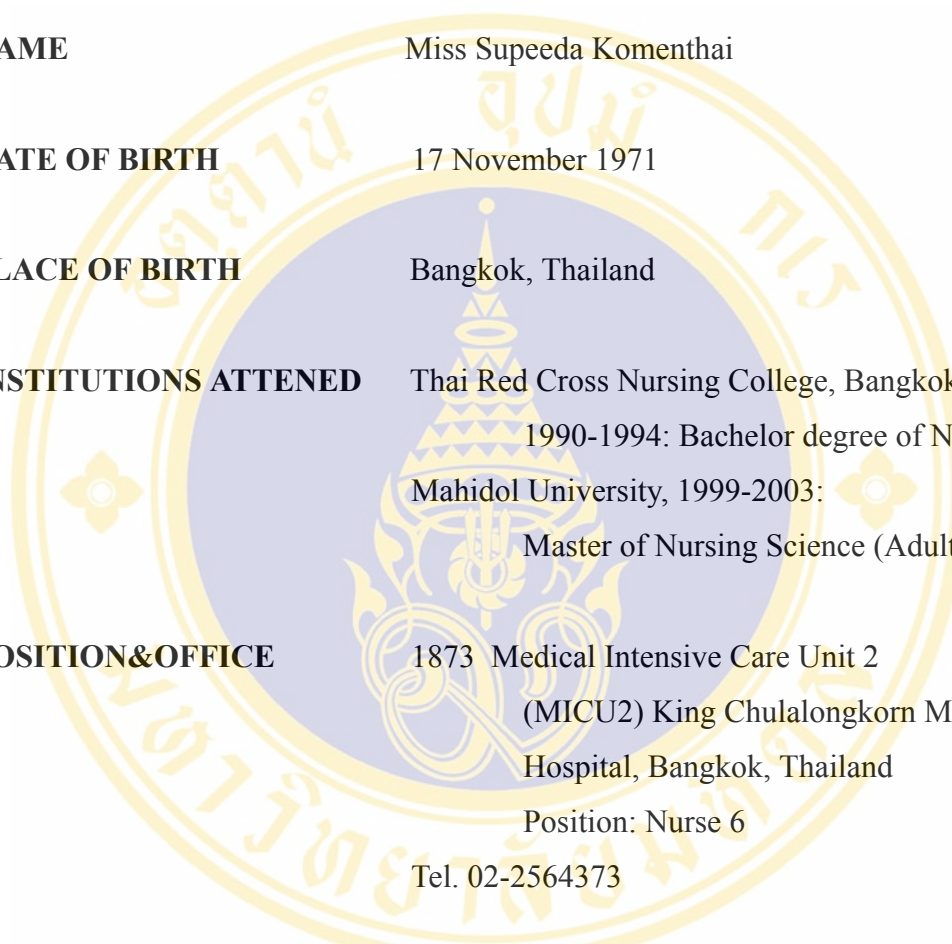
Quality of sleep	Before		After		t-value
	$\bar{X}$	SD	$\bar{X}$	SD	
Total	74.88	27.12	98.82	25.76	-4.778**
Sleep disturbance	34.08	14.22	50.12	14.47	-5.340**
Sleep latency	4.48	3.23	6.86	3.02	-3.012*
Midsleep awakening	3.72	2.58	6.06	3.19	-3.766*
Movement during sleep	4.11	2.96	6.67	3.12	-4.167*
Soundness of sleep	5.89	3.08	8.41	1.57	-4.894*
Wake after sleep onset	4.21	3.08	6.83	3.05	-4.938*
Quality of sleep disturbance	5.99	3.25	7.59	3.20	-2.110*
Quality of sleep latency	5.68	3.93	7.72	3.22	-2.502*
Sleep effectiveness	24.37	9.73	31.24	8.05	-3.198**
Rest upon awakening	5.43	3.15	7.88	2.50	-4.405*
Subjective quality of sleep	6.08	2.84	7.52	2.80	-1.873 <sup>NS</sup>
Sleep efficiency evaluation	6.15	2.88	7.89	2.54	-2.531*
Total sleep period	6.71	2.60	7.95	2.38	-1.970 <sup>NS</sup>
Nap supplementation	16.43	8.69	17.46	9.37	-0.668 <sup>NS</sup>
Daytime sleep	4.60	2.94	4.43	2.70	.263 <sup>NS</sup>
Morning sleep	2.79	2.29	3.55	2.57	-1.345 <sup>NS</sup>
Evening sleep	4.40	2.74	3.99	2.43	.812 <sup>NS</sup>
Wake after final arousal	4.65	3.82	5.49	3.98	-1.152 <sup>NS</sup>

\*\*p<.01, \*p<.05, NS= no significant

### MEAN OF HEART RATE AND RESPIRATORY RATE



## BIOGRAPHY



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