

CHAPTER 1

INTRODUCTION

Background of the Study

In Thailand the number of people over 60 years of age is expected to rise dramatically in the next 10 years. According to the Thai National Census, the elderly population will increase from 5.99 million in 2000 to 8.12 million in 2012 (National Statistical Office, 2000). People undergo many changes as they get older, such as reduced bone density, skeletal muscle atrophy, hardening of ligaments, tendons, and joints resulting in less flexibility and movement, and predisposing these structures to tears. Other changes are a reduction in blood vessel integrity causing a delay in heart muscle irritability and contractile recovery, reduced lung elasticity, declining hormone gland production, and nerve cells gradually deteriorate and die resulting in difficulty learning languages and senile forgetfulness (Ebersole & Hess, 1998). Changes in their sleeping pattern may also occur. All these changes challenge health personnel in taking care of this group.

In the United Kingdom and the United States, one-third of people, of which 40% are elderly, suffer from sleep disturbances (Chiu, et al., 1999). They have difficulty initiating and maintaining sleep (Floyd, Janisse, Medler, & Ager, 2000). Similar sleep problems have also been reported by Thai elderly people. Khumtaveeporn, Ouprasert and Tunsiri (1995) studied sleep patterns in 126 elderly people at the Elderly Health Promotion Center, Nursing Faculty, Mahidol University. Common sleep problems included interrupted sleep, difficulty getting back to sleep, and daytime sleepiness.

Poor sleep affects the elderly both physiologically and psychologically. Physiologically, they may have less energy, more fatigue, and confusion and in extreme cases decreased immunity (NIH Technology Assessment Panel, 1996). Psychologically, poor sleep causes irritability and diminished mood leading to a greater risk of accident (Lee, 1997), and it can also causes delirium in post-operative patents and Intensive Care Unit (ICU) patients (McGuire, Basten, Ryan, & Gallagher, 2000).

There are several ways to promote sleep for those who are having difficulty sleeping. The most common treatment is pharmacological with many over-the-counter sleep medications used. The other is a non-pharmacological approach known as sleep hygiene which includes the following recommendations: sleep only when sleepy, get up and go to bed at the same time every day, take a nap of less than one hour before 3 p.m. (Edell-Gustaffson, 2002), and refrain from exercise at least 4 hours before bedtime (Youngstedt, 1997). Others have suggested developing bedtime rituals such as reading a book, listening to classic music or meditating, having a light snack before bed as tryptophan in foods acts as a natural sleep inducer, taking a hot bath 90 minutes before bedtime and providing a quiet and comfortable bedroom (Drew-Cooper, 1996 cited in Ersser, Wiles, Walsh, & Bently, 1999; Floyd, Falahee, & Fhobir, 2000; Mornhinweg & Voignier, 1995). Furthermore, staying away from stimulant substances that may interfere with sleep such as caffeine, nicotine, and alcohol for at least 4-6 hours before bedtime is recommended (Wonzniak, 2000).

It has been reported that daytime exercise improves sleep. Singh, Clements, and Fiatarone (1996) studied thirty-two elderly subjects with depression and insomnia. They were asked to perform resistance training of the large muscle groups, 3 times a

week for 10 weeks. After 10 weeks training they slept better. Guilleminault, et al. (1995) randomly assigned 30 individuals with an average age of 44, who had insomnia, to 3 different 4-week treatments. The first treatment was sleep hygiene education including a fixed sleep-wake schedule and avoiding daytime napping. The second treatment was sleep hygiene education and light therapy with a bright light (3,000-lux) for 45 minutes. The third treatment involved sleep hygiene education and 45 minutes of brisk walking daily in the early evening. Wrist actigraphy measurements were taken the week before and after each of the three different 4-week treatments. The study showed that exercise and light elicited greater improvements in sleep. King, Oman, Brassington, Bliwise, and Haskell (1997) studied the effects of moderate exercise such as brisk walking or stationary cycling sessions on sleep in 43 elderly people with sleep problems. They found that 30-40 minutes of exercise, performed 4 times a week over a 4-month period, during the day or in the evening, improved their sleep. Besides brisk walking or stationary cycling, which are classified as moderate exercise for improving sleep, other moderate intensity exercises such as Tai Chi (Ross, Bohannon, Davis, & Gurchiek, 1999) or Yoga (Jitapunkul, 1999) were also recommended.

Tai Chi focuses on flexibility, balance, and proper breathing resulting in the reduction of stress (Jin, 1992 cited in Chen & Snyder, 1999). Tai Chi is classified as a low to moderate intensity exercise that is recommended for the elderly who are more prone to accidents (Stone, 1996 cited in Frontana, 2000; Wolf, Coogler, & Xu, 1997). This is supported by the findings of Province, et al. (2000) who found that Tai Chi among 72 subjects in the exercise group over a fifteen week period showed no injurious falls in all subjects. Lan, Lai, Chen, and Wong (2000) assigned 20 minutes

warm-up and 24 minutes structured Tai Chi Chun (TCC) training and 10 minutes of cool down exercises in 32 elderly people for 6 months. They found that TCC training enhanced muscular strength and endurance of knee extensors in elderly individuals. Stenson (1995) studied the elderly who practiced Tai Chi regularly over 2 years. The researcher found that the Tai Chi group showed less decline in lung function than those who were more sedentary. Jin (1992) assigned 4 treatments; Tai Chi, brisk walking, meditation, and neutral reading, to 48 adult males and 48 adult females. The 4 treatments were equally effective in reducing mood disturbances caused by mental or emotional stressors.

None of the studies reported the benefit of Tai Chi on sleep. However, there has been anecdotal evidence that Tai Chi improves sleep. Many Tai Chi practitioners have reported better sleep after they have engaged in the practice. However, there have been no scientific reports on the effects of Tai Chi on sleep. Currently, Li (2002) is conducting a six-month Tai Chi program in 50 elderly subjects but the results of the study have not been published yet.

In Thailand, Tai Chi Qigong (TCQ) is popular. It is a light exercise with a combination of body movement, mind concentration, and deep breathing. Deep breathing during slow movements of TCQ helps the practitioner to relax and to control their mind, which can promote deeper sleep and the ability to fall asleep more easily.

Significance of the Study

In Thailand, many groups of people particularly the elderly have practiced Tai Chi in sometimes. They have reported many benefits including improved flexibility,

relaxation, and better sleep. A scientific study is needed to confirm if Tai Chi can promote good sleep.

Objective of the Study

To investigate the effects of TCQ on sleep among the elderly.

Research Questions

Are there differences in the sleep parameters of elderly subjects before and during TCQ practice?

Framework of the Study

It has been reported that daytime exercise enhances sleep (Trinder, Montgomery, & Paxton, 1988). Acute vigorous exercise during the daytime could be followed by a good night sleep due to exhaustion (Davis, Eshelman, & McKay, 1982 cited in Townsend, 1996). Low to moderate intensity exercise may take longer to yield such benefits. Good sleep is related to happy substances such as β -endorphins which are produced during exercise (Wheatchaphat & Palawiwhat, 1993). It is recommended that the exercise should be at least 20 minutes long in order to stimulate the pituitary gland to produce β -endorphins (Bird, 1996; Townsend, 1996). Daytime exercise should take place for 20 minutes to 1 hour, 3 times a week and be finished at least 4 hours before bedtime (Youngstedt, 1996). For any exercise, 4-6 weeks of training is usually required to produce significant effects (American College of Sports Medicine, 1995).

Tai Chi is a low to moderate intensity exercise which balances posture, increases flexibility and promotes relaxation (Kirsteins, Dietz, & Hwang, 1991). Tai Chi also provides a movement meditation (Kuhn, 1999). The meditative stage that can arise during Tai Chi practice produces relaxation of the body and calms the mind. Concentration meditation may also enhance parasympathetic activity, which decreases autonomic tone that is a stage of relaxation (NIH Technology Assessment Panel, 1996). Consequently, sleep should occur easily under parasympathetic dominant. The benefit of Tai Chi on sleep is related to production of β -endorphins and parasympathetic dominance. To gain such benefit, TCQ should be performed 20-45 minutes a day (Duthie & Kate, 1998) at least 3 times a week (Ross, et al., 1999; Li, 2002).

The parameters which can reflect sleep improvement include sleep latency (SL), number of wakings after sleep onset (NOWASO), periods of waking after sleep onset (POWASO), total sleep time (TST), and sleep quality scores (SQS). Anxiety and depression have been shown to be associated with sleep problems (Stern & Herman, 2000), and so were included in this study.

To illustrate sleep improvement through TCQ training, this study assessed sleep parameters, anxiety and depression two weeks before TCQ and every two weeks during the 6 week TCQ program. Shorter SL, less number of WASO, shorter periods of WASO, longer TST and higher scores of SQ during TCQ program would determine better sleep. In addition, emotional states such as anxiety and depression should be improved after exercise.

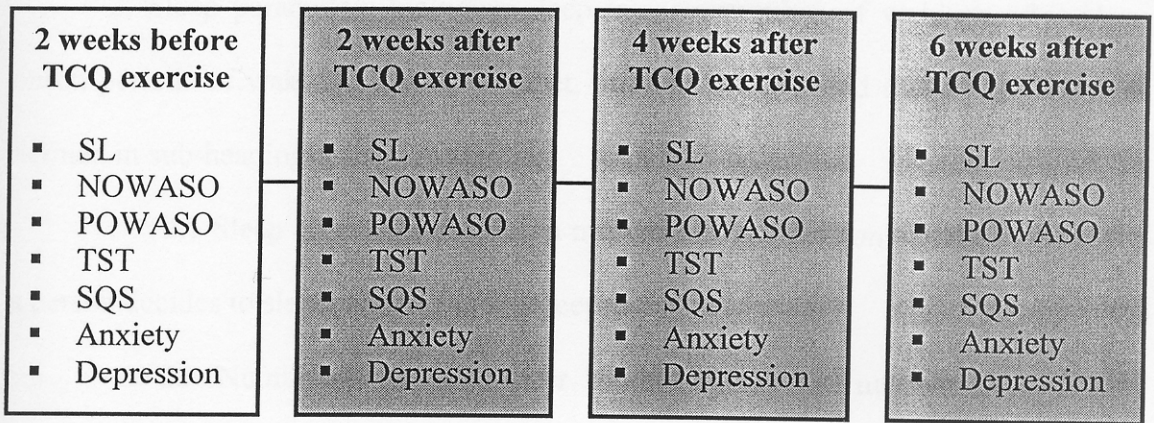


Figure 1. Flow diagram of the timing of data collection.

Hypotheses

The sleep parameters, anxiety and depression determine better sleep.

1. Sleep latency during TCQ exercise is shorter than before TCQ exercise.
2. The number of wakings after sleep onset during TCQ exercise are less than before TCQ exercise.
3. Periods of waking after sleep onset during TCQ exercise are shorter than before TCQ exercise.
4. Total sleep time during TCQ exercise is longer than before TCQ exercise.
5. Sleep quality scores during TCQ exercise are higher than before TCQ exercise.
6. Anxiety scores during TCQ exercise are lower than before TCQ exercise.
7. Depression scores during TCQ exercise are lower than before TCQ exercise.

Definition of Terms

1. The elderly are defined as people who are 60 years or older.

2. Sleep parameters including sleep latency, number of wakings after sleep onset, periods of waking after sleep onset, total sleep time, and quality of sleep are defined in sub-headings as follows:

2.1 Sleep latency, measured in minutes, is the duration of time from when a person decides to sleep until they fall asleep.

2.2 Number of wakings after sleep onset is the number of times an individual wakes up after falling asleep at night.

2.3 Periods of waking after sleep onset, measured in minutes, is the length of time that a person spends awake after waking up during the night.

2.4 Total sleep time measured in hours, is the total time that a person sleeps each night.

2.5 Sleep quality is an individual's perception of sleep with regard to sleep adequacy, depth of sleep, feeling refreshed after sleep and the overall feeling toward sleep. It is assessed by 4 questions with 4 possible response for each question which yield a sleep quality.

3. Anxiety measured by The Thai Hospital Anxiety and Depression Scales (Thai HADS) is a subjective feeling of nervousness and worry, an inability to stay still, a fear that something bad is going to happen, and an inability to think clearly.

4. Depression measured by The Thai Hospital Anxiety and Depression Scales (Thai HADS) is a subjective expression of unhappiness, loss of interest and hopelessness.

5. Tai Chi Qigong is an exercise which is characterized by continuous slow movements along with deep breathing for at least 15 minutes per session (Appendix A).

Scope of the Study

This study was conducted in two residential care facilities for the elderly, Chumphon and Phuket. The subjects were the elderly who reported sleep problems and were able to practice TCQ exercise and volunteered participated in the study.