THE EFFECTS OF TAI CHI QI QONG PROGRAM ON SELF-ESTEEM, URINE CORTISOL, FATIGUE, AND QUALITY OF LIFE IN THAI WOMEN LIVING WITH BREAST CANCER

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ABSTRACT

This two-group randomized control experimental study aimed to determine the effects of Tai Chi Qi Qong (TCQQ) program on self-esteem, urine cortisol level (UC level), fatigue, and quality of life (QOL) in Thai women living with breast cancer. Thirty Thai women living with breast cancer who routinely visited the breast clinic after treatment completion at least 1 year were randomly assigned to a 12-week TCQQ program (experimental group, n=15) and regular care (control group, n=15). Four main outcomes including self-esteem, UC level, fatigue, and QOL were measured using the Rosenberg Self-Esteem Scale (RSE), the Fatigue Symptom Inventory (FSI), and the Functional Assessment of Cancer Therapy-Breast (FACT-B), respectively. Data were collected at three time points: one day before the program implementation (T_1), the 6^{th} week (T_2), and the 12^{th} week (T_3) after program implementation. Differences between two groups were tested using *Chi*-square test and independent *t*-test and there were no significant difference between two comparison groups at T_1 ($p > .05$). Comparisons between two groups at T_1, T_2, and T_3 were performed using repeated measures ANCOVA. After controlling for baseline dependent variables (T_1) as covariates, the results revealed that Thai women living with breast cancer in experimental group had statistically significant higher self-esteem ($p = .026$), lower UC level ($p = .005$), lower fatigue ($p = .007$), and higher QOL ($p = .048$) at 6^{th} week (T_2) and 12^{th} week (T_3) than those in the control group who received usual care.

This research study has demonstrated the effectiveness of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer. The findings also supported the applicability of implementing TCQQ program in Thai women living with breast cancer to promote various aspects of health and quality of life. Randomized control trial with larger sample size is recommended.

KEY WORDS: WOMEN LIVING WITH BREAST CANCER/TAI CHI QI QONG/ QUALITY OF LIFE/ CORTISOL/ SELF-ESTEEM/FATIGUE/EXERCISE

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ผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง ต่อการรับรู้คุณค่าในตนเอง คอร์ติซอลในปัสสาวะ อาการเหนื่อยล้า และคุณภาพชีวิต ในสตรีไทยโรคมะเร็งเต้านม

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บทคัดย่อ

การวิจัยเชิงทดลองแบบสองกลุ่มเปรียบเทียบเพื่อศึกษาผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง ต่อการรับรู้คุณค่าในตนเอง คอร์ติซอลในปัสสาวะ อาการเหนื่อยล้า และคุณภาพชีวิต ในสตรีไทยโรคมะเร็งเต้านม กลุ่มตัวอย่างในการศึกษาคือสตรีไทยโรคมะเร็งเต้านมที่มาตรวจตามแพทย์นัด ในระยะหลังการรักษาเสร็จสิ้นแล้วมามากกว่า 1 ปี ณ คลินิกเต้านมศิริราช โรงพยาบาลศิริราช จำนวน 30 ราย การคัดเลือกกลุ่มตัวอย่างใช้วิธีการสุ่มเลือกเพื่อเข้ารับโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง (กลุ่มทดลอง =15 ราย) และได้รับการพยาบาลตามปกติ (กลุ่มควบคุม= 15 ราย) ตัวแปรตามทั้ง 4 ตัว ประกอบด้วย การรับรู้คุณค่าในตนเอง ระดับคอร์ติซอลในปัสสาวะ อาการเหนื่อยล้า และคุณภาพชีวิต การเก็บรวบรวมข้อมูลโดยการติดตามประเมินตัวแปรตามทั้ง 4 ตัวใน 3 ระยะคือ หนึ่งวันก่อนดำเนินโปรแกรม สัปดาห์ที่ 6 หลังดำเนินโปรแกรม และสัปดาห์ที่ 12 หลังดำเนินโปรแกรม วิเคราะห์ข้อมูลโดยใช้สถิติแบบพรรณนา การทดสอบความแตกต่างระหว่างกลุ่มก่อนดำเนินโปรแกรมด้วยการทดสอบไคสแควร์ การทดสอบฟิชเชอร์เอกซ์แซคท์ และการทดสอบทีเทสต์ และการทดสอบความแตกต่างระหว่างกลุ่ม หลังการดำเนินโปรแกรมด้วยการทดสอบความแปรปรวนร่วมแบบสองทาง ผลการศึกษาพบว่าหลังจากใช้คะแนนตัวแปรตามก่อนดำเนินโปรแกรม (T_1) เป็นตัวแปรควบคุม สตรีไทยโรคมะเร็งเต้านมที่เข้าร่วมโปรแกรมมีความแตกต่างของการรับรู้คุณค่าในตนเอง (p =.026) คอร์ติซอลในปัสสาวะ (p =.005) อาการเหนื่อยล้า (p =.007) และคุณภาพชีวิต (p =.048) ในสัปดาห์ที่ 6 และ สัปดาห์ที่12 หลังดำเนินโปรแกรมอย่างมีนัยสำคัญทางสถิติ.

ผลการศึกษานี้แสดงถึงประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กงต่อการเพิ่มการรับรู้คุณค่าในตนเอง ลดคอร์ติซอลในปัสสาวะ ลดอาการเหนื่อยล้า และเพิ่มคุณภาพชีวิตในสตรีไทยโรคมะเร็งเต้านม และสนับสนุนการนำโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กงนี้ไปประยุกต์ใช้ในสตรีไทยโรคมะเร็งเต้านมเพื่อส่งเสริมสุขภาวะด้านต่างๆ และคุณภาพชีวิตที่ดีต่อไป และควรมีการศึกษาเชิงทดลองในกลุ่มตัวอย่างที่มีขนาดใหญ่ขึ้น

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CHAPTER I
INTRODUCTION

1.1 Background and Significances of the Study

Breast cancer is now the most commonly diagnosed cancer worldwide in women. It is accounted for 1.38 million newly diagnosed cases in 2008 (23% of all cancers) and ranked the second overall (10.9% of all cancers) (Ferlay, Shin, Bray, Forman, Mathers, & Parkin, 2010). In the same study, it is also reported that the age-standardized incidence rate (ASR) of breast cancer in worldwide is 39.0 per 100,000 females; particularly in South East Asia, ASR of breast cancer is 31.0 per 100,000 females. In addition, breast cancer is now the most common cancer both in developed and developing regions with 690,000 new cases estimated in each region (population ratio 1:4) (Ferlay et al., 2010). Moreover, over the past 25 years the incidence rate for earlier stage of breast cancer has gradually risen approximately 30% in western countries because of more effectiveness of breast screening (Bower, 2008). Therefore, breast cancer still presents one of the most widely spread threats to women's health worldwide (Li & Lambert, 2007).

Consistently in Thailand, National Cancer Institute (NCI) (2009) reported that ASR of breast cancer in Thailand is 20.9 per 100,000 females in 2001-2003 which placed breast cancer as the highest category of cancer in Thai women. It is estimated that 1 in 10 Thai women have a chance of being diagnosed with breast cancer at some point in their life (NCI, 2009). The research team for a cross-sectional survey in 1995-1998 of the common leading woman cancers in four major cancer registries in Thailand reported that ASR of 17.2 per 100,000 at all sites, with an ASR of 16.9 per 100,000 at Chiang Mai Province (North region), 9.7 per 100,000 at Khon Kaen Province (Northeast region), 15.9 per 100,000 at Bangkok (Central region), and 12.1 per 100,000 at Songkhla Province (South region) (Vatanasapt, Sriamporn, & Vatanasapt, 2002). In Siriraj Hospital which is a super tertiary hospital in Bangkok, Thailand, breast cancer was approximately 13.67% that also the first ranked of all new

cancer cases and it is specifically 25.79% in woman cancer cases (Siriraj Cancer Center, 2008). Thus, breast cancer is considered as the highest volume of female cancer from the standpoint of Thai women health and it should receive great attention closely from health care providers.

Fortunately, increasing incidence of newly breast cancer diagnosis at earlier stage with wide spread adoption of effective adjuvant treatment has resulted in the growing number of women living with breast cancer (Bower, 2008; Colditz, Sellers, & Trapido, 2006; Giordano, Buzdar, Smith et al., 2004). Bower (2008) reported that regular mammography in women between the ages of 50–69 years could reduce mortality rate by breast cancer about 15–25%. Based on information from the United States Surveillance, Epidemiology, and End Result (US-SEER) database, the survival rates for breast cancer across all stages are slightly increasing: 89.3% (5-year survival rate), 82% (10-year survival rate), and 75% (15-year survival rate). Specifically, the 5-year survival rate is 98.3% (localized), 83.6% (regional), 23.4% (distant), and 100% (in breast *in situ)* (American Cancer Society: ACS, 2010; Jemal, Siegel, Xu, & Ward, 2010). It was estimated that approximately 2.5 million women with a history of breast cancer were alive in January 2006 and most of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment (ACS, 2010). In Thailand, 5-year survival rate for breast cancer was approximately 62.7% (Sankaranarayanan, Black, Swaminatha, & Prakin, 1998). Thai women living with breast cancer are then gradually accumulating and have become the larger population of cancer survivor now. Thai health care providers should have the potential to improve for better treatment outcomes and to minimize complications after treatment completion, in order to attain better quality of life (QOL).

Despite gradually increasing survival rate, some women living with breast cancer had still lived with poorer health and lower quality of life (Chae, & Seo, 2010; Härtl et al., 2010; Hewitt, Greenfield, & Stoval, 2006; Knobf, Insogna, DiPietro, Fennie, & Thompson, 2008; Meneses & Benz, 2010; Miller, Ancoli-Israel, Bower, Capuron, & Irwin, 2008; Montazeri, Vahdaninia, Harirchi, Ebrahimi, Khaleghi, & Jarvandi, 2008; Rosedale & Fu, 2010; Servaes, Verhagen, & Bleijenberg, 2002). Indeed, QOL is now a significant indicator of successful treatment in chronic illnesses

including breast cancer. QOL must be context-related because it is a dynamic construct that change over time (Knobf, 2007). QOL of individual living with cancer is also a multi-dimensional construct that is composed of psychological functioning, social adjustment, functional ability, and behavioral co-morbidity (Knobf, Musanti, & Dorward, 2007; Miller et al., 2008; Servaes et al., 2002). Hence, context-related QOL of women living with breast cancer after treatment completion should be clarified to well establish the improving QOL intervention.

With regard to the physical aspect of women living with breast cancer after treatment completion, several previous studies revealed that QOL was generally associated with varieties of behavioral co-morbidity (Bardwell, & Ancoli-Israel, 2008; Bower, 2008b; Deshields, Tibbs, Fan, 2005; Karakoyun-Celik, Gorken, Sahin, Orcin, Alanyali, & Kinay, 2010; Kim et al., 2008; Miller et al., 2008). Common persistent behavioral co-morbidities in women living with breast cancer after treatment completion were fatigue (Bardwell, & Ancoli-Israel, 2008; Bower, Ganz, Desmond, Rowland, Meyerowitz, & Belin, 2000; Bower, 2005; Bower et al., 2006; Bower, 2008b; Kim et al., 2008; Servaes et al., 2002), depression (Bower, 2008b; Hewitt et al., 2006; Kim et al., 2008; Miller et al., 2008; Servaes et al., 2002; Trentham-Dietz et al., 2008), sleep disturbances (Miller et al., 2008; Servaes et al., 2002), and cognitive dysfunction (Ah, Russell, Storniolo, & Carpenter, 2009; Bower, 2008a; Miller et al., 2008; Servaes et al., 2002). However, that behavioral co-morbidity may be apparent throughout the process of diagnosis and treatment for cancer and might persist well into the survivorship period. They could affect treatment adherence, morbidity and mortality of cancer treatment, and ultimately QOL (Bower, 2008b; Miller et al., 2008; Olson, Turner, Courneya, Field, Man, & Cree, 2008; Servaes et al., 2002).

Among all behavioral co-morbidities in women living with breast cancer after treatment completion, fatigue was claimed as a major source of variance in QOL. There is growing evidence to support that fatigue could persist for months or a few years after treatment completion. Fatigue was estimated 35%-66% at 5-year survival (Bower et al., 2000; Bower et al., 2006; Bower, 2008; Kim et al., 2008; Servaes et al., 2002) and 20-34% at 10-year survival (Bower et al., 2006). Furthermore, fatigue was emerged as the strongest predictor by far of QOL in first year after breast cancer diagnosis, explaining around 30% to 50% of variability within function scores and

overall QOL (Arndt, Stegmaier, Ziegler, & Brenner, 2006). Other behavioral co-morbidities, including pain, nausea and/or vomiting, breast symptoms, systemic therapy side effects, and arm symptoms, explained on average <5% of variability of various QOL scales beyond fatigue. Thus, fatigue is now a significant behavioral co-morbidity which needs effective intervention to improve QOL in women with breast cancer at treatment completion.

Underlying of mechanism of fatigue is still equivocal, but some possible novel mechanisms recent studies have suggested (e.g., neuroendocrine mediating, inflammation, immune system dysregulation). Thus, fatigue is multiply determined by both biological and psychological underpinnings. One of a possible examination is based on a psychoneuroimmunology model (PNI model). Recent studies linking inflammatory processes to central nervous system–mediated fatigue led us to examine cellular immune system status in women living with breast cancer. They revealed that women living with breast cancer who had persistent fatigue would also have alteration of cortisol level and suppression of specific immune (T-cell lymphocyte) (Bower et al., 2000; Bower et al., 2002, 2003; Bower, Ganz, & Aziz, 2005; Bower et al., 2006; Bower, 2008). Results of those previous studies suggested that persistent fatigue in women living with breast cancer might be associated with a chronic inflammatory process involving the T-cell compartment and neuroendrodirne mediating involving cortisol level. Thus, a functional alteration in proinflammatory cytokine and cortisol response could define a prognostic biomarker of behavioral fatigue (Collado-Hidalgo, Bower, Ganz, Cole, & Irwin, 2006).

In addition, women with breast cancer have also found that they are often faced with physical distresses. In several studies, women with breast cancer experienced many physical health problems such as menopause (Gélinas & Fillion, 2004; Knobf, et al., 2007; Knobf, et al., 2008; Mandelblatt et al., 2003) and poor upper body function (UBF) particularly in their arms (Bosompra, Ashikaga, O′Brien, Nelson, & Skelly, 2002; Mols, Vingerhoets, Coebergh, & Poll-Fransd, 2005; Johansson, Ohlsson, Ingvar, Albertsson, & Ekdahl, 2002; Lee, Ku, Dow, & Pai, 2001; Yap, McCready, Narod, Manchul, Trudeau, & Fyles, 2003). All of these physical health problems have the potential influence to disrupt activities of daily living, (e.g. dressing, housework, childcare), occupational work, and social activities. Furthermore,

if compounded by high level of fatigue and stress, these problems may have an adverse effect on the lives of women with breast cancer after treatment completion (Karakoyun-Celik et al., 2010; Mandelblatt et al., 2003; Nesvold, Fossa, Holm, Naumes, & Dahl, 2010; Rietman et al., 2003; Stevinson, Campbell, Sellar, & Courneya, 2006; Trentham-Dietz et al., 2008).

With regard to psychosocial aspect of women with breast cancer after treatment completion, it is estimated that one third to one half of women living with breast cancer experience psychosocial distress that influences psychosocial functioning overtime (Knobf, 2007; Montazeri, 2008; Montazeri et al., 2008). The occurrence of psychosocial distress in women living with breast cancer depends on multiple antecedent and concurrent factors associating with treatment. Basically, women living with breast cancer would look forward to treatment completion and people in their surroundings (e.g. family, friends, and health care provider) would view treatment completion as the time to "get back to normal" and get on with her life (Knobf, 2007; Knobf et al., 2008; Montazeri, 2008). "Getting back to normal" would be seen as psychosocial challenge that needs coping resources to facilitate their coping in this cases. At this side, feeling of uncertainty and anxiety may persist or increase as separation anxiety, decreased emotional well-being, worry, feel more stress, and feelings of isolation and abandonment related to that healthcare services may be presented among women living with breast cancer (Härtl et al., 2010; Hewitt et al., 2006; Knobf, 2007; Knobf et al., 2008; Mandelblatt et al., 2003; Miller et al., 2008; Rosedale, 2009; Wu, Li, & Jin, 2008). Therefore, treatment completion may be a significant period that women living with breast cancer have to face with several psychosocial distresses and they were expected to well adapt to this new normal life.

Indeed, the most common psychological distress in women with breast cancer after treatment completion were anxiety and depression which still persisted for years after the disease diagnosis and treatment. Vahdaninia and colleagues (2010) showed that severe anxiety and depression reported by women with breast cancer at 18-month follow-up period was 38.4% and 22.2%, respectively. Risk factors for developing anxiety and depression at 3 months following treatment completion was fatigue (odds ratio (OR) = 1.04, 95% Confidence interval (CI) = 1.01-1.07) and at 18 months follow-up, anxiety was predicted by pain (OR = 1.02, 95% CI = 1.00-1.05),

whereas depression was predicted by both fatigue (OR = 1.06, 95% CI = 1.02-1.09) and pain (OR = 1.05, 95% CI = 1.01-1.08). In the quality of life evaluations, difficulty in sleeping, emotional status, fatigue, and body appearance were positively associated with both depression and anxiety ($p < 0.05$ for all), whereas physical function ($p = 0.002$), pain ($p<0.0001$), general health ($p < 0.0001$), future anxiety ($p < 0.0001$), and arm symptoms ($p = 0.001$) were negatively associated in patients with depression (Karakoyun-Celik, et al., 2010). Consistently in Thai women living with breast cancer, Lueboonthavatchai (2007) reported that common psychosocial distresses were anxiety (16%) and depression (19%). Predicting factors of those psychological distress in Thai women living with breast cancer were social support ($p < 0.05$), coping ($p < 0.05$), and symptoms (pain and fatigue) ($p < 0.05$). Conclusion, high depression and anxiety levels in Thai women living with breast cancer under follow-up period negatively affected their QOL. Hence, improving psychosocial distress in women living with breast cancer at treatment completion should be focused on coping and some specific symptoms (e.g. fatigue and pain).

Other significant psychosocial distress in women living with breast cancer was declination of self-esteem (Dirksen, 2000; Servaes et al., 2002). Women with breast cancer viewed self-esteem as affected self-worth, self-respect and self-value which were found to be important aspects affecting their QOL (Berterö, 2002). They need to be respected and loved as general women they are rather than illness person. Moreover, their concerns related to their QOL seemed to be heightened when treatment has been completed due to the psychological effects of the treatment experience become their reality (Berterö, 2002). Self-esteem would be worse by breast cancer surgery due to its impacted on self-image and sexual life (Markopoulos, et al., 2009; Sertöz, Mete, Noyan, Alper, Kapkac, 2004). If compounded by higher fatigue and stress, self-esteem would be lower (Servaes et al., 2002). However, self-esteem plays a significant role in the ability of women living with breast cancer to thrive and go on to normal live (Dirksen, 2000; Lee et at., 2001; Servaes et al., 2002). Self-esteem was also found to be positively correlated with, and explained most of the variance in well-being and QOL in women living with breast cancer (Dirksen, 2000; Mustian et al., 2004; Servaes et al., 2002). Hence, self-esteem should be an

appropriate target for interventions designed to aid women living with breast cancer in maintaining and improving their QOL after treatment completion.

Consistently, psychological distress after treatment completion appeared to effect on QOL in context of Thai women living with breast cancer as well. A grounded theory conducted in Thai women living with breast cancer with long-term treatment side effects, the investigators described that daily living process was dynamic changed by treatments, symptom-related uncertainty, and the possibility of recurrence that influence their normal life (Chunlestskul, Boontong, Jirawatkul, Sindhu, & Nilchaikovit, 2003). Another phenomenology study, the investigators examined that Thai women living with breast cancer had a great impact on living experiences and disrupting to their normal lives and family harmony (Junda, 2004). A cross-sectional study in 3-year Thai women living with breast cancer revealed that they have had many concerns and worries about treatment effects, recurrence, new cancer, and diagnostic procedure, which all had a direct effect on their stress appraisal (Wonghongkul, Moore, Musil, Schneider, & Deimling, 2000). As a result, Thai women living with breast cancer still had lower psychological well-being, moderate social well-being, moderate spiritual well-being, and only moderate overall QOL. However, Thai women living with breast cancer who had lower uncertainty and lower stress appraisals as harmful would have higher QOL and longer survival times ($p < 0.05$) (Wonghongkul, Dechaprom, Phumivichuvate, & Lasawatkul, 2006). This finding raises challenge question about the potential role of QOL in breast cancer as a predictor of longer survival time. Hence, improving QOL in breast cancer after treatment completion was a beneficial area because it may have potential influence on survival time as well.

The examinations of improving QOL intervention specifically contributing to better physical and psychosocial health in women living with breast cancer after treatment completion were various. Earlier investigators already reviewed existing evidence regarding effectiveness of physical exercise on fatigue and QOL in various cancer groups surprisingly (Bicego et al., 2009; Duijts, Faber, Oldenburg, Beurden, & Aaronson, 2010; Galvao & Newton, 2005; Knols, Aaronson, Uebelhart, Fransen, & Aufdemkampe, 2005; McNeely, Campbell, & Rower, 2006; Vallance, Courneya, Plotnikoff, Yasui, & Mackey, 2007; Valenti, 2008). In addition, they challenged other

alternative interventions that may be more helpful in enhancing QOL in women living with breast cancer after treatment completion. Recent evidence suggested that mind-body therapy such as Yoga (Bower, Wooley, & Sternlieb, 2005; Evans, Cousns, Tsao, Sterlieb, & Zeltzer, 2011; Moadel et al., 2007) and Tai Chi (TC) (Eom, 2007; Galantino et al., 2003; Hwang & Kwak, 2009; Lee, Choi, Ernst, 2010; Lee, Lee, & Ernt, 2009; Lee, Pittler, & Ernst, 2007; Mustian, Katula, Gill, Roscoe, Lang, & Murphy, 2004; Mustian, Katula, & Zhao, 2006; Reid-Arndt, Matsuda, & Cox, 2011; Yeh, Lee, Chen, & Chao, 2006) may have beneficial effects on physical health, psychological health, and QOL in women living with breast cancer.

Interestingly, there is mounting evidence to support that in enough time given, TC can improve both physical and psychosocial health in various populations including cardio-respiratory function and aerobic capacity (Chan, Lee, Suen, & Tam, 2011; Taylor-Pillae & Froelicher, 2004a; Taylor-Pillae, 2008), immune function (Irwin, Olmstead, & Oxman, 2007; Sandlund & Norlandar, 2000), muscular strength and flexibility (Kuramoto, 2006; Macfarlane, Chou, Cheng, 2005; Wang, Collet, Lau, 2004), stress and mood (Esch, Duckstein, Welke, Stefano, & Braum, 2007; Taylor-Piliae, Haskell, Waters, & Froelicher, 2006; Wang et al., 2009; Wang et al., 2010), cortisol level (Esch et al., 2007; Jin, 1989, 1992), fatigue (Galatino et al., 2005; Mustain et al., 2004), self-efficacy (Dechamps, Lafont, & Bourdel-Marchasson, 2007; Li, McAuley, Harmer, Duncan, Duncan, & Chaumeton, 2001; Li, Harmer, McAuley, Fisher, Duncan, & Duncan, 2001; Taylor-Pillae & Froelicher, 2004b; Taylor-Piliae et al., 2006), self-esteem (Kutner, Barnhart, Wolf, McNeely, & Xu, 1997; Lee, Lee, & Woo, 2007; Li, Harmer, Duncan, ,Duncan & Chaumeton, 2002; Mustain et al., 2004; Wang et al., 2010), and several subcomponents of overall QOL (Esch et al., 2007; Fisher, Li, & Shirai, 2003; Galatino et al., 2005; Mansky et al., 2006; Mustain et al., 2004; Wang et al., 2004). In addition, there are some suggestions that TC may increase disease-free and overall survival in selected populations (Ingram & Visovsky, 2007; Pinto & Floyd, 2007).

Specifically, six experimental studies conducted in women living with breast cancer revealed that TC could improve body mass (Galantino et al., 2003; Mustian et al., 2004), complete blood cell count (CBC) (Yeh et al., 2006), muscular strength and flexibility (Eom, 2007; Hwang & Kwak, 2009; Mustian et al., 2004),

stress and mood (Eom, 2007), self-esteem (Mustian et al., 2004), aerobic capacity and fatigue (Galantino et al., 2003; Mustian et al., 2004; Mustain et al., 2006), and improve QOL (Galantino et al., 2003; Mustian et al., 2004; Mustian et al., 2006). Hence, TC program has demonstrated statistically and clinically relevant beneficial effects on health and QOL in women living with breast cancer; it may be a beneficial program in Thai women living with breast cancer as well.

TC and Qi Qong are practiced on similar platforms in general conventional hospitals across China (Munshi, Ni, & Tiwana, 2008). However, TC has variety of types and diversified health benefits. One of the most widely use of TC was Tai Chi Qi Qong (TCQQ). It is a combination of TC and Qi Qong consisting short styles of TC 18-forms, that can improve both physical and psychosocial health and QOL in various populations (Chan et al., 2011) including in Thai elderly (Tongnok, Panutai, & Pramoch, 2007; Wannatong & Kongsuruyanavin, 2007). About TCQQ, the exercise intensity of each motion is approximately 3.1 METs (S.D. = 0.9) and the energy expenditure of each set (18-forms) is about 60 Kcal (Chao, Chen, Lan & Lai, 2002). Meanwhile, the estimated intensity of TCQQ in elderly individuals approximated 50% of the maximum oxygen uptake (VO_{2max}) for men and 60% of the maximum oxygen uptake (VO_{2max}) for women (Chao et al., 2002). Another study revealed that TCQQ practicing intake energy is approximately 4 METs (Moderate activities) (Ainsworth et al., 2000). These findings demonstrated that TCQQ is a low-moderate intensity exercise and it can be prescribed as a therapeutic program for chronic illness including breast cancer. Based on the metabolic equivalent and energy expenditure value in each TCQQ movement, it is a safe program that can be tailored to fit with the activity level of each individual; however, a little is known about its effects in women living with breast cancer. A previous meta-analysis was recommended that TC duration should be continuously at least 12 weeks and TC dose should be at least 30 minute with 2 times/week (Taylor-Pillae & Froelicher, 2004a). Thus, TCQQ program should be used in Thai women living with breast cancer to examine its effects on health and QOL and to assess its feasibility in Thai context.

At present, most studies in women living with breast cancer have been conducted in western countries; however, in Thailand very little have been done. Two descriptive studies in at least 3-years Thai women living with breast cancer revealed

that they had a moderate level of QOL and mostly concerned about weight gain and fatigue (physical well-being), high uncertainty (psychosocial well-being), high challenge (stress appraisal), and seeking social support (coping) (Wonghongkul et al., 2000, Wonghongkul et al., 2006). Consistent findings were found in another study. It revealed that symptom distress, social support, and uncertainty, were able to jointly explain 46.7% of variance on QOL in Thai women living with breast cancer after 1 year post-treatment completion, and thereafter; in particular, symptom distress best predicted on QOL (*Beta* = 0.449) (Sivarux, Pongthavornkamol, Wattanakitkrilert, Tanticharoensin, 2012).

Other three quasi-experimental studies were conducted in Thai women with breast cancer using different programs. Firstly, the supportive-educative program focused on self-care deficit and QOL in 1-3 years Thai women with breast cancer which results were significantly improved (Soivong, Chanprasit, Wonghongkul, Muttarak, & Northouse, 2004). Secondly, a 6-week nutritional supporting program aimed to manipulating nutritional status in 25 Thai 5-year women living with breast cancer which results were significantly improved (Aree, Wonghongkul, Tungpunkom, Sawasdisingha, Thummathai, & Muttarak, 2007). Lastly, a quasi-experimental study in 5-years Thai women living with breast cancer focused on the effects of the educative-supportive program on uncertainty, QOL, and self-care deficit which results were statistically significant improved but it did not change overtime (Wonghongkul, Sawasdisingha, Aree, Thummathai, Tungpunkom, & Muttarak, 2008). Therefore, previous studies in Thai women living with breast cancer are now limited and most of studies were conducted a health educative program in at least 1-years women living with breast cancer. The study to test another alterative QOL intervention in Thai women living with breast cancer at the treatment completion is still lacking; In particular, QOL promoting intervention using the PNI model as framework has never been conducted in cancer population in Thailand.

Summary, numbers of women surviving with breast cancer each year are gradually increasing; making women with breast cancer are now a larger population of all cancer survivors. This is in part due to more advances in breast cancer screening and its treatment; as a result, it has led to increasing numbers of individuals who are either cured of their breast cancer or living with it as a chronic disease. In addition,

treatment completion is a significant period that women with breast cancer have been expected to well adapt to this new normal life; although, they have still faced with several psychosocial and physical problems eventually resulting in QOL. TCQQ, one of the most widely used as a mind-body therapy today, has a potential range of physical, psychosocial, and spiritual synergistic effects if practicing enough. TCQQ is a Chinese wisdom exercise that includes meditation and spiritual uplifting through simple but deep movements that stimulate the body and mind to induce relaxation effect. These techniques can encourage a personal sense of control, improve mood, reduce side effects of treatment, increase immunity, and it is consistently with a more holistic approach to health. Hence, a TCQQ program promoting better health and ensuring better QOL following treatment completion in women living with breast cancer is now the focal clinical outcomes and research.

In addition, an implementation of TCQQ program in women living with breast cancer has never been conducted in Thailand. Therefore, this prospective experimental study of TCQQ program implementation was designed to determine the effects of TCQQ program on self-esteem, UC level, fatigue, and QOL in women living with breast cancer in Thai context.

1.2 Research Questions

1) Does TCQQ program affect on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer at 6^{th} week and 12^{th} week after the program implementation?

2) Do the effects of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer change over time at 6^{th} week and 12^{th} week after the program implementation?

1.3 Purpose of the Study

1) To compare self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer between the experimental group who receive TCQQ program

and the control group who receive usual care at 6th week and 12th week after the program implementation.

2) To determine the interaction effects between TCQQ program and time on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer.

1.4 Hypotheses

Thai women living with breast cancer who completed TCQQ program would have higher self-esteem, lower urine cortisol level, lower fatigue, and improved QOL than those who received the usual care.

1.5 Conceptual Framework

The most important development has been the explosion of research in the field of psychoneuroimmunology or PNI: “psycho” for mind, “neuro” for the neuro-endocrine system (the nervous and hormonal systems), and “immunology” for the immune system. This science which deals with how the brain affects the immune cells and how the behaviors can affect the immune system is known as the PNI model. The PNI model examines the interactive relationships among psychosocial and physiological health (neuroendocrine and immune system) (McCain, Gray, Walter, & Robins, 2005; Miller et al., 2008; Robinson, Mathews, & Witek-Janusek, 2002; Segerstrom, & Miller, 2004; Zeller, McCain, & Swanson, 1996). The theoretical framework was incorporated Lazarus and Folkman’s cognitive-transactional model of the stress responses within the PNI model. This stress process model holds that the variety of coping strategies (including relaxation and social support) used in response to perceive stress serve to psychologically mediate the adaptation outcomes of psychological functioning, QOL, and somatic health. McCain and colleagues (2005) demonstrated that illness-related stress appraisal and coping patterns serve to psychologically mediate the adaptation health outcomes of neuroendocrine-immune reactivity, QOL, and behavioral co-morbidity in women living with breast cancer at treatment completion. Hence, the PNI model in this study synthesized psychological,

neuroendocrine-immune reactivity and somatic health within the context of Thai women living with breast cancer.

In addition, TCQQ is variously described as a meditative or internal martial art or a moving mind–body exercise. The practice of TCQQ as meditative movement is expected to elicit functional balance internally for healing, stress neutralization, longevity, and personal tranquility (Jahnke, Larkey, Rogers, Etnier, & Lin, 2010). TCQQ was defined as an exercise based on three main concepts; slow intentional movements, often coordinated with breathing, and imagery, which aims to strengthen and relax the physical body and mind, enhance the natural flow of what the Chinese call *"Qi or Chi"* (a nontranslatable word that describes the interpenetration and connection of phenomenon, or life energy), and improve health, personal development, and self-defense (Wayne & Kaptchuk, 2008a, 2008b). An ecological system of the complexity of TCQQ program and the potential therapeutic effects on its practitioners is presented. All potential therapeutic effects will be occurred in eight dimensions: 1) musculoskeletal strength, flexibility and efficiency; 2) breathing; 3) concentration, attention, and mindfulness; 4) imaginary, visualization, and intention; 5) physical touch, massage, and subtle energy; 6) psychosocial interaction; 7) alternative health paradigm, philosophy, and spirituality; and 8) ritual, icons and environmental effects as demonstrated below (See figure 1).

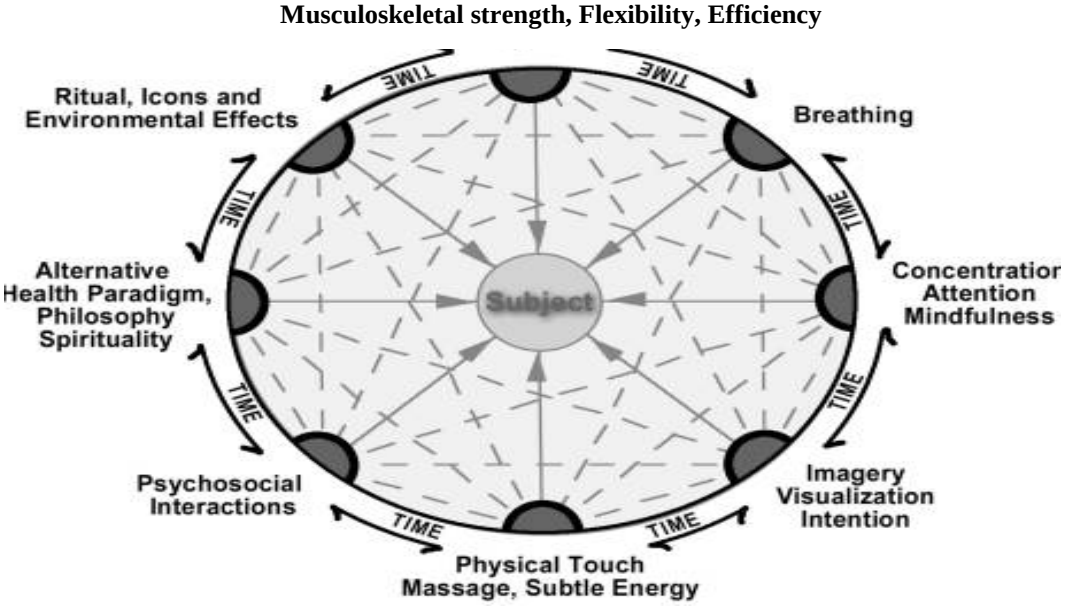


Figure 1.1 The ecological system of the complexity of TC intervention and the potential therapeutic effects on its practitioners (Wayne & Kaptchuk, 2008a)

Hence, it seems that the PNI model and TC have the nearest basic concept about mind and body connection which may synergically affect human health. Consistently, Zeller and colleagues (1996) stated that nursing research should involve scientific inquiry into the biological and behavioral responses of individuals to actual or potential health problem. Thus, the PNI model was a conceptual model that fit to examine the interface of neuroendocrine-immune as it related to the major behavior challenge faced by patients. In addition, these internal reactivity seem to be connected on their own individual and personality behavior which they were expressing which synergic affected health as consequence (Andersen, 2002; Bower, Ganz, Aziz, & Fahey, 2002; Miller et al, 2008; Segerstrom, & Miller, 2004; Zeller et al., 1996). Therefore, four main concepts consisting of psychosocial change, neuroendocrine-immune reactivity, behavioral co-morbidity, and health were examined by using the PNI model and the TC ecological system as a holistic perspective conceptual framework. The research framework was presented as diagram in Figure 1.2.

In sum, the conceptual framework to guide this study was the PNI model. The four main concepts were used to explain the mechanism that how psychosocial change (self-esteem) by TCQQ practice associated with neuroendocrine-immune reactivity (UC level) and behavioral co-morbidity change (fatigue) which those three parts may have synergic effect on health of Thai women living with breast cancer indicated by QOL as described below.

1.5.1 Psychological change: self-esteem

It could be examined that TC practice induced the mind-body interpenetration based on incorporating and uniting principles of slow intentional movements, often coordinated with breathing, and meditation, thought to bring the personal tranquility and balance internally for healing. Characterized as a self-study or self-evaluation through a series of specific TC forms and personal concentration, attention, mindfulness, and intention were internal developed. From those principles, that personal self-evaluation could be improved, individuals could better come to see themselves and to evaluate themselves as they think others see and evaluate them. Self-esteem is a self-worth evaluation pass through several processes that were identified as important to the development of self-esteem in general: reflected

appraisals, social comparisons, and self-attributions (Dirksen, 2000). Consistently, women living with breast cancer have reported an increased awareness and appraisal of self including and exploration of their past, present, and future life. Theses feelings may lead to greater sense of personal control in living from day to day.

Indeed, TC practitioners who sufficiently practice are prone to have better self-esteem (Kutner et al., 1997; Lee et al., 2007; Li et al., 2002; Mustain et al., 2004; Wang et al., 2010). TC practice also has demonstrated improvement of self-esteem and QOL in women living with breast cancer (Mustian et al., 2004). TC appears to be associated with improvement in psychological well-being including increasing self-esteem (Kutner et al., 1997; Lee et al., 2007; Li et al., 2002; Wang et al., 2010). As the TC practice could induce self-esteem as resourceful cognitive functioning (more concentration and intention with problem solving and coping selection), individual stress could be also adjusted (stress neutralization). This suggests that self-esteem plays a critical role in the ability of women living with breast cancer to thrive and go on to live with normal lives (Dirksen, 2000; Lee et al., 2001; Servaes et al., 2002). Thus, self-esteem was included in this study as a psychosocial factor to be improved by TCC practice in Thai women living with breast cancer.

1.5.2 Neuroendocrine-immune reactivity: cortisol level

The cortisol production is produced by two major communication centers for brain-body interaction, the hypothalamus works with the pituitary gland that named the hypothalamus-pituitary-axis (HPA). When the brain perceives a stress stimulus, these two structures throw the adrenal glands into high gear for “fight or flight.” It immediately releases adrenaline from the adrenal glands, and corticotrophin-releasing hormone (CRH) from nerve cells in the hypothalamus. CRH travels to the pituitary gland, where it triggers the release of adrenocorticotrophic hormone (ACTH), which then stimulates the production of cortisol in the adrenal glands. Cortisol sustains energy, but it also curbs the surge of adrenaline and turns off CRH.

Indeed, several previous studies supported that TC practice could reduce cortisol level in various population (Jin, 1989, 1992; Sandlund & Norlandar, 2000; Wang et al., 2004). It could be examined that TC practice could reduce psychosocial stressor in the same effects of stress management and relaxation technique. While TC

practicing, TC practitioner would be in peaceful movement, relax, and raised consciousness; therefore, stress stimulus will be decreasingly stimulated to the HPA-axis. As a result, cortisol level after TC practicing would be reduced. Beneficially, the reduction of cortisol level could be more positive effects on human health. For instance, decreasing of cortisol level, as stress hormone, could reduce causes of the depression of proinflammatory cytokine in human (Platanias, 2005). A weekly cortisol level could be negative related to immune status (white blood cell count: WBC) (p=0.002) which could be sustained until the 2nd week (p= 0.89) in depressive patients (Deutsh, Lerner-Gava, Reches, Boyko, Limor, & Grisaru, 2007). In addition, a lower cortisol concentration in women with metastatic breast cancer was associated with the greater quality of social support which is the indicator of healthier neuroendocrine functioning (Turner-Cobb, Sephton, Koopman, Blake-Mortimer, & Spiegel, 2000). Cortisol level had been demonstrated as a neuroendocrine-immune marker resulting in individual health adaptation to illness and treatment. Thus, cortisol level was included in this study as physiologic factor to be improved by TC practice in Thai women living with breast cancer.

1.5.3 Behavioral co-morbidity: fatigue

Fatigue can be developed by two processes: physiological and psychological tract; consistently, fatigue in cancer patients is from the disease itself, treatment, and psychological distress. Moreover, cancer patients who living with maladaptation of energy sources such as low nutrition, sedentary life-style, and stressful mind, they then experience worse fatigue (Olson et al., 2008). Indeed, psychosocial stress could affect to the Central Nervous System (CNS) which further affects the endocrine system via the pituitary gland in controlling hormone secretion. After that the endocrine system modulated the immune system through the hormone secreted by the pituitary and adrenal glands. This hypothalamus-pituitary-adrenal axis (HPA-axis) played as central role, as immune cell are equipped with the receptors for HPA molecules, and were altered in number, function, and distribution as a result of the hormones secreted. Through the autonomic nervous system, the nervous system also had direct effects on the immune system via the thymus gland, the spleen, and bone marrow. Cytokines (communication molecules of the immune system), were

secreted by immune system cells and were one of the components that fight foreign invaders, regulate the production of immune cells and also impacted the central nervous system and the HPA axis. Cytokines also drove our physiological “illness response”, affecting our mood, fever, eating, and sleeping patterns, along with other associated behaviours.

Fatigue is the most common behavioural co-morbidity in cancer patients associated with both physical and psychological health and it is prominent among cancer patients undergoing treatment and may persist for months or years after successful treatment completion. (Bower et al., 2002; Bower, 2005; Bower, Ganz, Aziz, & Fahey, 2003; Bower, Ganz, & Dickerson, 2005a; Bower, Ganz, & Aziz, 2005b; Collado-Hidalgo et al., 2006; Gélinas & Fillion, 2004; Miller et al., 2008; Servaes et al., 2002). Indeed, several previous studies demonstrated that TC practice could reduce fatigue symptom (Galantino et al., 2003; Galatino et al., 2005; Mustain et al., 2004). It could be examined that TC practicing would have potential effect on both physiological tract and psychological tract in the same time. TC practicing would reduce stress stimulus affecting to the HPA as relaxation technique and alteration in pro-inflammatory cytokine then decreasingly response. Meantime, higher individual aerobic capacity and physical strength by TC practicing benefited to adaptation of energy sources; as a result, individual fatigue was improved.

Beneficially, the reduction of fatigue symptom could be more positive effects on human health. For instance, several previous studies supported the notion that fatigue in cancer survivors associated with lower self-esteem and lower self-efficacy (Servaes et al., 2002) and alteration in proinflammatory cytokine response and define a prognosis biomarker of behavioral fatigue (Collado-Hidalgo et al., 2006; Miller et al., 2008). Consistently, patients with primary breast cancer who experiencing fatigue had greater cytokines (Bower et al., 2002), chronic cellular immune response (Bower et al., 2003) and flatter cortisol response to stress (Bower et al., 2005a, 2005b).Hence, fatigue was included in this study as synergistic outcome by TC practicing in Thai women living with breast cancer.

1.5.4 Health: QOL

In terms of PNI model, it explains the psychobiological pathways through which psychosocial factors stimulated biological systems via central nervous system activation of autonomic, neuroendocrine, and immunological responses. They then synergic affected to health responses proximately. Some psychobiological responses appeared to be relevant across a range of health outcomes. In this study, self-esteem defined as psychosocial factors stimulated biological systems via central nervous system activation of autonomic, neuroendocrine (UC level), and immunological responses in Thai women living with breast cancer. Communication molecules of the immune system also droved our physiological "illness response"; affecting our mood, fever, eating, and sleeping patterns, along with other associated behavioural co-morbidity such as fatigue. The involvement of psychobiological responses was determined by the interplay between individual differences inresponsivity and exposure to positive and negative life experiences. The PNI model operated health in holistic view; therefore, QOL was a multi-dimensional health concept (physical, psychological, social, and functional dimension) that was a good representative dependent factor to reflect adapted health in chronic illness including women living with breast cancer.

QOL was essentially subjective in nature, a personal concept, judged from the point of view of the individual (Shimozuma et al., 2002). Generally, there were many different phases of cancer treatment and survival which present unique issues related to QOL. Survival, for example, was unique period that could cause physical and psychosocial problems that adversely affected to QOL (Ganz, Rowland, & Desmond, 1998; Ganz, Rowland, Meyerowitz, & Desmond, 1998; Ganz, Desmond, Leedham, Rowland, Meyerowitz, & Belin, 2002; Hewitt et al., 2006; Knobf et al., 2007; Knobf et al., 2008; Miller et al., 2008; Servaes et al., 2002). Logically, individual living with limited physical resources and psychosocial resources would negative result in her QOL. It had been hypothesized that those women living with breast cancer with better physical and psychosocial resources potential tend to have better QOL.

Several previous studies supported that TC practicing could improve QOL in individuals living with cancer (Fisher et al., 2003; Galatino et al., 2005; Lee et al.,

2007; Lee et al., 2009; Mansky et al., 2006; Mustain et al., 2004; Wang et al., 2004). It could be assumed that TC practicing may have potential positive affects on both physical resources and psychosocial resources resulting in QOL in individuals living with cancer. Firstly, TC practicing induced lower stress stimulus into the HPA axis (relaxation and stress management) combining with higher self-esteem (Kutner et al., 1997; Lee et al., 2007; Li et al., 2002; Mustain et al., 2004; Wang et al., 2010) as well as better psychosocial resources. Meantime, TC practicing induced lower cortisol level (Jin, 1989, 1992; Sandlund & Norlandar, 2000), lower fatigue (Galantino et al., 2003; Galatino et al., 2005; Mustain et al., 2004), and better immune function (Irwin et al., 2007; Wang et al., 2004) as well as better physical resources. Finally, both two resources were positively synergic effect on QOL in TC practitioners.

All dependent variables including self-esteem, UC level, fatigue, and QOL were fit with the PNI model. For the purposes of this study, the particular psychosocial moderators to be studied include self-esteem was measured by the Rosenberg Self-esteem (RSE). The marker of neuroendocrine-immune function was measured using UC level. Fatigue was measured using the Fatigue Symptom Inventory (FSI). Finally, the QOL was measured using the Functional Assessment in Cancer Treatment – Breast Cancer Module (FACT-B) (See figure 1.2). All of questionnaires to be used in this study had been previously translated into Thai.

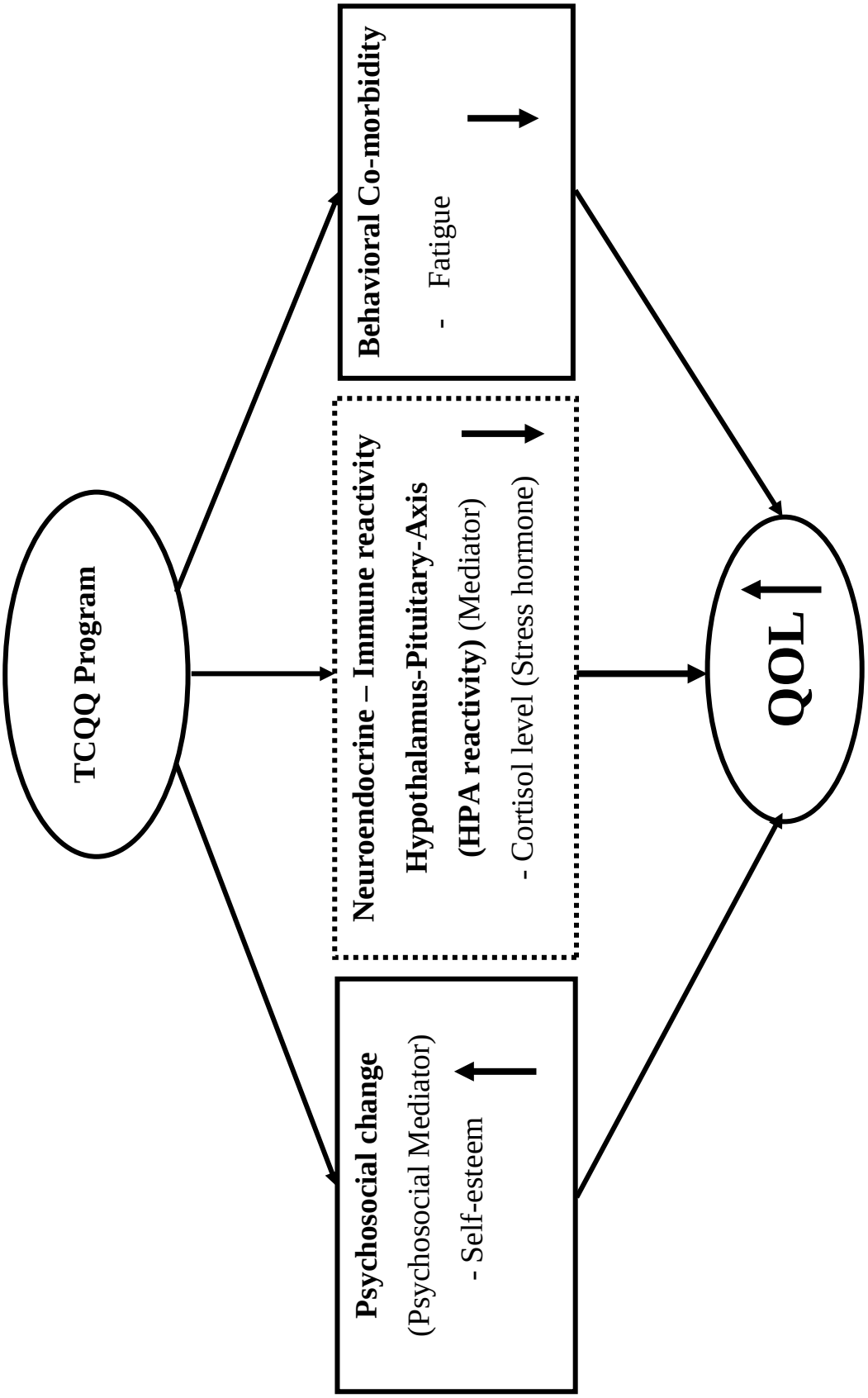


Figure 1.2 The research framework based on the PNI model (McCain et al., 2005)

1.6 Assumptions

The study based on the assumption of the PNI model that psychosocial and immune stressors act synergistically to promote inflammation and sickness behavior in humans. In addition, the adjustment process for individuals living with cancer may be burdensome and lengthy, and deteriorations in QOL are underscored if they also have adverse health effects (Andersen, 2002; Bower et al., 2002; Miller et al, 2008; Zeller et al., 1996).

1.7 Scope of the Study

This two-group randomized control experimental study aimed to determine the effects of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer. The participants who participated in this program were Thai women living with breast cancer with age of 20 years old or older who completed cancer treatment during a past year, and came for routine follow-up visit at the breast clinic of one university hospital; a super tertiary care hospital in Bangkok, Thailand. Data collection started on mid-December, 2011 to September, 2012.

1.8 Definition of Terms

For the purposes of this study, the following definitions were used:

1.8.1 Tai Chi Qi Qong program (TCQQ program) refers to an integrated mind-body program of the wisdom Chinese martial art, 18-forms TCQQ that is originally developed by Professor Lin Ho-Serng of Shanghai Medical University in the 1970s. TCQQ is a short style of TC combined with Qi Qong consisting of 18 forms and the speed of practice guiding by audiotape music. In this study, TCQQ program was developed in Thai language version by the researcher which was used to determine its effects based on the PNI-model examination in Thai women living with breast cancer. This program included providing 6 items; 1) TCQQ lesson plan, 2) TCQQ Handbook, 3) TCQQ Home-Package DVD, 4) TCQQ Poster, 5)

TCQQ Exercise Diary and 6) Guided question for weekly telephone follow-up visit. TCQQ program was a hospital-based program and set in 12 sessions (60 minute per session per week) which demonstrated and trained by one researcher at the breast clinic. The participants were then independently practiced at their home at least 2 times per week. Telephone follow-up visit was done by researcher weekly to monitoring and guide the program practicing.

1.8.2 Self-esteem refers to the breast cancer survivors' judgments of her personal worth (Bandura, 1997) while the ending of treatment period. It was measured by the Rosenberg Self-Esteem Scale (RSE) which was developed to measure how individual generally feel about his or her self-worth. The RSE was already translated into the Thai language version by Thangjitpukdeesakul and colleagues in 2001.

1.8.3 Urine cortisol level (UC level) refers to the primary stress hormone secreted from the adrenal glands and it is largely responsible for the down regulation of immune function as a result of stress stimuli (Hellhammer, Wust, & Kudielka, 2009). In this study, UC level was measured by a 24-hour urine free cortisol testing by the radioimmunoassay analysis (RIA). The 24-hour UC had given an integrated index of the free cortisol circulating in the blood during this period of time. The 24-hour urine was all fresh urine collecting in 24 hour (from 8 a.m. - 8 a.m. next day) without specimen and collection medium. It was independently collected by the participants at their home. A 24-hour UC analysis was done at the quarantined standard urology laboratory in one university hospital (super tertiary care) in Bangkok.

1.8.4 Fatigue is multiply determined by both biological and psychological underpinnings. In this study, it refers to the perception and evaluation of fatigue level in terms of its severity, frequently, interference perception within 2 weeks in Thai women living with breast cancer at the 1st year after treatment completion. fatigue level was measured by the Fatigue Symptom Inventory (FSI) that originally was developed by Denniston and Baker in 2000. The FSI in Thai language version was already translated by Buranaruangrote and colleagues in 2006.

1.8.5 Quality of life (QOL) is context-related concept and dynamic construct that change over time (Knobf, 2007). QOL incorporates individual preference into level of impairment: QOL refers to patient's appraisal of and satisfaction of their current level of functioning compared to what they perceive to be possible or idea (Cella & Cherin, 1998). It also refers to essentially subjective in nature, a personal concept, judged from the point of view of the individual (Shimozuma et al., 2002). In this study, it refers to the perception of Thai women living with breast cancer at the 1st year after treatment completion about the impacts of their illness on QOL. QOL of women living with breast cancer is also a multi-dimensional construct that is composed of psychological functioning, social adjustment, functional ability, and behavioral co-morbidity (Knobf, Musanti, & Dorward, 2007; Miller et al., 2008; Servaes et al., 2002). It was measured by the Functional Assessment of Cancer Therapy-Breast cancer (FACT-B), the QOL measure developed specifically for individuals living with breast cancer (Brady et al., 1997). This instrument included four domains: psychological functioning, social adjustment, functional ability, and disease-treatment-related symptom (Andersen, Kiecolt-Glaser, & Glaser, 1994; Cella & Cherin, 1998).

1.9 Expected Outcomes

1) This study may provide clear comprehension for nurses and other health care providers regarding the effects of TCQQ program based on the PNI model to assist Thai women living with breast cancer promoting various aspects of health and QOL.

2) Findings regarding effectiveness and applicability of TCQQ program could be utilized to design preferable nursing programs among Thai women living with breast cancer for a future larger study.

CHAPTER II
LITERATURE REVIEWS

This study was to determine the effects of TCQQ program on self-esteem, UC, fatigue, and QOL in Thai women living with breast cancer. In this chapter, the literature and previous evidences supporting the proposed study were presented and the gaps addressed by the research question were outlined. The chapter was organized as below:

2.1 Women living with breast cancer health

2.1.1 Physical and psychosocial health

2.1.2 Neuroendocrine-immune alterations

2.1.3 Behavioral co-morbidities

2.1.4 Health-related Quality of life (HRQOL)

2.2 Traditional medicine and Thai culture (TTM)

2.3 Tai Chi (TC): Mind-body intervention

2.3.1 Philosophy of TC

2.3.2 TC Forms

2.3.2.1 “Yang” style

2.3.2.2 “Chen” style

2.3.2.3 “Tai Chi Qi Qong 18-forms” (TCQQ)

2.4 Psychoneuroimmunology model (PNI)

2.4.1 Introduction of PNI

2.4.2 The personal factors in the PNI model

2.4.3 The psychological component of the PNI model

2.4.4 The Neuro-Endocrine Component of the PNI model

2.4.5 The "Immune" component of the PNI model

2.4.6 The “Health” component of the PNI model

2.5 Physiological and psychological benefits of TC in the context of the PNI models and the ecological system of the complexity of TC

2.1 Women living with breast cancer health

The concept of the human being as a mental-spiritual-physical entity is widely held and is a fundamental principle in nursing and many health services. Consistently, scientists have found evidence to support the claims that what we think and how we feel have powerful effects on the biological functions of our bodies, and that there is a complex, dynamic interaction between the mind and the body which affect health (McCain et al., 2005). In particular, there is growing support for a psychoneuro- immunology (PNI model), a paradigm that integrates the mind and the body (Coe & Laudenslager, 2007; Lyon, McCain, Walter, Schubert, 2008; McnCain et al., 2005; Trilling, 2000). This integration makes the PNI model as a conceptual framework for the study of research questions that address links between the mind and the body. Women being with breast cancer provide a model for studying the connections between mind and body because they consistently experience both physical and psychological problems as well. Therefore, physical and psychological problems among women living with breast cancer were integrated into the PNI model for this study and divided into 4 parts consisting of physical and psychosocial health, neuroendocrine-immune alteration, behavioral co-morbidities, and quality of life (QOL) as described below.

2.1.1 Physical and psychological health

Nowadays, treatments of breast cancer are multidimensional composed of surgery, chemotherapy, radiation therapy, hormonal therapy, and biotherapy often extending time more than a year after diagnosis. Research on treatment effects on health and QOL in women living with breast cancer had mostly focused on the time immediately post diagnosis and undergoing treatment; however, several cross-sectional studies of long-term women living with breast cancer had suggested that adjuvant chemotherapy is associated with poorer physical functioning and overall QOL (Chae, & Seo, 2010; Härtl et al., 2010; Hewitt et al., 2006; Knobf et al., 2008; Meneses & Benz, 2010; Miller et al., 2008; Rosedale & Fu, 2010) with more severe some symptoms in part because of the extending course of treatment as well as the persistent residual symptoms such as fatigue, neuropathy, and pain (Bower et al., 2000; Ganz et al., 1998; Ganz et al., 2002; Gélinas & Fillion, 2004; Servaes et al., 2002). However, few prospective studies had examined the impact of breast cancer treatment on the trajectory of women's recovery during the year immediately after treatment completion.

However, physical and psychosocial functioning in women living with breast cancer was showed its improvement controversially after breast cancer treatment completion by several previous researches. Indeed, women living with breast cancer who received chemotherapy experienced more severe and persistent physical symptoms that should be more effectively managed as part of survivorship care (Ganz, Kwan, Stanton, Bower, & Belin, 2011; Servaes et al., 2002). Firstly, women living with breast cancer often have plagued by various physical disabilities after treatment completion consisting of menopause (Gélinas & Fillion, 2004; Knobf, et al., 2007; Knobf, et al., 2008; Mandelblatt et al., 2003), cognitive dysfunction (Ah, Kang, & Carpenter, 2007; Ah et al., 2009; Mandelblatt et al., 2003; Servaes et al., 2002), sleep disturbance (Mandelblatt et al., 2003; Servaes et al., 2002), and impairment of upper body function (UBF) including arms flexibility, movement, and strengthen (Bosompra et al., 2002; Bozentka, Berdjiklian, Chan, Schmidt, Buzby, & Bora, 2001; Johansson et al., 2002; Lee et al., 2001; Mols et al., 2005; Rietman et al., 2003; Yap et al., Fyles, 2003). In particularly, the poor UBF was showed as the significant physical disability in relating to perceived disability in daily physical

activities and QOL in women living with breast cancer (Rietman et al., 2003). However, all of those physical disabilities now existed in some women living with breast cancer after treatment completion and they could have the potential to disrupt activities of daily living such as dressing, housework, childcare, occupational work as well as normal life, social activities, and QOL in long term (Ah et al., 2007; Ah et al., 2009; Bosompra et al., 2002; Courneya & Friedenreich, 1999; Ganz, 2002; Härtl et al., 2010; Hayes, Battistutta, & Newman, 2005; Lee et al., 2001; Mandelblatt et al., 2003; Mols et al., 2005; Morrow, Andrews, Hickok, Rosecoe, & Matteson, 2002; Passik & McDonald, 1998; Servaes et al., 2002; Shimozuma, Ganz, Petersen, & Hirji, 1999; Stevinson et al, 2006; Trentham-Dietz et al., 2008).

Several previous studies were consistently revealed that physical activity (PA) in women living with breast cancer would be gradually declined after treatment completion (DeSanto-Madeya, Bauer-Wu, & Gross, 2007; Irwin et al., 2003) and could positive correlated to QOL (Galvao & Newton, 2005; Warburton, Nicol, & Bredin, 2006) and survival time (Demark-Wahnefried, Pinto, & Gritz, 2006; Holick et al., 2008; Holmes, Chen, Feskanich, Kroenke, Colditz, 2005;). Indeed, women living with breast cancer still faced with some physical problems resulting in declining of their physical activity which may relate to poorer QOL and shorter survival time. Therefore, promoting of recommended PA in women living with breast cancer might improve QOL and extend survival time. Interestingly, several previous studies supported that some aerobic exercise improving on PA in various population was positive correlated with some psychosocial resources improvement consisting of self-esteem (Elavsky, McAuley, Motl, Konopack, Marquez, Hu, et al., 2005; McAuley, Blissmer, Katula, Terry, & Shannon, 2000; Mustian et al., 2004; Tremblay, Inman, & Willms, 2000) and self-efficacy (McAuley et al., 2000; McAuley, Elavsky, Motl, Konopack, Huand, & Marquez, 2005; Elavsky et al., 2005). Hence, focusing on improvement of both physical health and some psychosocial resources such as self-esteem and self-efficacy by some beneficial aerobic exercise might be beneficial intervention relating to better QOL in women living with breast cancer as well.

Furthermore, women being with breast cancer also report a number of psychological problems including anxiety, depression, anger or hostility, and an inability to concentrate, suicidal idea, loss of appetite, the disruption of daily activities,

grief and sorrow, loss of maternity, loss of feminine body image, and sexual problems with spouse due to the loss of the breast (Bower et al., 2008b; Li & Lambert, 2007; Passik & McDonald, 1998; Segrin, Badger, Dorros, Meek, & Lopez, 2007). A study of Thai women living with breast cancer found that anxiety (16%) and depression (19%) were two common psychological problems (Lueboonthavatchai, 2007). In the same previous study also revealed that the most closely associated factors with anxiety and depression in Thai women living with breast cancer were social support, family relationship and functioning, coping, number of hospital admission, and presence of disturbing symptom (pain, respiratory symptom, and fatigue) (all significant at $p<0.01$). However, the significant factors which could predict anxiety and depression in Thai women living with breast cancer were only poor social support ($p<0.05$), coping ($p<0.05$), and the symptoms of pain and fatigue ($p<0.05$). Hence, improving psychological status in Thai women living with breast cancer should be focused on coping, symptom management particularly in fatigue and pain, and social support.

Despite the prevalence of psychological problems in women living with breast cancer, these problems go mostly undertreated and may diminished QOL and reduce survival. Consistently, several psychological outcomes studied include self-esteem (Dirksen, 2000 Fox, 2000; Mustian et al., 2004) and self-efficacy (Bandura, 1977, 1982, 1997, 2004; Lev, 1997; Rogers, Courneya, Verhulst, Markwell, Lanzotti, & Shah, 2006). The rationales for choosing this psychosocial variable as the indicated research outcomes are outlined below.

Several authors have reported that self-esteem is a primary indicator of health, coping and QOL (Dirksen, 2000; Mustian et al., 2004; Servaes et al., 2002). Self-esteem represents the evaluative and affective components of self-concept (how an individual views the self) and can be described as the negative and positive views individuals hold regarding themselves (Dirksen, 2000; Servaes et al., 2002). Research has demonstrated that self-esteem is positively correlated with, and is the psychological factor explaining most of the variance in QOL and well-being among women living with breast cancer (Mustian et al., 2004; Servaes et al., 2002). It could be examined that people with high self-esteem believe in their abilities and strengths and self-esteem has been linked to better adjustment and less helplessness in people with a variety of health problems. This suggests that self-esteem plays a critical role in the ability of women

living with breast cancer to thrive and go on to live normal lives (Dirksen, 2000; Lee et al., 2001; Servaes et al., 2002), and may be an appropriate target for interventions designed to improve QOL (Dirksen, 2000; Mustian et al., 2004).

2.1.2 Neuroendocrine-immune alterations

The cortisol production is produced by two major communication centers for brain-body interaction, the hypothalamus works with the pituitary gland that named the hypothalamus-pituitary-axis (HPA). When the brain perceives a stress stimulus, these two structures throw the adrenal glands into high gear for "fight or flight." It immediately releases adrenaline from the adrenal glands, and corticotrophin-releasing hormone (CRH) from nerve cells in the hypothalamus. CRH travels to the pituitary gland, where it triggers the release of adrenocorticotrophic hormone (ACTH), which then stimulates the production of cortisol in the adrenal glands. Cortisol sustains energy, but it also curbs the surge of adrenaline and turns off CRH.

Beneficially, the reduction of cortisol level could be more positive effects on human health. For instance, decreasing of cortisol level, as stress hormone, could reduce causes of the depression of proinflammatory cytokine in human (Platanias, 2005). A weekly cortisol level could be negative related to immune status (white blood cell count: WBC) ($p = 0.002$) which could be sustained until the 2nd week ($p = 0.89$) in depressive patients (Deutsh et al., 2007). In addition, a lower cortisol concentration in women with metastatic breast cancer was associated with the greater quality of social support which is the indicator of healthier neuroendocrine functioning (Turner-Cobb et al., 2000). Cortisol level has been demonstrated as a neuroendocrine-immune marker resulting in individual health adaptation to illness and treatment.

2.1.3 Behavioral co-morbidities

Fatigue is a poorly defined feeling. It can refer to a subjective symptom and it has been suggested that since there is difference between lack of energy from loss of motivation and sleepiness it should be distinguished from tiredness and exhaustion (Sharpe & Wilks, 2002). Fatigue is considered to be a multidimensional concept with several modes of expression: physical (e.g. diminished energy, need to rest), cognitive (e.g. diminished concentration or attention) and affective (e.g.

decreased motivation or interest). It is a common and distressing symptom in individuals with cancer and the reported frequencies of fatigue in individuals with cancer range from 25% to 75% during and after treatment (Gélinas & Fillion, 2004; Servaes et al., 2002). Studying fatigue in individuals with cancer has now become a global concern (Ganz, 2002), and cancer related fatigue has been accepted as a diagnosis in the International Classification of Diseases Tenth Revision Clinical Modification (Ganz, 2002).

The causes of fatigue are still unknown and this makes it difficult to comment on the problem precisely. The relationship between fatigue and disease and treatment-related factors in addition to demographic and psychological variables is well documented. Recently there have been two extensive reviews of the literature on fatigue in individuals with cancer in general and in individuals with breast cancer in particular (Aouizerat et al., 2009; Vahdaninia, Omidvari, & Montazeri, 2009). The latter study concluded that the influences of factors such as pain, impaired quality of sleep, and depression are highly consistent across several studies although it is not clear whether it is the symptoms that cause the fatigue or vice versa.

Fatigue could be developed by two processes: physiological and psychological tract; consistently, fatigue in individuals with cancer is from cancer itself, treatment, and psychological distress. Firstly, cancer is the parasite cell living with the highest invasive energy consuming from its host, as a result; whole bodily energy gradually lose and person felt likely weakness, tired, fatigue, and exhaust. Moreover, cancer patients who living with maladaptation of energy sources such as low nutrition, sedentary life-style, and stressful mind, they then were worse health and QOL (Olson et al., 2008). In addition, cancer treatment targeted to destroy all high proliferated cancer cells including normal cell, radical diminishing could be altered the whole body functioning into imbalance. Combination of gradually energy loss by cancer invasion and lower body function by cancer treatment will be synergistic adverse effects. Lastly, psychological stress could be further affects to the Central Nervous System (CNS) which affects to the endocrine system via the pituitary gland, the controlling hormone secretion. After that the endocrine system modulated the immune system through the hormone secreted by the pituitary and adrenal glands. This hypothalamus-pituitary-adrenal axis (HPA-axis) play as central role, as immune

cell are equipped with the receptors for HPA molecules, and are altered in number, function, and distribution as a result of the hormones secreted. Through the autonomic nervous system, the nervous system also has direct effects on the immune system via the thymus gland, the spleen, and bone marrow. Cytokines (communication molecules of the immune system), are secreted by immune system cells and are one of the components that fight foreign invaders, regulate the production of immune cells and also impact the central nervous system and the HPA axis. Cytokines also drive our physiological "illness response", affecting our mood, fever, eating, and sleeping patterns, along with other associated behaviours.

Fatigue is a common symptom among women being treated with chemotherapy after breast cancer surgery (Bosompra et al., 2002; Bower et al., 2005, 2008; Bozentka et al., 2001; Carlson, Campbell, Garland, & Grossman, 2007; Isaksson & Feuk, 2000; Johansson et al., 2002; Ribiet al., 2007; Servaes et al., 2002; Shimozuma et al., 1999; Vahdaninia et al., 2010; Yap et al., 2003). The condition leads to feelings of insomnia, less energy than before/ general, weakness, tiredness, nausea and/or vomiting that all persisting long term treatments have ended and negatively effect to upper body function as well.

2.1.4 Quality of life (QOL)

There is growing evidence of reduced QOL in women being treated with chemotherapy after breast cancer surgery (Pandey, Thomas, Ramdas, & Ratheesan, 2006; Peintinger, Reitsamer, Stranzl, & Ralph, 2003; Shimozuma et al., 1999). For example, using the Functional Assessment of Cancer Therapy-Breast (FACT-B), Pandey and colleagues (2006) showed a reduction in physical well-being ($p = 0.001$), functional well-being ($p = 0.00$), and the breast-specific subscale ($p = 0.00$), but no significant change in social or emotional well-being one month after surgery. In a study of QOL and arm complaints after axillary node dissection or sentinel lymph node biopsy in individuals with breast cancer, the authors showed that type of surgery (axillary node or sentinel lymph node) did not have an impact on global QOL, but the authors added that there were changes in other factors, such as pain, that influence aspects of QOL resulting in upper body function impairment (Peintinger et al., 2003).

Shimozuma and colleagues (1999) conducted a prospective longitudinal study of QOL using the Thai – FACT-B version 4. They reported significant reductions in overall QOL score, and subscale for the social well-being, and functional well-being domain during chemotherapy. One year after surgery, study participants had impaired physical functioning, mental health, emotional health, social functioning, and poorer self-perceived health and psychosocial adjustment, regardless of the type of breast cancer surgery.

In a study in which the investigators used a grounded theory approach to examine the QOL of Thai women living with breast cancer who had long-term side effects, the participants all reported that daily living was changed due to the treatments (e.g. surgery, radiation and chemotherapy effects), regardless of whether they experienced recurrent disease (Chunlestskul et al., 2001). In a phenomenological study participants said that breast cancer had a great impact on women' lives and disrupted their lives and family harmony. Five themes of experience of breast cancer emerged, including coming to know *"mareng"* (cancer), suffering and life changes, managing it, uncertainty, and coming to term *"thumjai"* in Thai. In a descriptive study among those with 3-year Thai women living with breast cancer, Wonghongkul and colleagues (2002) revealed that the participants had been living with only a moderate level of QOL; high levels of physical well-being, moderate levels of social well-being and spiritual well-being, and low levels of psychological well-being. Participants were distressed by treatments and worried about the possibility of recurrence, new cancer, and diagnostic procedures during follow-up which all had a direct affect stress appraisal (harm/loss), and which could in turn affect coping strategies and QOL. Interestingly, the result also showed that participants who had better QOL and slightly better survival rates (5.5 years), less uncertainty, and less harm stressful appraisal ($p < 0.05$). Being married and receiving information support from health personnel during follow-up visit were viewed by breast cancer patients as highly beneficial for promoting health outcomes in the long term.

Research to date suggests important things between the physical and psychological problems associated with breast cancer and important health outcomes such as QOL. It is proposed that in Thailand these links should be examined from within a culture rooted in Traditional Thailand Medicine (TTM).

2.2 Traditional medicine and Thai culture (TTM)

The Kingdom of Thailand has its own system of traditional medicine called "Thai traditional medicine" (TTM). It originated during the Sukhothai period (1238-1377 and is derived from Indian and Chinese systems of traditional medicine. TTM encompasses a holistic philosophy, is based on plants, and includes the use of herbal saunas, herbal medicines, herbal steam baths, and hot compresses; traditional massage; acupuncture; and reflexology (WHO, 2008).

At least eight hundred years ago, 102 hospitals were set up, and at least 30 kinds of herbal preparations were used. Medicine formularies for TTM were first documented in Thailand on the walls of Wat Potharam Temple. In the late 1700s, traditional medicine and allopathic (western) medicine were distinguishable for the first time (WHO, 2008). TTM was the preferred method of treatment until the late 1800s, when western missionaries applied the new drug "quinine" to treat malaria in Thailand. As a result, Thai people began to trust allopathic medicine. The first public hospital to use both TTM and allopathic medicine was established by his Royal Highness King Chulalongorn (King Rama V), with his own money. Located in Bangkoknoi, Bangkok, this hospital was called "Siriraj Hospital".

TTM developed in parallel with the other forms of treatment within the health care system in Thailand until the early 20th century (WHO, 2008). In the early 1900s, the registration system for medical practitioners increased the distinction between TTM and allopathic medicine. For example, TTM practitioners were defined as those who practice medicine based on their observations and experiences that were passed on by word of mouth and traditional books but were not based on the scientific model used in allopathic medicine (WHO, 1978).

The spread of allopathic medicine to Thailand led to a decline in TTM. As a result, modern medicine eventually replaced TTM and became the primary approach to health problems, while TTM was neglected for over 60 years. The revival of TTM began in the late 1970s, and now is routinely found in large acute care hospitals, where practitioners of TTM represent an important resource for the Thai health care system.

Over the last two decades, since the Alma-Ata Declaration and a World Health Organization conference on traditional medicine there has been renewed interest in TTM (WHO, 2008). On 24 March 1993 the National Institute of Thai

Traditional Medicine became a division of the Department of Medical Services, Ministry of Public Health. The role of the institute was to facilitate the integration of TTM into the public health service.

The Thai government currently encourages the development of TTM. They promote increased use of TTM and limit use of extravagant medical and pharmaceutical technology within the national public health care system. In addition, the Thai government supports the development of scientific evidence about TTM and promotes training of TTM practitioners, and the use of medical herbs. All types of traditional medicine practitioners are now registered with the Medical Registration Bureau of the Ministry of Public Health.

At present, TTM products include traditional herbal medicines (phytotraditional products, phytopharmaceuticals, and phytomedicine), botanical dietary supplements, therapeutic supplements botanical cosmetics, and standardized herbal extracts. TTM treatments have been used for both acute and chronic illness. The current challenge of TTM treatments is the integration of TTM with allopathic medicine. Tai Chi (TC) has a long history in Asian countries and is a TTM routinely available in Thailand. An important aspect of TC is that it is designed to address both physical and psychological problems related to health.

2.3 Tai Chi (TC): Mind-body intervention

The history of TC is not well understood. China had a long history of health-enhance exercises that mimic animal movements, however; how theses earlier exercises to link to what now called as TC is unclear (Fontaine, 2005; Seaward, 2002). The 17th century text authored by the martial artist *Chen Wang-Ting* where it is described as a new style of *"kung fu"* (Seaward, 2002; Wayne & Kaptchuk, 2008). Despite this explicit origin in the martial art, TC as currently taught and practiced commonly integrates the Traditional Chinese Medicine principles of health and longevity, meditative and spiritual principles, and Taoist philosophy into its training regimen (Fontaine, 2005; Seaward, 2002; Wayne & Kaptchuk, 2008, I & II).

According to the concept of health held by many Chinese people, there is a life force or subtle energy that surrounds and permeates us all, which the Chinese call

"Qi or Chi". To move in unison with this energy in harmony with all things, and to move as freely as running water is to be at peace or one with the universe. This harmony of energy promotes tranquility and inner peace (Seaward, 2002). TC is a series of movements that were developed to help people move in unison with this energy. If done correctly and over time, TC promotes harmony and balance with the (energy). TC is an exercise that demonstrates unification or harmony of mind and body, and with the *Chi* of the universe. Other common names include *T'ai Chi, Tai Chi Chuan, Tai Chi Chih, Tai Ji Juan, Taiji quan, Tai Ji, Taiji, Tai Chi Qi Qong, Qi Qong,* and *Shadow boxing* (Fontaine, 2005; Seaward, 2002; Wayne & Kaptchuk, 2008). The words *Tai* and *Chi* can be translated in several ways such as *"supreme ultimate"*, a meaning symbolic of balance, power, and enlightenment. TC, the softest of the martial arts, is also called *"moving mediation"* (Seaward, 2002). Literally translated, it means *"great ultimate fist"* and is sometimes translated as *"supreme boxing"* or *"root of all motion"* (Fontaine, 2005).

To understand *Chi* more fully it may be helpful to view it within the cultural context where it originated. The Chinese concept of health is quite different from the view commonly held in other countries. North Americans and Europeans generally view health as the absence of disease and illness a product of bacteria and virus, while the Chinese see health as an unrestricted current of subtle energy throughout the body (Seaward, 2002). When *Chi*, (a subtle energy, which flows through the body in a network of meridians, or "energy gates") is restricted or congested, the body is susceptible to physiological dysfunction. In Chinese medicine, poor health is thought to be the result of low resistance, caused by no harmonious (blocked) energy. TC is a type of preventive exercise to maintain the peaceful flow of energy throughout the body and thus maintain good health (Seaward, 2002). It helps to maintain an unrestricted flow of energy, which in term helps to maintain one's resistance to various biological, psychological, or sociological influences.

Fontaine (2005) described TC as a discipline that combines physical fitness, meditation, and self-defense. It teaches one to maintain calm and is centered against the greatest opposition (stressors), to harmonize with aggression and fear, rather than fight it. As a physical exercise, it teaches how to conserve and concentrate energy rather than to dissipate it randomly. The integration of this life force into this

moving meditation of self-defense suggests that TC is not a violent exercise. Rather, it is an exercise to maintain balance in one's life. Therefore, the practice of TC in this view is a wonderful metaphor for conscious relaxation and the ability to move in balance and harmony with our environment.

In summarized, TC in this study was defined as an exercise based on slow intentional movements, often coordinated with breathing and imagery, which aim to strengthen and relax the physical body and mind, enhance the natural flow of what the "*Qi or Chi*" (the interpenetration and connection of life energy), and improve health, personal development, and self-defense. TC likely had some potential benefits on individual health and self-development; therefore, TC will be applied aiming to examine its potential effects on health and personal development in Thai breast cancer survivors.

2.3.1 Philosophy of TC

TC is different from all other forms of self-defense, and perhaps unique into itself, is its basis in philosophy. The practice of its physical movements is a wonderful metaphor for the essential mental attitude to successfully deal with life's daily stressors. The physical movements are fluid: they move with force, not against it. Many times, when we are confronted with situations we perceive to be threatening, our first instinct is to force a change or try to manipulate something we have no control over. TC suggests quite literally going with the flow, swimming with the tide, not against it. The philosophy of TC involves the manipulation of force by controlling oneself and yielding to become part of it. As TC developed, it quickly assimilated many philosophical concepts from ***Taoism,*** and to a lesser extent, *Confucianism*. Even the symbol used to a represent TC-a circular mandala of white and black halves with each half carrying a smaller circle of the other inside-represents the balance of opposites.

Following an examination of TC Seaward (2002) said that there are four basic philosophical concepts taught in TC: "*fasting the heart"*, "*returning to nature"*, "w*u-wei"*, and "*winning by losing"*. *"Fasting the heart"* is a concept to explain the flow of life's energy, a moving essence. Fasting means silence, the language of the soul. *"Fasting the heart"* means to find comfort in solitude. *"Return to nature"* is

another way of describing a regression to the joys of childhood, embracing innocence, joy, laughter, and play. These are traits that, as adults, we lose the ability to utilize and appreciate within ourselves. *"Wu-wei"* is described as the philosophy of nothing-doing, nothing-knowing. It means to act without forcing; to move in accordance with the flow of nature's course. Often *"Wu-wei"* is expressed in the comparison of opposites. The forth component, *"Winning by losing"* advocates the success of failure. When failure is acknowledged, it becomes the first step to success. Winning by losing is an expression of unconditional acceptance. An additional concept of TC is realization that true understanding comes from emptying the mind (lowering the wall of ego). This emptiness allows liberation of the human spirit to unite with the universal life energy. Although this energy may seem elusive to those who have never practiced TC, its effects cascade down through the body to influence the physiological system as well.

2.3.2 TC Forms

TC is developed to the point of formalization in the late Ming (1368-1644) and early *Qing* (1644-1911) dynasties (Fontaine, 2005; Seaward, 2002; Wayne & Kaptchuk, 2008). TC is a soft martial art for individuals of all ages and fitness levels. The five principles of successful TC practice consist of 1) calm down and think of TC only, 2) eliminate any exertion, 3) be consistent in movement and speed, 4) practice truly and precisely and study the movements you make, and 5) persevere and practice for the same amount of time at the same hour each day (http://www.innovative computers.ca/riverspringstaichi/default02.htm).

TC common forms that have been studied and by researchers in various styles included the "Yang" style, "Chen" style (Li et al., 2001), and 18-forms Tai Chi Qi Qong (18-TCQQ) (Chao et al., 2002; Lan, Chou, Chen, Lai, & Wong, 2004; Leung & Tsang, 2008). Results showed different points related to the time required to complete each style. The average time taken to practice "Yang" style was about 17 minutes, whereas only 6 minutes were needed for "Chen" style (Li et al., 2001) and TCQQ-18 was only 3 minutes (Chao et al., 2002). To date, any update TC style is more feasible, simple, and enjoyable than the other traditional styles. The attributes of all popular TC styles are examined below.

2.3.2.1 "Yang" style and its energy cost: "Yang" style is the most popular TC practiced style and developed in the early twentieth century and is sometimes called "*Yang Cheng Fu*". Pacing is uniformly slow throughout the form, with no variation in speed during transitions. Continuity, without break or pause, is the key principles of the "Yang" style. The hand form is loose and open for the most part; fists are not clenched during punches (http://www.taichiacadmy.com/yang.htm). "Yang" style develops softness and strength at the same time and knowing the static movement is good, but it is more important to know how to get from one movement to another. "Yang" style has been studied using empirical approaches and is the most effective style from the standpoint of health, particularly among the elderly (Li et al., 2001; Taylore-Pilliae & Froelicher, 2004).

"Yang" style is composed of 108 separate motions that can take 6-12 month to learn. When they are combined, the result is a cross between slow-motion shadow boxing and dancing. Each movement has a name, such as "repulse the monkey", "the snake creeps down", "the white crane spreads its wings", or "parting the wide horse name". The name of each movement describes what it looks like or the purposes it serves. One systematic review noted that the energy demand of "Yang" style was between 2.5 to 4.1 metabolic equivalents (METs), with a mean oxygen uptake of 0.708 to 1.07 l/min and a peak heart rate of 101.1-134 beats/min which is lesser than "Chen" style but greater than "Simplified 24 form" style (Li et al., 2001). Another study aimed at evaluating the exercise intensity of "Yang" style reported that heart rate during TC practice was 58% of the heart rate reserve (HRR), and oxygen uptake was 55% of the peak oxygen uptake ($V0_{2max}$). Thus "Yang" style TC is considered to require moderate intensity regardless of ages or gender (Lan, Chen, & Lai, 2008).

2.3.2.2 "Chen" style and its energy cost: "Chen" style may be distinguished from "Yang" style by a deeper stance, by circles and twists, and by varied pacing. The hand form has the index fingers of each hand extended at an angle from the plane of the hand, and the thumb touching the side of the hand gently. Pacing varies from almost a standstill to explosive power moves (http://www.taichiacademy .com/chen.htm). The four key principles of "Chen" style are a) stance low, b) pacing varies, c) twists and turns to store energy, and d) slower phases accumulate energy and

then explode into power moves. As a result, “Chen” style is more difficult to learn and to perfect.

“Chen” style is comprised of 36 forms and contains all essential principles of the original Chen Style consisting of 1) Opening, Form, 2) Golden Guard Stamping Foot – Right, 3) Leisurely Tying Coat, 4) White Crane Flashes Wings, 5) Step Diagonally Forward & Twist Step, 6) Lift Knee and Withdraw Hands, 7) Forward Block, 8) Cover Hand and Punch with Fist, 9) Double Push Hands, 10) Punch Underneath Elbow, 11) Repulse Monkey, 12) Step Back and Press Elbow 13) Left and Right Parting Wild Horse's Mane, 14) Left and Right Golden Cock Standing on One Leg, 15) Six Blocking and Four Closing - Right Style, 16) Single Ship - Left Style, 17) Moving Hands Like Clouds, 18) High Pat Horse, 19) Left and Right Patting Foot, 20) Kicking with One Leg, 21) Fists Draping Over Body, 22) Back Twist with Shoulder and Elbow Punch, 23) Green Dragon Emerging from the Water, 24) White Gorilla Offering Fruit 25) Six Blocking and Four Closing - Left Style, 26) Single Whip - Right Style, 27) Double Stamping Feet, 28) Fair Lady Working at the Shuttles, 29) Beast's Head Pose, 30) Dragon on the Ground, 31) Step Froward Seven Stars, 32) Step Backward Riding Tiger, 33) Turn Body, Lotus Kick, 34) Forward Cannon Punch, 35) Golden Guard Stamping Foot-Left Style, 36) Closing Form (http://www.taichiproductions.com/secureshop/product.php?ProductID=244;Retrieved on March 4, 2009)**.** One systematic review noted that the “Chen” style takes less time than “Yang” style, but that “Chen” style demanded significantly higher energy expenditure (4.8 METs), with a corresponding increase in mean oxygen uptake of 1.00 l/min and peak heart rate 107.2 beats/min which is the highest metabolic requirement of all TC styles (Li et al., 2001).

2.3.2.3 Tai Chi Qi Qong 18-forms (TCQQ) and its energy cost: TCQQ is an aerobic exercise of low to moderate intensity (Chao et al., 2002; Leung & Tsang, 2008). TCQQ is a combination of Tai Chi Chuan and Qi Qong, developed by Professor Lin Ho-Serng of Shanghai Medical University in the 1970s (Chan et al., 2011; Leung & Tsang, 2008). It is a short style of TC consisting of 54 forms and could be divided into 3 sets, hence each set consisted of 18 forms. Each form is a body movement pattern including rhythmic limb and trunk movement. Each form is different, dependent and 6 repetitions are practiced for about 1 minute. TCQQ

practitioner can perform 1, 2, or 3 set as they prefer and the speed of practice can be guided by audiotape Chinese music (Chao et al., 2002). TCQQ is easy to learn, and each movement can be practice individually. It is a popular TC exercise and widely practices both in social centers and residences.

TCQQ is comprised of 18 forms of "Chen" style and contains all essential principles of the original "Chen" style consisting of 1) Starting position 2) Opening the chest 3) Rainbow dance 4) Separating clouds by wheeling arm 5) Rolling arm 6) Rowling the boat in the center of the lake 7) Lifting the ball in front of the shoulder 8) Looking at the moon by turning of the body 9) Pushing palm 10) Cloud hands in horse stand 11) Scooping the sea 12) Pushing wave 13) Flying pigeon 14) Punching in horse stand 15) Flying wild goose 16) Rotating wheel in a circle 17) Marching bunching ball and 18) "*Shou Gong*" (Chao et al., 2002).

The energy expenditure and cardiovascular response during the practice of TCQQ-18 are evaluated precisely by research. A previous study was conducted in 47 TCQQ experienced practitioners (13 men and 34 women) aiming to evaluate the cardiovascular response and energy expenditure measured by a K-4 telemetry system. The findings indicated that the exercise intensity of each motion is about 3.1 METs (S.D. = 0.9) and the energy expenditure of each set (18 forms) is about 60 Kcal. The estimated intensity of TCQQ in elderly individuals approximated 50% of the maximum oxygen uptake (VO_{2max}) for men and 60% of the maximum oxygen uptake (VO_{2max}) for women (Chao et al., 2002). Thus, these findings demonstrated that TCQQ is a low intensity exercise and can be prescribed as an alternative exercise program for chronic illness rehabilitation such as cardiopulmonary, musculoskeletal, and cancer including breast cancer. Based on the metabolic equivalent and energy expenditure data of each movement of TCQQ, an exercise program can be tailored to fit the activity level of each individual. All TCQQ 18-forms are demonstrated as below (See figure 2.3).

Figure 2.3 The demonstration of TCQQ-18 (Leung & Tsang, 2008) (cont.)

In summarized, all TC styles can be classified as low-moderate exercise as their intensity exceeds 50-60% of maximum oxygen intake (VO_{2max}) and energy expenditure was about 3-4.5 METs. TC exercise is safe, simple, and economic in nature, and can be used by healthy and unhealthy, men and women, and in any age group. There is a growing body of literatures and evidences showing the benefits of TC from at the standpoint of variables included in the PNI model as further described.

2.4 Psychoneuroimmunology (PNI)

2.4.1 Overview of PNI

PNI has been used as a framework to guide the development of TCQQ studies because it proposes links between mind and body. Scientists' claim that what we think and how we feel seems to have powerful effects on the biological functions of our bodies, and that there is a complex, dynamic interaction between the mind and the body which affect health (McCain et al., 2005). The term "psychoneuroimmunology" (PNI) was first adopted by Robert Ader during his presidential lecture to the American Psychosomatic Society in 1980 (Ader et al., 2001). In that lecture he summarized research that demonstrated the fundamental unity of the bodily systems that function to maintain health and he underscored the fact that the immune system is no exception to this general rule. That is the essential starting view of the psychologists who try to prove that there are connections between mind (brain) and body, and that these connections also affect each other. A psychoneuroimmunology (PNI) is essentially an integrative science. It seeks to shed light on the relationships among psychological, neuro-endocrine, and immunological systems and the links between these relationships and health outcomes (See figure 2.4).

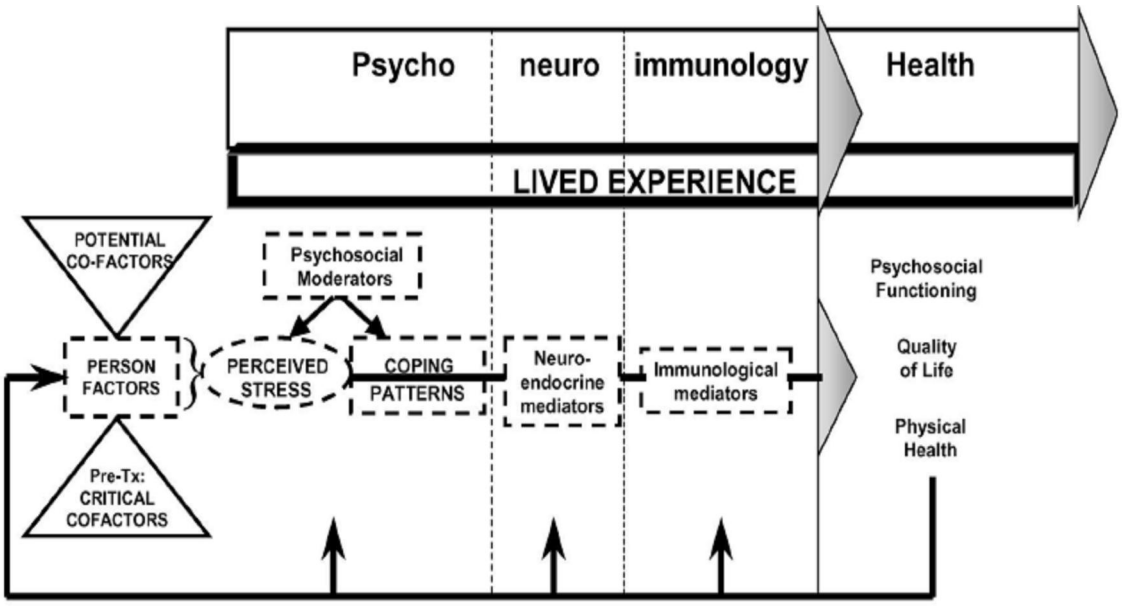


Figure 2.4 The generic model of the PNI (McCain et al., 2005)

The generic PNI model was developed to facilitate an understanding of how psychosocial and/or spiritual variables, which are generally considerate subjective in nature, can affect physiological variables, which are generally considerate objective in nature. The general PNI model as developed by McCain and colleagues (2005) integrates the cognitive-transactional model of stress developed by Lazarus and Folkman (1994). McCain and colleagues (2005) used the PNI to examine links between psychobehavioral and physiological processes affecting the health of individuals with HIV and breast cancer. The generic PNI model consists of four key components: "Psycho", "Neuro", "Immunology", and "Health".

2.4.2 The Personal Factors in the PNI Model

McCain and colleagues (2005) proposed that certain factors, called personal predispose an individual to certain stress, coping, and health patterns. They divided the factors into potential and critical cofactors, and proposed that these cofactors affect the personal factors, which are the antecedences influencing the "Psycho" component of the PNI model. The components of all personal factors in the PNI are examined below.

2.4.2.1 Potential Cofactors

Potential cofactors included recent coffee consumption, substance use (smoking and alcohol), and exercise activity. Coffee consumption, substance use and other exercise activities were collected as part of the demographic information (Al' Absi et al., 1998; Robinson et al., 2002). Although religion/spirituality had not been included as a cofactor in other PNI studies, it could be considered a potential cofactor. The central principles of a Buddhist way of life were to be kind to others, to refuse to harm other living things, and to have a peaceful mind. Meditation was encouraged as part of daily life. The Buddhist way of being likely provides additional support for the management of stress associated with cancer and its treatment.

2.4.2.2 Critical Cofactors

Turning to the critical cofactors, several authors have shown that age is associated with affective distress in women with newly diagnosis breast cancer (Compass, Stoll, Thomsen, Oppedisano, Epping-Jordan, & Krag, 1999: Kroenke, Rosner, Chen, Kawachi, Colditz, & Holmes, 2004). Although affective distress in most women with breast cancer decreases over time, subsets of women remain highly distressed throughout their treatment and recovery (Kroenke et al., 2004). Age also plays a critical role in resistance to infection, with an increased risk of infection found in older people (Calder, 2007). Older individuals also demonstrated decreased T-cell proliferation (Calder, 2007). In the case of women with breast cancer, age also influences hormonal activity, which can influence the neuro-endocrine component of the PNI model (Robinson et al., 2002). Calder (2007) stated that the typical consequences of biological aging are the decrease of vitality of muscle-strength and tension, reduction of brain function, loss of cardiovascular and respiratory capacity, loss of hormonal activity and immunity. Therefore, it is critical that studies of any systems influenced by age be designed it ways that make it possible to consider the influence of age on the specified outcomes.

2.4.3 The Psychological Component of the PNI Model

The second component of the PNI model, "Psycho", is comprised of perceived stress and coping patterns which originate in the human cognitive system

(McCain et al., 2005). Based on the work of Lazarus and Folkman (1984), perceived stress is considered a dynamic transaction among personal factors, social-environmental factors, and illness-related stress factors that influence both cognitive appraisal (thereby defining perceived stress) and coping patterns. McCain and colleagues (2005) state that coping pattern alters the stress-related neuro-endocrine and immune response, and that confront coping patterns lead to improvement in the psychological functioning, quality of life, and physical health. McCain and colleagues (2005) showed that the manipulation of breast cancer-related stress and coping patterns in women undergoing treatment resulted in a change in the neuro-endocrine and immune responses and in the physical health, psycho-sociological health, and QOL.

Psychological moderators McCain and colleagues (2005) incorporated psychological moderators (inner strength and social support) within the psychological component of the PNI model. Many researchers have demonstrated that self-esteem explains a significant amount of the variance in HRQL and well-being among breast cancer survivors (Mustian et al., 2004). This suggests that self-esteem plays a critical role in the ability of breast cancer survivors to thrive and go on to live normal lives (Dirksen, 2000; Lee et al., 2001). Moreover, several authors have reported that self-esteem is also a primary indicator of health, coping and HRQL (Courneya & Friedenreich, 1999; Dirksen, 2000; Mustian et al., 2004).

2.4.4 The Neuro-Endocrine Component of the PNI Model

The "Neuro" component of the generic PNI model refers to the physiological responses to perceived stress appraisal and coping patterns. Any illness-related stressors which the individual perceives trigger his/her neuroendocrine system. Physiologic responses to illness-related stressors can be conceptualized as two separate responses: the sympathetic/adrenal response with the secretion of catecholamines (epinephrine, norepinephrine, and enkephalins), and the pituitary/adrenal response with the secretion of corticotrophin (ACTH), endorphins, and cortisol (Calder, 2007). Both responses have feedback loops to the brain and thus are able to signal when these responses are no longer needed. McCain and colleagues

(2005) stated that the "Neuro" component could be measured by using physiological indicators, particularly cortisol.

2.4.5 The "Immune" component of the PNI model

The "Immune" component of the generic PNI model refers to the relationship between illness-related stress appraisal and coping patterns and the immune system. The neuro-endocrine system mediates the immune response. Elevation of cortisol causes the depression of pro-inflammatory cytokine (Type1) such as IL-1, IL-2, IL-6, and interferon-gamma, and inhibits production of IL-2 by monocytes (Platanias, 2005). The decreased IL-1 results in decreased T-lymphocyte and macrophage function. Decreased IL-2 and interferon-gamma result in reduced CD8+ lymphocyte and macrophage function, T-lymphocyte proliferation, and inhibited production of IL-2 by monocytes, resulting in decreased production of interferon-gamma and increased production of Il-4 (Platanias, 2005). C-reactive protein (CPR) is considered another excellent indicator of inflammation (http://www.healthy-heart-guide.com/crp-blood-test. html). Effect of psychological stress on serum cortisol and plasma CRP and provides some evidence of the interaction between the endocrine and immune systems in response to a psychological stress (Dugue, Leppanen, Teppo, Fyhrquist, & Grasbeck, 1993).

2.4.6 The Health Component of the PNI Model

There have been three major studies of women with breast cancer that were based on the PNI model and that examined relationships among stress and health outcomes. Levy and colleagues (1987) stated women with breast cancer who reported more distress after surgery also reported less psychological adjustment, higher levels of fatigue-like symptoms, and decreased perception of social support. These factors significantly predicted reduced NK-cell activity ($p < 0.00001$), and accounted for 51% of the variance in NK-cell activity. Levy and colleagues (1987) proposed that illness-related stress may act in concert with the risk factors for breast cancer to promote immune dysregulation.

Andersen and colleagues (1998) found that following surgery, women with breast cancer reported illness-related stress such as anxiety and depression that

triggered their neuroendocrine systems. The authors studied 116 breast cancer patients recently treated surgically for breast cancer before beginning the adjuvant therapy. The authors reported that stress level significantly predicted NK-cell lysis, diminished response of NK-cell to recombinant interferon grammar, and decreased proliferate response of peripheral blood lymphocyte. The authors concluded that stress inhibits cellular immune responses that are relevant to cancer prognosis, including NK-cell activity and T-cell response. The authors suggested that further study of breast cancer patients is warranted in order to examine this hypothesis.

McCain and colleagues (2005) used the PNI model as the foundation for two mind-body-spirit intervention studies for stress management - tai chi training and spiritual growth groups-with women who had early breast cancer. Immune function was measured using NK-cells, LAK cells, cytokine production (both in type I and type II), and lymphocyte proliferations. The neuro-endocrine component was assessed using urinary cortisol, endorphin, and enkephalin, and health outcomes were defined as depression, benefit finding, QOL, symptom distress, and fatigue. The final results are not yet available as the study is still in process.

In summary, research by others has provided some support for the linkages among the personal factors, psychological factors, neuro-endocrine factors, immune function factors and health outcomes in proposed in the PNI model (Antoni, 2003; Bauer-Wu, 2002a. 2002b; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Schleifer, 2007; Levy et al., 1987). The PNI model is well suited to such research questions that study cancer as a chronic illness with strong roots in altered immune response.

2.5 Physiological and psychological benefits of TC in the context of the PNI models and the ecological system of the complexity of TC

Many investigators have had examined the influences of TC on various physiological and psychological health outcomes identified as physical and psychological problems experienced by various population including in women living with breast cancer or that are particularly relevant to important health outcomes with be reported. This section is structured in a manner that links the research on the

ecological system of the complexity of TC to the components of the PNI model. It begins with the findings of several systematic reviews and several meta-analyses, and also includes papers published since these reviews were published. In order to make this section easier to read, a table listing all of the papers included in the systematic review and meta-analyses along with the population studied and the primary outcomes of interest is provided.

2.5.1 Psychological health: Self-esteem

TC practitioners who practice enough are prone to have better self-esteem (Kutner et al., 1997; Lee et al., 2007; Lee et al., 2010; Mustian et al., 2004; Sandlund & Norlandar, 2000; Verhagen et al., 2004; Wang et al., 2004; Wang et al., 2010). Two reviews included only studies of older adults (Verhagen et al., 2004; Wang et al., 2004) while two reviews focused on women living with breast cancer (Lee et al., 2007; Lee et al., 2010). In addition, Kutner and colleagues (1997) conducted in randomized older adults to TC, balance training or an educational group for 15-week TC and measured self-esteem using the RSE, but found no significant differences between groups. As noted above, Mustian and colleagues (2004) randomized women living with breast cancer to receive TC or a psychosocial support intervention. Self-esteem was again measured using the RSE scale and reported a significant improvement in the TC group ($p < .01$). The benefits of TC for self-esteem in the breast cancer population may have been due to particularly low self-esteem in this population, as noted above.

Indeed, it could be examined based on the ecological system of the complexity of TC that TC practicing could induce the mind-body interpenetration based on incorporating and uniting principles of slow intentional movements, often coordinated with breathing, and meditation. The “mind” component of TC includes a number of interrelated aspects that may each confer therapeutic value. One central concept of TC is concentration or focus, whereby the mind becomes unified in its purpose for an extended period of time. This focused attention can be directed to one’s own body as well as to the external environment. A typical TC phrase that exemplifies this principle is: “Cleanse your mind and concentrate on the slowness and evenness of your movements” (Wayne & Kaptchuk, 2008). Characterized as a self-study or self-

evaluation through a series of specific TC forms and personal concentration, attention, mindfulness, and intention were internal developed. In addition, psychosocial interactions could be the better function due to balancing between peaceful psychological and social perception with more relax, thought to bring the personal tranquility and balance internally for healing (Wayne & Kaptchuk, 2008). From those principles, that personal self-evaluation could be improved, individuals could better come to see themselves and to evaluate themselves as they think others see and evaluate them.

Consistently, self-esteem is a self-worth evaluation pass through several processes that were identified as important to the development of self-esteem in general: reflected appraisals, social comparisons, and self-attributions (Mustian et al., 2004). Due to, TC practice could induce self-esteem as resourceful cognitive functioning (more concentration and intention with problem solving and coping selection), individual stress could be also adjusted (stress neutralization) (Wayne & Kaptchuk, 2008). This suggests that self-esteem plays a critical role in the ability of women living with breast cancer to thrive and go on to live normal lives (Dirksen, 2000; Lee et al., 2001; Pedro, 2001; Servaes et al., 2002). Thus, self-esteem will be included in this study as a psychosocial factor that may be improved by using TCC practice in Thai women living with breast cancer.

2.5.2 Neuroendocrine – Immune: Cortisol level

Two reviews included studies about the relationship between TC and some stress responses. Li and colleagues (2001) included a study by Jin (1989) in which individuals with more than one year of TC experience were compared to those who had less than eight months of TC experience. The investigators found that those who had been doing TC for at least one year showed decrease salivary cortisol following TC when compared to those who were beginning practitioners. Wang and colleagues (2004) included a paper by Jin (1992) in which older adults were randomly assigned to TC, brisk walking, meditation, or reading. Cortisol levels in all four groups dropped and there were no significant differences between groups.

Indeed, several previous studies supported that TC practice could reduce cortisol level in various population (Jin, 1989; Jin, 1992; Li et al., 2001; Sandlund &

Norlandar, 2000; Wang et al., 2004). It could be examined that TC practice could reduce psychosocial stress stimulus in the same effects of stress management and relaxation technique. While TC practicing, TC practitioner would be in peaceful movement, relax, and mindfulness-raise; therefore, stress stimulus would be decreasingly stimulated the HPA-axis. As a result, cortisol level after TC practicing would be reduced. Indeed, a typical TC phrase that exemplifies this principle is: "Cleanse your mind and concentrate on the slowness and evenness of your movements" (Wayne & Kaptchuk, 2008). In addition, efficient breathing is another central focus of many TC practicing systems, and breath is often directly associated with the concept of cultivation of *qi*: "The inhalation and exhalation are long and deep and the *qi* sinks to the *dan tian*" (*dan tian* means "cinnabar fields" and is located slightly beneath and behind the navel) (Wayne & Kaptchuk, 2008). While TC practicing, TC practitioner will be in peaceful movement, relax, and mindfulness-raise; therefore, stress stimulus will be decreasingly stimulated the HPA-axis. As a result, cortisol level after TC practicing will be reduced.

Beneficially, the reduction of cortisol level could be more positive effects on human health. For instance, decreasing of cortisol level, as stress hormone, could reduce causes of the depression of proinflammatory cytokine in human (Platanias, 2005). A weekly cortisol level could be negative related to immune status (white blood cell count: WBC) (p=0.002) which could be sustained until the 2nd week (p= 0.89) in depressive patients (Deutsh et al., 2007). In addition, a lower cortisol concentration in women with metastatic breast cancer was associated with the greater quality of social support which is the indicator of healthier neuroendocrine functioning (Turner-Cobb et al., 2000). Cortisol level has been demonstrated as a neuroendocrine-immune marker resulting in individual health adaptation to illness and treatment. Thus, cortisol level was included in this study as physiologic factor that may be improved by TC practicing in Thai women living with breast cancer.

2.5.3 Behavioral co-morbidities: Fatigue

Indeed, several previous studies supported that TC practice could reduce fatigue symptom (Galantino et al., 2003; Galatino et al., 2005; Mustain et al., 2004). Indeed, fatigue could be developed by two processes: physiological and psychological

tract; consistently, fatigue in cancer patients is from cancer itself, treatment, and psychological distress. Moreover, cancer patients who living with maladaptation of energy sources such as low nutrition, sedentary life-style, and stressful mind, they then were worse fatigue (Olson et al., 2008). It could be examined that TC practicing may potential affect on both physiological tract and psychological tract in the same time. TC practicing would reduce stress stimulus affecting to the HPA as relaxation technique and alteration in pro-inflammatory cytokine then decreasingly response. Meantime, higher individual aerobic capacity and physical strength by TC practicing would benefit to adaptation of energy sources; as a result, individual fatigue was improved.

Beneficially, the reduction of fatigue symptom could be more positive effects on human health. Indeed, psychosocial stress could affect to the Central Nervous System (CNS) which affects to the endocrine system via the pituitary gland, the controlling hormone secretion. After that the endocrine system modulated the immune system through the hormone secreted by the pituitary and adrenal glands. This hypothalamus-pituitary-adrenal axis (HPA-axis) play as central role, as immune cell are equipped with the receptors for HPA molecules, and are altered in number, function, and distribution as a result of the hormones secreted. Through the autonomic nervous system, the nervous system also has direct effects on the immune system via the thymus gland, the spleen, and bone marrow. Cytokines (communication molecules of the immune system), are secreted by immune system cells and are one of the components that fight foreign invaders, regulate the production of immune cells and also impact the central nervous system and the HPA axis. Cytokines also drive our physiological “illness response”, affecting our mood, fever, eating, and sleeping patterns, along with other associated behaviours. For instance, several previous studies were supported that fatigue in cancer survivors associated with lower self-esteem and lower self-efficacy (Servaes et al., 2002) and alteration in proinflammatory cytokine response and define a prognosis biomarker of behavioral fatigue (Aouizerat et al., 2009; Collado-Hidalgo et al., 2006; Miller et al., 2008). Consistently, individuals with primary breast cancer who were fatigued had greater cytokines (Bower et al., 2002), chronic cellular immune response (Bower et al., 2003) and flatter cortisol response to

stress (Bower et al., 2005). Hence, fatigue was included in this study as synergistic outcome by TC practicing in Thai women living with breast cancer.

2.5.4 Health: QOL

Generally, QOL consists of a number of domains including physical well-being, functional well-being, and emotional/psychological well-being, and spiritual well-being. There are many different phases of cancer treatment and survival which present unique issues related to QOL. Survival, for example, is unique period that can cause physical and psychosocial problems that adversely affect to QOL (Andersen, 2002; Ganz et al., 1998; Granz et al., 2002; Hewitt et al., 2006; Knobf et al., 2007; Knobf et al., 2008; Miller et al., 2008; Servaes et al., 2002). Logically, an individual living with limited physical resources and psychosocial resources would have negative result in her/his QOL. It has been hypothesized that those individuals living with breast cancer with better physical and psychosocial resources potential tend to have better QOL.

Indeed, several previous studies supported that TC practicing could improve QOL in individuals with cancer (Fisher et al., 2003; Galatino et al., 2005; Lee et al., 2007; Lee et al., 2009; Mansky et al., 2006; Mustain et al., 2004; Wang et al., 2004). It could be assumed that TC practicing may have potential positive affects on both physical resources and psychosocial resources resulting in QOL in individuals with cancer. Firstly, TC practicing will induce lower stress stimulus into the HPA (relaxation and stress management) (Jin, 1989; Jin, 1992; Sandlund & Norlandar, 2000; Wang et al., 2009; Wang et al., 2010) combining with higher self-esteem (Kutner et al., 1997; Lee et al., 2007; Mustain et al., 2004; Sandlund & Norlandar, 2000; Wang et al., 2010) as well as better psychosocial resources. Meantime, TC practicing will induce higher cardio-respiratory function and aerobic capacity (Galantino et al., 2003; Lee et al., 2009; Li et al., 2001; Mansky et al., 2006; Mustain et al., 2006; Sandlund & Norlandar, 2000; Taylor-Pillae & Froelicher, 2004; Wang et al, 2004; Verhagen et al., 2004), higher muscular strength and flexibility/balance (Kuramoto, 2006; Macfarlane, Chou, Cheng, 2005; Mansky et al., 2006; Wang et al., 2004), lower cortisol level (Jin, 1989; Jin, 1992; Sandlund & Norlandar, 2000; Wang et al., 2004), lower fatigue (Galantino et al., 2003; Galatino et al., 2005; Mustain et al.,

2004), better immune function (Irwin et al., 2007; Li et al., 2001; Sandlund & Norlandar, 2000; Wang et al., 2004) as well as better physical resources. Finally, both resources will be synergic affect to QOL in TC practitioners.

In summary, the study indicators consisted of self-esteem, UC level, and fatigue which were expected to effect on QOL, when compared to usual care. For the purposes of this study, the particular psychosocial moderators to be studied include self-esteem was measured by the Rosenberg Self-Esteem (RSE). The marker of neuroendocrine-immune function was measured using UC level. Fatigue was measured by the Fatigue Symptom Inventory (FSI). Finally, the QOL was measured by the Functional Assessment in Cancer Therapy – Breast Cancer (FACT-B) (See figure 3).

In addition, there are a number of potential confounding factors in this study. Stage and age were controlled in the analysis. In addition, substance use and other exercise activities were collected as part of the demographic information, and may be included in the analysis at a later date (Fukuda & Morimoto, 2001a, 2001b; Robinson et al., 2002). All of the questionnaires to be used in this study had been previously translated into Thai language version with acceptable validity and internal reliability.

2.6. The TC programs and women living with breast cancer

TC is an exercise that includes meditation and spiritual uplifting through simple but deep movements that stimulate the body and mind to induce relaxation effect (Chen & Snyder, 1999; Fontaine, 2005; Jancewicz, 2001; Seaward, 2002; Wayne & Kaptchuk, 2008). It has a range of physiological, psychological, and spiritual effects which are found to be beneficial for individuals with cancer at the time of treatment and afterwards (Stevinson et al, 2006). Some studies show the beneficial effects of TC on individuals with cancer, including an influence on disease-free and overall survival in selected populations (Ingram & Visovsky, 2007).

Two systematic reviews of the literature (Lee et al., 2007; Mansky et al., 2006) and four experimental studies (Eom, 2007; Galantino et al., 2003; Mustian et al., 2004; Mustian et al., 2006) have been conducted to evaluate the effects of TC

intervention on the health of individuals with breast cancer. The outcomes of interest that also fit with the PNI model included aerobic capacity, muscle strength, flexibility, fatigue, self-esteem, and QOL.

In the first randomized control trial, Galantino and colleagues (2003) found that women living with breast cancer that completed chemotherapy and radiation therapy and were randomized to receive "Yang" style TC for 6 weeks (60 min; three times weekly) demonstrated improvements in all domains of physical health when compared with the walking exercise. The second randomized control trial by Mustain and colleagues (2004) was conducted in women with breast cancer who completed treatment within the last 30 months and were randomly to receive three times a week for 60 minutes in 12-week of "Yang" style TC intervention or a psychosocial intervention (PST) for improving QOL and self-esteem. The TC group demonstrated significant improvements in both QOL and self-esteem when compared with psychosocial intervention (PST). In the third randomized control trial study, Eom (2007) found that women with breast cancer who completed chemotherapy and were randomized to receive "Yang" style TC for 12 weeks (50 min; one times weekly) demonstrated significant improvements in physical functional, psychosocial adaptation, and QOL when compared with those who received an education program. In the forth randomized control trial Mustain and colleagues (2006) found that women who completed treatment for breast cancer and were randomized to receive "Yang" style TC for 12 weeks (60 min; three times weekly) demonstrated significant improvements in functional capacity, including aerobic capacity, muscular strength, and flexibility, and QOL whereas the PST group showed significant improvement only in flexibility.

The main conclusions of the studies of TC in individuals with breast cancer were that those who received the TC intervention showed improvements in psychosocial status, physical health and QOL (Galantino et al., 2003; Lee et al., 2007; Mustian et al., 2004). TC fits the recommended exercise intensity recommended for individuals who have been treated for breast cancer (Harris et al., 2007; Stevinson et al, 2006). Indeed, the majority of studies show beneficial effects of TC on health outcomes in individuals with breast cancer.

2.7 Gaps in the literature and rationale for the proposed study

Although there is a growing body of literature on the influence of TC on the physical and psychological problems experienced by women with breast cancer, the results were difficult to interpret given the variation in the forms of TC used, the length of time TC was practiced, characteristics of the intervention itself, and the measures used for each of the study variables. In the proposed study, the study variables were carefully selected based on the problems faced by women with breast cancer, the components of the PNI models, and previous studies showing response to TC. Further, where several measures are available for any given variable, the one most sensitive to TC was selected. Last, in terms of the characteristics of the intervention itself, the TC form and the timing of the intervention were based on results from other previous studies. Thus, the proposed study made a significant contribution to knowledge about the benefits of TC for women with breast cancer.

2.8 Summary

A literature review has revealed that at present women with breast cancer have been living with physical and psychosocial health problems after diagnosis, undergoing treatments, and until post treatment completion. The prominent health problems in women with breast cancer post treatment completion are noted as upper body function impairment (UBF), psychosocial health problems, stress responses, poor immunity, fatigue, and QOL. However, regard of women with breast cancer' health and QOL declination has needed to be improved those issues by some therapeutic nursing intervention which can affect to all components in the same time more particularly synergistic impact to both mind and body.

At present, TC is recommended as the mind-body interaction intervention which has high benefits on health both in healthy, elderly and chronic condition people. TC can have effects on the musculoskeletal system, cardiovascular-respiratory system, aerobic capacity, metabolism responses, psychosocial health and stress responses, and other self-perceived health such as self-esteem. Moreover, TC has a high feasibility, safe, economic, and proper moderate intensity of exercise for individuals with breast cancer, particularly those who have had a sedentary life-style.

TCQQ, one kind of TC, is a low-moderate exercise intensity and practical exercise expecting to improve health and QOL as well. Hence, TCQQ program was implemented in this study to determine its effects on health and QOL as a new nursing intervention in Thai women living with breast cancer based on Thai context.

Interestingly, Thai Traditional Medicine (TTM) now is going to show the scientific-based evidence of alternative treatment modalities for the Thai population in both health and illness particularly in those with chronic illness such as cancer. TTM is an alternative treatment which patients are able to use as health promotion, prevention, treatment, and rehabilitation parallel to complementary treatment with the allopathic medicine. TC originated as a Chinese martial art with an emerging history as the best exercise for physical and psychological health. In Thailand, TC has proved its well effects in elderly people but it has never been proved in individuals with breast cancer. Therefore, TC as a new therapeutic nursing intervention is necessary to be studied its effects by experimental research in Thai women living with breast cancer under the TTM supporting policy.

To conclude, the findings of the effects of TCQQ program on health and QOL in Thai women living with breast cancer has yielded a better scientific evidences and new knowledge of TCQQ as the therapeutic nursing intervention. It enables nurses to use more holistic approach in dealing with health problems of Thai women living with breast cancer. In addition, nurses can assist women with breast cancer and their family to develop their capacity and potential to appropriately manage health in accordance with breast cancer disease and its treatments, which in turn enhance both the role and quality of nursing care.

CHAPTER III
METHODOLOGY

The purpose of this study was to determine the effects of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer at the 1st year after treatment completion. The methodology was designed consistency to figure out that propose of this study as described below.

3.1 Research Design

The prospective two-group randomized controlled trial study (RCT) was designed to determine the effects of TCQQ program on self-esteem, UC level, fatigue, and QOL in Thai women living with breast cancer at the 1st year after treatment completion. The TCQQ program was designed through scientific examinations of the PNI model. The primary endpoints in this study were fatigue and QOL. The secondary endpoints were self-esteem and UC level. The study participants were recruited from Siriraj Breast Clinic, Siriraj Hospital, Bangkok, Thailand. Data were collected at three time points prior to the implementation of the program. Data was collected at 6th week and 12th week after implementation.

The study was conducted in three phase. 1) Pre-implementation program phase (baseline: T_1) measures of self-esteem, UC level, fatigue, and QOL were obtained. 2) The implementing program phase (the 6th week: T_2), TCQQ program was given continuously by the experienced TC trainer (Researcher) and measures of self-esteem, UC level, fatigue, and QOL were obtained. 3) The implemented program phase (the 12th week: T_3) measures of self-esteem, UC level, fatigue, and QOL were obtained and its feasibility was assessed. The research design was demonstrated as figure below (See figure 3.5)

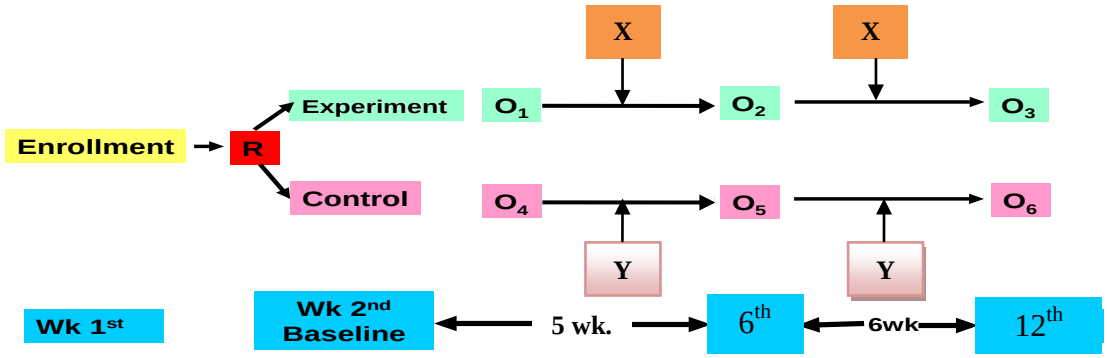


Figure 3.5 The prospective two-group randomized controlled trial design (RCT)

R	: Random assignment of the participants who me t inclusion criteria for the study
Experiment (X)	: Participants received the basic knowledge about TCQQ program and TCQQ training once a week
Control (Y)	: Participants received the usual care
Observe (O)	: An evaluation of self-esteem, UC level, fatigue, and QOL both in experiment and control groups
O_1, O_4	: Baseline data evaluation (2^{nd} week) (1, 4)
O_2, O_5	: the 6^{th} week data evaluation (2, 5)
O_3, O_6	: the 12^{th} week data evaluation at the end of the study (3, 6)

3.2 Population and Sampling

The population in this study was Thai women living with breast cancer who completed all cancer treatment at least 1 year. The samples were those Thai women living with breast cancer who came for a follow-up visit at the Siriraj Breast Clinic, Siriraj Hospital, Bangkok, Thailand.

Inclusion criteria:

1) First diagnosis with stage 0–IIIb breast cancer (use TNM staging)

2) Treatment completion at least 1 year

3) No physical limitations prohibiting any low to moderate exercise

4) No clinical diagnoses of mental disorders, as defined by the use of psychotropic drugs and self-report.

5) Communicative accessibility and able to be connected by telephone

6) Ability to read, writes, and speaks in Thai language

7) Willingness to participate in the study program

Exclusion criteria:

1) Thai women living with breast cancer with concurrently breast cancer complications such as arm swelling/arm-lymphedema, arm pain, infection, or seroma that prohibited to any low to moderate exercise which evaluated by medical history and/or physician diagnosis

3.3 Sample Size

The appropriate sample size for this prospective two-group RCT design was calculated using sample size estimation of 12 cases per group rule of thumb which justification was based on formal power analysis (Julious, 2005). Two significant reasons for justifying this sample size were given based on: feasibility and gains in the precision about the mean or variance. Firstly, feasibility in this design of a parallel group trial a sample size of 12 cases per group was round off number and so facilities for the three – period cross over trial measures which need a sample size that is a divisible by 3. Lastly, in sample size calculation, for the parallel group trial by both mean and variance, it was found that after a sample size of 12 cases the gains in decision become less pronounced.

As the study participants were evaluated for the outcome changes at 6^{th} week and 12^{th} week, participants drop-out might reduce the power of randomization and threat to the external validly of the study. Since there was a previous study that similar had been conducted, data required to calculate the sample size were gained from a similar study. One previous meta-analysis study reported that the attrition rate of a 12-week TC program in individuals with breast cancer in the US (Taylor-Piliae & Froelicher, 2004) was estimated of 17%; therefore, the additional sample size was 3 cases in this study (≈ 25%). Summarizing, the sample size in each group was 15 cases (Totally cases = 30 cases).

3.4 Setting

The Siriraj Breast Clinic at Siriraj Hospital, Faculty of Medicine, Mahidol University is one of the well-known tertiary cares in Thailand and it is selected to recruit the prospective study participants. Two significant reasons for justifying this setting are given based on: feasibility and gains in the precision about homogeneity of population. Selection of only one breast clinic in this study is due to the researcher's concern about threats to internal validity that might be found because of demographic variety. This newly Siriraj Breast Clinic has been established on January 17th, 2011 at the 7th floor Prasripajarindhra Building, Siriraj Hospital, Bangkok, Thailand. Due to the fact that Bangkok is the capital city of Thailand, numbers of breast cancer clinics are established in various areas of Bangkok as health care resources for individuals with breast cancer. Thai women living with breast cancer who visited to this clinic came from both urban and rural area around Thailand, anyways they have similar characteristic of treatment and health care services. They seem to be representative of women living with breast cancer in Thailand. In addition, the Siriraj Breast Clinic provides a sustained supportive environment for both initial and long-term care. The major goal of the Siriraj Breast Clinic is a one-stop service unit which is suitable to develop a holistic health promotion and continuing care for women living with breast cancer in Thailand.

In Siriraj Hospital which is a university hospital in Bangkok, Thailand, breast cancer was approximately 13.67% that also the first ranked of all new cancer cases and it is specifically 25.79% in Thai woman with cancer cases (Siriraj Cancer Center, 2008). About 95% of the newly diagnosed Thai women living with breast cancer have still received surgery as the first line of treatment. The Siriraj Breast Clinic provides services to about 2,000 Thai women living with breast cancer, and approximately 50-100 Thai women living with breast cancer per day (Siriraj Cancer Center, 2008). Key health care providers who run this Siriraj Breast Clinic are 7 oncology surgeons, 1 advanced practiced nurse (APN), 6 register nurses (RN) and 10 practical nurses (PN). The Siriraj Breast Clinic is a one-stop unit aiming to provide continuity care in Thai women living with breast cancer both out-patient department service (OPD service) and follow-up service. It also provides all information about screening and investigation, procedure, pre-post treatment care, symptom and

complications. Furthermore, medical telephone consultation is available during office hours between 07.00 AM to 04.00 P.M. Monday to Friday when the Siriraj Breast Clinic staff is usually available.

Appointment of all Thai women living with breast cancer in Siriraj Hospital is only set at Siriraj Breast Clinic. A tentative schedule for follow-up in Thai women living with breast cancer is almost the same in every case as demonstrated below (See table 3.1).

Table 3.1 A tentative schedule for follow-up in Thai women living with breast cancer at Siriraj Hospital.

Treatment/ Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Surgery	weekly	monthly					3 months			3 months		
Chemotherapy		8^{th} day and 21^{st} day monthly (6-8 months)										
Radiation		Once a week until Radiation completion										
Survivors		3 month, 6 month, or annually										

3.5 Instrumentations

Two sets of research instruments were used in this study consisting of the instruments for data collection (See appendix D) and TCQQ program (See appendix E). The first set encompassed three parts consisting of the personal case record form (P-CRF) (the demographic information form and medical-related information form), the main research outcome measures (the RSE, UC level, the FSI, the FACT-B). The second set encompassed two parts consisting of TCQQ program equipment and TCQQ program procedure. All of the psycho-behavioral measures were chosen for the theoretical relevance, good psychometric properties, and standard use in other likely intervention studies as described below.

3.5.1. Instruments for data collection

Instruments for data collection in this study were divided into three parts (See appendix D). The first part was the personal case record form (P-CRF) was developed by the researcher consisting of demographic information form and medical-related information form. The second part was the instruments using to evaluate expected outcomes in this study consisting of the RSE, UC level, the FSI, and the FACT-B. Average time to finish those all research instruments were approximately 15-30 minutes. The detail information about all research instruments were discussed below.

3.5.1.1 Part I: Personal Case Record Form (P-CRF)

3.5.1.1.1. The demographic information form was developed to obtain all relevant basic information including currently address, age, height, weight, body mass index (BMI), education, occupation, income, marital status, caregiver type, health care payment, accommodation, exercise preferable, history of exercise and type of exercise, other complimentary and alternative medicine, and caffeine consumption (See appendix D). This demographic information form was 15 items combining of open-ended items and multiple choice items. Participants were asked to provide all demographic information accurately by research assistants based on participants' currently status and their willingness. Time to finish this form was about 3-5 minutes.

3.5.1.1.2 Medical-related information form was developed to collect all relevant medical-related information consisting of diagnosis, staging, date of diagnosis, treatments (surgery, chemotherapy, radiation, hormone therapy, other treatments), lymph-node status, ER/PR status, complications, co-morbidity and its treatment, menopausal status, infection history, vital sign record, and UC level record (See appendix D). This medical-related information form was 10 items combining of open-ended items, multiple choice items, and table record. Both hospital file recording and individual interviewing were applied to collect that information accurately by research assistants based on participants' currently status and their willingness. Time to finish this form was about 3-5 minutes.

3.5.1.2 Part II Research outcome measures

The following research outcome measures were used to evaluate the effects of TCQQ program on self-esteem (the RSE), UC level, fatigue (the FSI), and QOL (the FACT-B) in Thai women living with breast cancer (See appendix D). The details and information about these research measurements were more discussed below.

3.5.1.2.1 The Rosenberg Self-Esteem Scale (the RSE)

The RSE was used for assessing self-esteem in Thai women living with breast cancer in this study, the RSE commonly used in individuals with cancer (Bertero, 2002; Mustian et al., 2004). The RSE was originally introduced by Rosenberg in 1965. Based on a sample of 5,024 healthy adolescents, it was reported a reproducibility coefficient of 0.92 and scalability coefficient of 0.72. Mustian and colleagues (2004) consistently reported a Cronbach's alpha of 0.76 in their currently study of a 12-week TC program for the US women living with breast cancer. Several previous studies had been conducted to establish the validity and reliability of the RSE, and researchers had found that the RSE factor structure was dependent on age (Davis, Kellett, Beail, & Turk, 2009). Specifically, they were also founded that the factor analysis of the adolescent data set yielded a uni-dimensional scale, while factor analysis of an adult data set yielded a two-dimensional result. This point underscores the importance of including age in any studies of self-esteem.

The RSE is a 10-item questionnaire; 4-point response version of the RSE was used to evaluate global self-esteem, which refers to an overall sense of personal worth. The RSE used a Likert-scale ranging from 0 to 3 (strongly agree, agree, neutral, disagree, and strongly disagree, respectively).The total score was computed by summary score. Since questions 1, 2, 4, 6, and 7 are five positively worded items and questions 3, 5, 8, 9, and 10 are five negatively worded items, with a dichotomous scoring system, these items must be reverse scored for all analyses. Scores range from 0 and 30, with higher scores corresponding to higher self-esteem. Time to finish this questionnaire might be about 3-5 minutes.

The RSE had already been used in several previous studies in Thai population. A translated Thai version was also tested and demonstrated

a Cronbach's alpha of 0.67 in a samples of Thai juvenile delinquents (Thangjitpukdeesa- kul, 2002). A previous study in Thai baccalaureate nursing students reported a Cronbach's alpha 0.85 (Ross, Zeller, Srisaeng, Yimmee, Somchid, & Sawatphanit, 2005). Interestingly, in a previous study comparing samples of female undergraduate students in Thailand and those in the US, the investigators concluded that the differences in culture between the two groups of students did not affect scores on the RSE (Beeber, Seeherunwong, Schwartz, Funk, and Vongsirimas, 2007). In the same study, the Cronbach's alpha of the Thai version of RSE was 0.79 compared to 0.86 of the English version. In another previous study, the investigators using a cross-sectional correlation research design, reported that the Cronbach's alpha of the Thai version of RSE ranged from 0.77 to 0.88, and the overall consistency for the study was 0.78 (Vongsirimas, Sittihmongkol, Beeber, Wiratchai, & Sangon, 2009). These findings had indicated good construct validity and reliability of the RSE for was used as a measure in this study.

3.5.1.2.2 Urine cortisol level (UC level)

Because of well-known immunosuppressive effects of cortico-steroids, most of the effects of stress on immunity have tentatively been related to the increased release of cortisol or corticosterone. Cortisol level is the biological marker of stress as well as stress hormone that has previously been used in studies of individuals with cancer (Bower, Ganz, & Aziz, 2005b; Hellhammer, Wust, & Kudieka, 2009; Porter, Mishel, Neelon, Belyea, Pisano, & Soo, 2003; Wedekind, Bandelow, Broocks, Hajak, Rüther, 2000). Cortisol level is the primary stress hormone secreted from the adrenal glands and it is largely responsible for the down regulation of immune function as a result of stress (Hellhammer et al., 2009; Wedekind et al., 2000).

There is a high correlation between unbound free cortisol levels in serum, urine, and salivary which remains high during the circadian cycle and under different dynamic tests, such as (dexamethasone suppression and ACTH stimulation (Hellhammer et al., 2009). Since free cortisol level represents the biologically active hormone fraction, urine cortisol (UC) measures have been considered to be an optimal measure of adrenocortical function more than serum cortisol (Hellhammer et al., 2009). The relationship between the cortisol concentration

in serum and urine was non-linear (Aardal-Eriksson, Karlberg, & Holm, 1998). However, another previous study reported that longitudinal correlation (24-hours) between log-serum cortisol and log-urine cortisol ranged from 0.81 to 0.96 (median = 0.91) (Dorn, Lucke, Loucks, & Berga, 2007). Indeed, cortisol is routinely used as a biomarker of psychological stress and related mental or physical disease, although the psychological mechanisms which trigger the HPA axis can only indirectly be assessed by salivary cortisol and UC level. The different mechanisms that control the HPA axis reactivity (hippocampus, hypothalamus, pituitary, adrenals) and their respective modulators, receptors, and binding proteins, may all affect UC level. In conclusion, UC level is considered a suitable noninvasive alternative to blood collection for the assessment of cortisol level in this study.

3.5.1.2.3 The Fatigue Symptom Inventory (the FSI)

The definition of fatigue in cancer patients influenced the way in which it should be measured. A definition of fatigue proposed by Cella and colleagues in 1998 is “a subjective state of overwhelming and sustained exhaustion and decrease capacity for physical and mental work that is not relived by rest”. There is general agreement that fatigue is defined as a subjective and multidimensional and that assessment requires the use of a self-report method (Jacobsen et al., 2004). With regard to assessment, three features are worthy of note. The assessment method must distinguish fatigue from the normal state of tiredness, must be sensitive to increases in perceived fatigue, and must consider the multidimensional nature of fatigue.

Three systematic reviews noted that the choice of the fatigue scale should be made based on the time frame over which individuals were asked to consider their fatigue level, the psychometric properties of the scale, and the correspondence between the various multidimensional measurements available and the research questions being asking (Jean-Pierre et al., 2007; Minton & Stone, 2009). One important issue is whether or not the individuals to be assessed are currently experiencing fatigue symptom. The main conclusions from the above systematic reviews were that the FSI is suitable for use with individuals who may or may not currently be facing fatigue but who have been experiencing fatigue in the past week

(Hann, Denniston, & Baker, 2000; Jacobsen et al., 2004; Jean-Pierre et al., 2007; http://www.rtog. org). In addition, the FSI also offers the unique opportunity to assess fatigue intensity and duration, and interference of fatigue (severity and chronicity) with various aspects of QOL (Hann et al., 1998; Hann et al., 2000).

In choosing a measurement, the researcher concerned the psychometric properties of the tools available. The validity and reliability of the FSI in a number of studies of breast cancer patients were found to be at an acceptable level. The FSI was first developed with women undergoing treatment for breast cancer, women who had completed treatment for breast cancer, and men with no history of cancer. The Cronbach's alpha in this sample ranged from 0.93 to 0.95, and test-retest reliability for the FSI in cancer patients undergoing treatment yielded moderately strength of correlations ranging from 0.35-0.75 (Hann et al., 1998; Minton & Stone, 2009; http://www.rtog.org). Responsiveness with clinically significant changed overtime and between group differences for treatment-related interventions had been demonstrated by the FSI between pre- and post-treatment fatigue level (Minton & Stone, 2009; http://www.rtog.org). Unfortunately, the FSI included only the physical and mental dimensions of fatigue (not the cognitive dimension) (Minton & Stone, 2009), but it was still the most suitable assessment tool for this study.

The FSI is a 14-item measure that assesses the severity, frequency, and diurnal variation of fatigue, as well as its perceived interference QOL (http://www.rtog.org). Severity was measured using four separate items that assessed most, least, and average fatigue in the past week as well as current fatigue. Frequency was measured using two separate items that assessed the number of days in the past week that respondents felt fatigue as well as the portion of each day on average they felt fatigued. Diurnal variation was measured using a single item that provides descriptive information about daily patterns of fatigue. Perceived interference was measured using seven separate items that assessed the degree to which fatigue in the past week was judged to interfere with general level of activity, ability to bath and dressing, normal work activity, ability to concentrate, relations with others, enjoyment of life, and mood. The interference rating could also be summed to yield a total

interfere score (http://www.rtog.org; Jacobsen, 2004). A higher FSI score indicated higher fatigue.

The FSI had been translated into Thai language version by Buranaruangrote and colleagues (2006) in her master thesis with black translation technique. The internal consistency of the FSI in Thai women with breast cancer undergoing treatment was excellent (Cronbach's alpha = 0.96) (Buranaruangrote et al., 2006; Mamom et al., 2008). The FSI had been selected as the fatigue measure in this study because it fitted well with the focus of the research question on body-mind interaction and was internally consistent. Time to finish this questionnaire was about 3-5 minutes.

3.5.1.2.4 The Functional Assessment of Cancer Therapy–Breast (the FACT-B)

The QOL is essentially subjective in nature, a personal concept, judged from the point of view of the individual (Shimozuma et al., 2002). The appropriate QOL measurement to identify the patient's true needs is a powerful means of realizing the most desirable breast cancer treatment for the patient; particularly, today many studies are underway in the FACT-B. The FACT-B had been tried to reduce floor and ceiling effects by developing individual cancer-specific modules. Based on a systematic review of six questionnaires, the investigators noted that the FACT-B had acceptable psychometric properties in individuals with breast cancer. The main conclusion was that the FACT-B was a good measure of assessing QOL in individuals with breast cancer, because it had good internal consistency (Cronbach's alpha=0.63-0.86), good test-retest reliability (r=0.85-0.88), good construct (correlation with other standard instruments), good responsiveness to change in clinical status, reasonable time for completion, did not require special training for administration, and was easy to score (Okamoto, Shimozuma, Katsumata et al., 2003; Shimozuma et al., 2002; http://www. facit.org).

The FACT-B included 5 well-being subscales: physical, social, emotional, functional, and breast cancer specific. These scales presented a series of statements to the respondent who answered on a 5-point scale of agreement from ''not at all'' to ''very much'', with higher scores indicating better QOL. The FACT-B was a standardized instrument that consists of a 27-item general

cancer concerns scale (the Functional Assessment of Cancer Therapy-General: FACT-G) and a nine-item breast cancer–specific scale (Breast Cancer Subscale). The FACT-B had been translated in many languages, including Thai people. Acceptable reliability of the FACT-B had been reported for the English versions in breast cancer patients with the internal consistency of the Cronbach's alpha range of 0.77-0.91, respectively (Kim et al., 2006). In Thai individuals with breast cancer undergoing treatment, the Cronbach's alpha was above 0.70 in most domains (range 0.48-0.84) (Raetai, Pratheeppawanit, Veerapreeyakul et al., 2005). Thus the FACT-B was used to assess QOL in the proposed study. Time to finish this form was about 10 minutes.

Summarizing, all four research questionnaires: The RSE, the FSI, and the FACT–B were tested their instrumental reliability by pilot testing in a study of 20 Thai women living with breast cancer in one university hospital. A cronbach's alpha coefficient was employed at significant level of 0.05. The table demonstrated variables of interest, instrument and time consuming, previous conbach's alpha coefficient score both in original English version and Thai version (See Table 3.2).

Table 3.2 Summary of the reliability of all research outcome measures of the study

Variable	Instrument/ Time consuming	Cronbach's alpha (Original version) (English)	Cronbach's alpha (Thai version) Previous study	Cronbach's alpha (Thai version) In this study
Self-esteem	The Rosenberg Self-Esteem Scale (the RSE) (3-5 minutes)	0.72-0.74	0.67-0.88	0.576
Fatigue	The Fatigue Symptom Inventory (the FSI) (3-5 minutes)	0.93-0.96	0.96	0.945
Quality of Life (QOL)	The Functional Assessment of Cancer Therapy – Breast (FACT-B) (5-10 minutes)	0.63 – 0.86	0.77-0.91	0.890

3.5.2 TCQQ program

TCQQ program was used in this study consisting of two parts: TCQQ program equipment (TCQQ lesson plan, TCQQ handbook, TCQQ home package DVD, TCQQ poster, and TCQQ exercise diary.) and TCQQ program procedure which described as below (See appendix E).

3.5.2.1 Part I: TCQQ program equipment

3.5.2.1.1 TCQQ program equipment had six components: a TCQQ lesson plan, a TCQQ handbook, a TCQQ home package DVD, a TCQQ poster, and TCQQ exercise diary as described below (See appendix E).

3.5.2.1.2 TCQQ lesson plan was the whole lesson planning for TCQQ program. It consisted of the objectives, benefits, time frame, TCQQ practice activities, TCQQ media, evaluation, and all relevant content of the program. The contents of the TCQQ lesson plan emphasized the TCQQ practice and practical guidelines. This TCQQ lesson plan helped TCQQ trainer (researcher) to conduct and consistent with the objective and goal of the TCQQ program accurately and consistently. (See appendix E).

3.5.2.1.3 A TCQQ handbook was a manual booklet in Thai-version which was prepared by the researcher. It was based on the published scientific literature and the experiences of the researcher and the TC trainers. The contents of the TCQQ handbook book were summarized and emphasized the TCQQ activities and practical guidelines. The content outline of TCQQ hand book was TCQQ basic knowledge, preparation and practical guidelines, and performing pictures (See appendix E).

3.5.2.1.4 A TCQQ home package DVD was a manual DVD in Thai-version which was prepared by researcher and TC trainer. The content of the DVD consisted of the practical guideline and TCQQ performing. The length of DVD was about 30 minutes.

3.5.2.1.5 A TCQQ poster was a static picture poster that demonstrated the TCQQ performing. The content of the poster was performed by researcher. The poster size was about 0.5 X .75 meter^2 (See appendix E).

3.5.2.1.6 A TCQQ exercise diary was a booklet in Thai language version which was designed by the researcher as a daily notebook

recorded about the daily TCQQ practicing. The participants in experimental group had to fill in data about daily TCQQ practicing in detail including duration of each TCQQ practicing time, times and frequency of TCQQ practicing, adverse effect and/or barrier to TCQQ practicing, and such other information as skipping TCQQ practicing in that day. The aim of the TCQQ exercise diary was to monitor and follow-up the progression of TCQQ program and degree of TCQQ practicing of the participants in experimental group (See appendix E).

3.5.2.2 Part II TCQQ program procedure

TCQQ program procedure was prepared by the researcher and handout in Thai language version. The program aimed to provide an overview of TCQQ program comprising of its main objectives, study procedures, time line for expected outcome measures, communication, and connection with researcher, researcher information, and other information necessary for patients. TCQQ program procedure was intended to implement psychosocial and physical improvement and TCQQ skill training. TCQQ exercise intensity was to be at the low-moderate level which means 50-70% of maximum heart rate. TCQQ program was divided into three phases namely warm-up phase, exercise phase, and cool-down phase, similar to other exercise programs. The warm-up phase was designed to extend muscle for 5 minutes. The exercise phase was comprised of TCQQ 18-form and took 45 minutes but could be extended to 50 minutes if there would be no adverse effects. The cool down phase was done by gradually decreasing the exercise step to normal over 5 minute. The overall time of TCQQ program was about 60-70 minutes. All procedures both in the experimental and the control group were demonstrated as below (See table 3.3).

Detailed description of procedures in control group

The participants who were assigned to the control group completed the baseline data (T_1) and received a take-home manual leaflet (the usual care). The researcher made an appointment with the participants at the 6^{th} week (T_2) and the 12^{th} week (T_3) which coincided with the data collection at baseline. The time of the appointments depended on the health status of the participants. The participants completed data collection at the 6^{th} week (T_2) and 12^{th} week (T_3) on the day of researcher's appointment, Telephone contact was made with the control group once a

week to monitor their usual care activities. Participants in control group did their exercise independently at home at least 2 times in each week. (See table 3.3).

Table 3.3 TCQQ program procedures for experimental and control group focusing on the TCQQ program and the usual care.

Week	Experimental Group	Control Group	Noted
1st	- Establishing relationship and trust - Introduction among group members - Brief discussion about TCQQ program as an approach to mind and body program	- Establishing relationship and trust - Introduction among group members - Usual care: advise and take home leaflet	
- 1st Data collection (baseline)			
1st	- Practice TCQQ (60 minutes) : 1st – 6th form	- Practice as advised in usual care	A weekly telephone call to monitor both groups to adhere with their practice guideline
2nd	- Practice TCQQ (60 minutes) : 7th – 12th form - Review practice TCQQ : 1st – 6th form - Practice all TCQQ : 1st – 12th form		
3rd	- Practice TCQQ (60 minutes) : 13th – 18th form - Review practice TCQQ : 1st – 12th form - All practice TCQQ : 1st – 18th form		
4th–6th	- Practice TCQQ (60 minutes) : 1st – 18th form		
- 2nd Data collection (30 minutes)			
7th–12th	- Practice TCQQ (60 minutes) : 1st – 18th form - Group Termination and any necessary review	- Practice as advised in usual care - Group Termination and any necessary review	A weekly telephone call to monitor both groups to adhere with their practice guideline
3rd Data collection (30 minutes)			
Program Termination			

Detailed description of procedures in the experimental group

After completing data collection at baseline, participants were initiated to TCQQ program by the researcher. Participants received the same take-home manual and exercise leaflet as those in “the usual care” group but also began TCQQ program at the Siriraj Breast Clinic, Siriraj Hospital. TCQQ program consisted of initial training and then a weekly class at the Siriraj breast clinic. Twelve 60-minute classes were taught by a TCQQ trainer (researcher). Each 60-minute session began and ended with a five minute warm up/cool down, including a standard flexibility regime to minimize the risk of injury. After the warm up was followed by 40-50 minutes of TCQQ exercises, using TCQQ 18-form (See table 3.4). TCQQ program began with exercises that had an intensity level set initially at 30% of maximum heart rate and progress gradually over 12 weeks to 55% of maximum heart rate, as improvement to undertake. TCQQ program occurred. Additionally, each participant was asked to practice the TCQQ program twice-weekly independently at her home; the researcher called once a week to monitor the home-based component of TCQQ program. Participants were provided with the exercise diary in which the dates of times for their TCQQ classes were listed. The exercise diary also included a place for them to indicate whether they did their TCQQ exercises independently at home at least 2 times in each week.

Table 3.4 TCQQ program consisting of TCQQ 18 forms

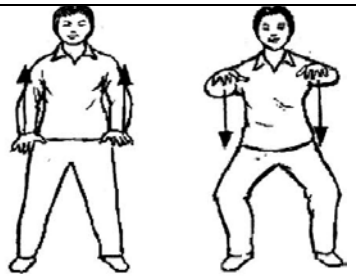
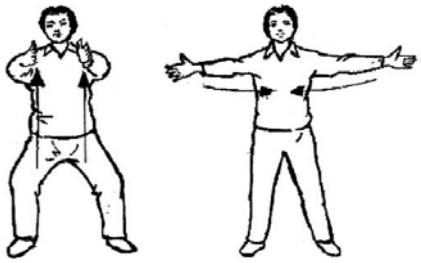
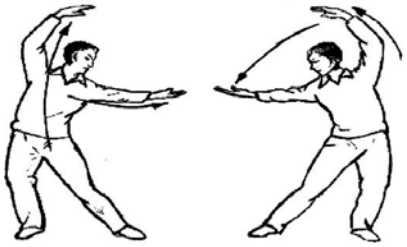
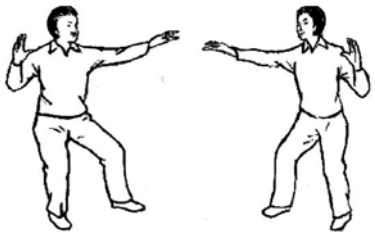
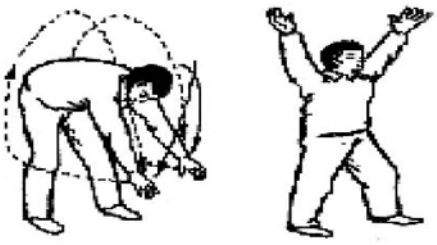
Name	Picture
1. Starting position	
2. Opening the chest	
3. Rainbow dance	
4. Separating cloud by wheeling arm	
5. Rolling arm	
6. Rowing the boat in the center of the lake	

Table 3.4 TCQQ program consisting of TCQQ 18 forms (cont.)

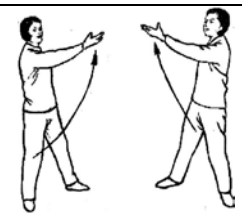
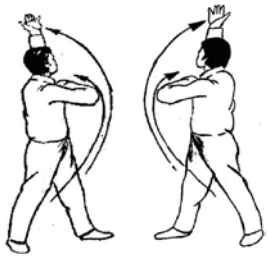
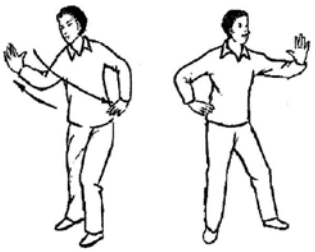
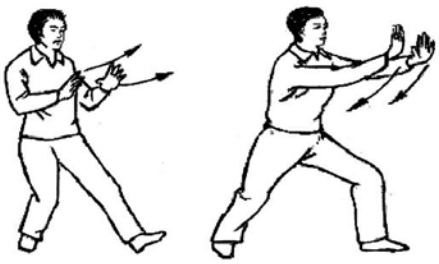
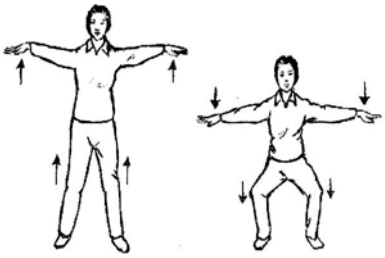
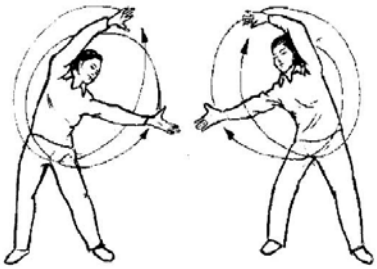
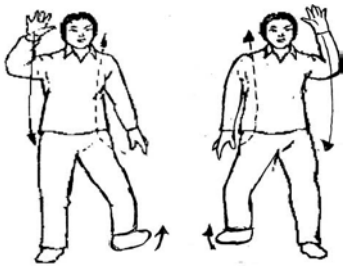
Name	Picture
7. Lifting the ball in front of the shoulder	
8. Looking at the moon by turning of the body	
9. Pushing palm	
10. Cloud hand in horse stand	
11. Scooping the sea	
12. Pushing wave	

Table 3.4 TCQQ program consisting of TCQQ 18 forms (cont.)

Name	Picture
13. Flying pigeon	
14. Punching in horse stand	
15. Flying wild goose	
16. Rotating wheel in the circle	
17. Marching bouncing ball	
18. Shou Gong	

Three expert panels consisting of one psychologist (Physician), one physical therapist, and one advanced practice nurse (oncology APN) were asked to do content validity of TCQQ program including all research instruments, to ensure that they were clearly presented and understandable content. Following any recommended changes and prior to the onset of the study, five breast cancer survivors were asked to review the same information and to comment on any areas requiring clarification (See appendix A).

A follow-up telephone call and telephone question guide

After TCQQ program initiation, both groups received a follow-up telephone call from the researcher, once a week. The telephone question guide was also developed by researcher consisting 8 items (See appendix D). The content of the telephone question guide contained about doing exercise practice or not, practicing frequency, practicing place, practicing time, practicing partner, practicing performance, other practicing effects, and barrier and problem of practicing. The weekly telephone call to patients was used to motivate participants in the control group to do described in the patient practice guideline (usual care), and to motivate the participants in the experimental group to do describe in the patient practice guideline (usual care) and TCQQ program. The telephone call was also providing an opportunity to identify any complications, problems, or difficulties related to treatment or, in the case of the experimental group, TCQQ program, so that these matters could be resolved.

3.6 Research assistant selection and preparation

A research assistant was selected from experienced RN with at least three years of experience in the head, neck, and breast surgical oncology ward, Siriraj hospital, Mahidol University, Bangkok, Thailand. Research assistant had worked both with the experimental group and the control group. Research assistant had already received training by researcher in how to administer all study measures. These measures included: the RSE, the FSI, and the FACT–B, and the research assistant also collected a 24-hour urine for the UC testing. Following the training, the research assistant completed a trial during data collection from 30 participants continuously.

The agreement between the research assistant's scoring results and those of the researcher was calculated using kappa and it was 0.95. The value of kappa was more than 0.80; it was in an acceptable value.

3.7 Data collection

The study initiated after receiving formal permission letter of Siriraj Institutional Review Board approval (SIRB) by the Human Research Protection Units, Faculty of Medicine, Mahidol University (See appendix B) and had already finished training of the research assistants as outlined above. The procedures for data collection were as follows.

1) The researcher screened the files of Thai women living with breast cancer in the Siriraj Breast Clinic, which was the out-patient department clinic (OPD) at Siriraj Hospital, and made a list of potential eligible participants. Potential eligible participants were selected randomly using a simple randomized table, which was kept confidential by the researcher only.

2) Thai women living with breast cancer were given an information sheet by the researcher during their hospital clinic waiting time. Generally, most of Thai women living with breast cancer arrived at the clinic at least 2 hours before their exactly appointment time. Thai women living with breast cancer who willingness participated in this trial were interviewed by the researcher to check the eligible inclusion criteria. If they met all of the inclusion criteria, the researcher asked them to sign the consent form, and obtained some basic information such as their home address and/or a convenient phone number and made the next appointment to begin the study.

3) Prior to the study, each eligible participant was randomly assigned into the experimental or control group using a randomization table, which was kept confidential by the researcher only.

4) The researcher arranged to meet the participants on the day that they visited to the Siriraj Breast Clinic at Siriraj Hospital. Routinely, the participants were informed about the information of the study and the appointment was scheduled once a week which was concurrent with their outpatient clinic visit.

5) At the first week of appointment on the scheduled follow-up date, participants who were randomized into the control group receiving the usual care, which was a leaflet flyer with advice about practice guideline after breast cancer treatment completion. The participants in the control group were advised that they might obtain TCQQ program through the research team after the study was over, if they wished. Meantime, participants who were randomized into the experimental group receiving the leaflet flyer about practice guideline after breast cancer treatment completion and had participated in their first TCQQ program session.

6) The research assistant made an appointment with each participant for three times of data collection, which was at the 2^{nd} week (the baseline data), at 6^{th} week, and 12^{th} week after program implementation.

7) The routine clinic staff provided the standard care flyer to all participants in the control group and experimental group. Meantime, the researcher introduced the participants in the experimental group to TCQQ program. The TCQQ trainer (researcher) instructed and demonstrated the participants how to perform the TCQQ practicing accurately at their home at least two times per week, and asked them to practicing TCQQ at hospital once a week.

8) All data analyses were conducted by the researcher. All collected data were kept confidentiality and reviewed only by the researcher and members of the researcher's supervisory committee.

3.8 Controlling of threats to Internal Validity

In this study, the selection bias was already controlled by randomly assignment of participants into the experimental and control groups. The demographic characteristics of two groups were compared by using the *Chi-square* test (nominal and ordinal scale) and the *t*-test (interval and ratio scale) to ensure that the groups are equivalent. In this way, improvements in the experimental group relative to the control group could be attributed to TCQQ program rather than some other cause.

Pre-and post-program data were collected by the research assistant that was blinded which the participants group, in order to avoid measuring biases. Additionally, the instruments of this study had been already tested their qualities;

reliability and validity and were not changed along the study. As a prospective study which took place over the 12 week period continuously, some participants in the control and experimental groups might not fully complete in providing data or drop out of TCQQ program. As a result, the sample size had been already increased slightly, based on the work of others, to ensure sufficient power for the planned data analyses.

3.9 Protection of Human Subjects

The research proposal was submitted to Siriraj Institutional Review Board approval (SIRB) by the Human Research Protection Units, Faculty of Medicine, Mahidol University for a permission letter (See appendix B). The participants were informed about the study objectives and their participation was voluntary and only those who had signed the consent form would be enrolled to the study (See appendix C). Furthermore, the participants were free to reject or cancel their participation to this study at any time that they preferred. TCQQ program was also provided by only one TCQQ trainer (researcher); in addition, all files, documents, and data had been kept and seen confidentiality by only researcher and the advisor teams. The control group had the opportunity to receive the same program and activities as same as the experimental group if they preferred after the studied program completion. It aimed to protect participants' right as equity care. The study was also monitored by the Siriraj Institutional Review Board (SIRB) until the end of the study continuously.

3.10 Data analysis

Analyses of the results were conducted using the Predictive Analytics Soft Ware Statistics for window version 18 (PASW-18) as described in details below (Cohen & Holliday, 1982; Munro, 2005; Polit & Beck, 2004; Tabachnick & Fidell, 2007).

3.10.1 Data management

Data screening about distort data and missing data was already done firstly. Outliers and extremely cases might create other confusing because the solution could be influenced and sometime distorted by them. In addition transformation of variables to bring them into compliance with requirement of the RM-ANOVA was considered. Finally, perfect or nearly perfect correlations among variables were threatening a multivariate analysis. After that the Repeated-measure Multivariate Analysis Of Variance (RM-ANOVA) procedure was applied which based on their basic assumptions; the fit between data set and their assumptions were also tested.

As covariate, controlling of dependent variable scores at baseline assessment (T_1) was already done and the Repeated-measure Multivariate Analysis of Co-Variance (RM-ANCOVA) was applied as the additional statistic analysis. Possible reasons of this additional statistic analysis, there might have some hidden influent confounding factors which couldn't be excavated because of incomprehensive literature reviews in various and widely resources and unspecified limitation. Nowadays, literatures and knowledge about breast cancer survivors were abundant quantity and varieties dramatically. Anyway, those hidden influent confounding factors might direct or indirect effected to those dependent variables or the studied program. Moreover, unspecified limitations of measurement and personnel case record form (P-CRF) might be also existed. In this study, controlling of dependent variables at baseline assessment (T_1) as covariate were then the possible valid technique aiming to determine the actual effects of TCQQ program in Thai women living with breast cancer at T_2 and T_3.

3.10.2 Basic assumption testing

Underlying of the RM-ANOVA and/or ANCOVA procedure is the basic assumption of multivariate normality which each variable and all linear combinations of variables are normal distributed. All basic assumption testing consisting of normality (by *Levene's* test of equality of error variance), homogeneity of variance-covariance matrices (by *Box's* test of equality of covariance matrices), linearity, and multicollinearity (by *Mauchy's* test of Sphericity) were also in the acceptable values (no statistically significant differences (NS), $p > .05$).

3.10.3 Data analysis

Descriptive statistics using mean, standard deviation (SD.), and number s were employed to describe all basic characteristics of the participants in experiential and control group. The *Chi*-square test and the independent *t*-test were also applied to test the differences of basic characteristics and dependent variables at baseline assessment (T_1) between experimental and control groups.

The RM-ANOVA and/or ANCOVA were then applied to determine differences and change over time of dependent variables: self-esteem (the RSE), UC level, fatigue (the FSI), and QOL (the FACT-B) in Thai women living with breast cancer after TCQQ program implementation. Comparisons of dependent variables between experiment and control groups at the baseline (T_1), the 6^{th} week (T_1), the 12^{th} week (T_1) were already done to test all research hypotheses. The significant level of the hypothesis testing was at .05.

If some basic assumptions of the RM-ANOVA and/or ANCOVA were not met, the Friedman Two-Way Analysis of Variance by Ranks as the nonparametric statistic of RM-ANOVA and/or ANCOVA would be employed to test all research hypotheses. The *Friedman*'s test is a test for two related variables. It could be used in situation such as matched cases, several level of treatment had been administration, more than one matched control group had been used for comparison, and repeated measure for the dependent variable. It can analyze for a magnitude of differences and therefore was considered as one powerful nonparametric statistic (See figure 3.6).

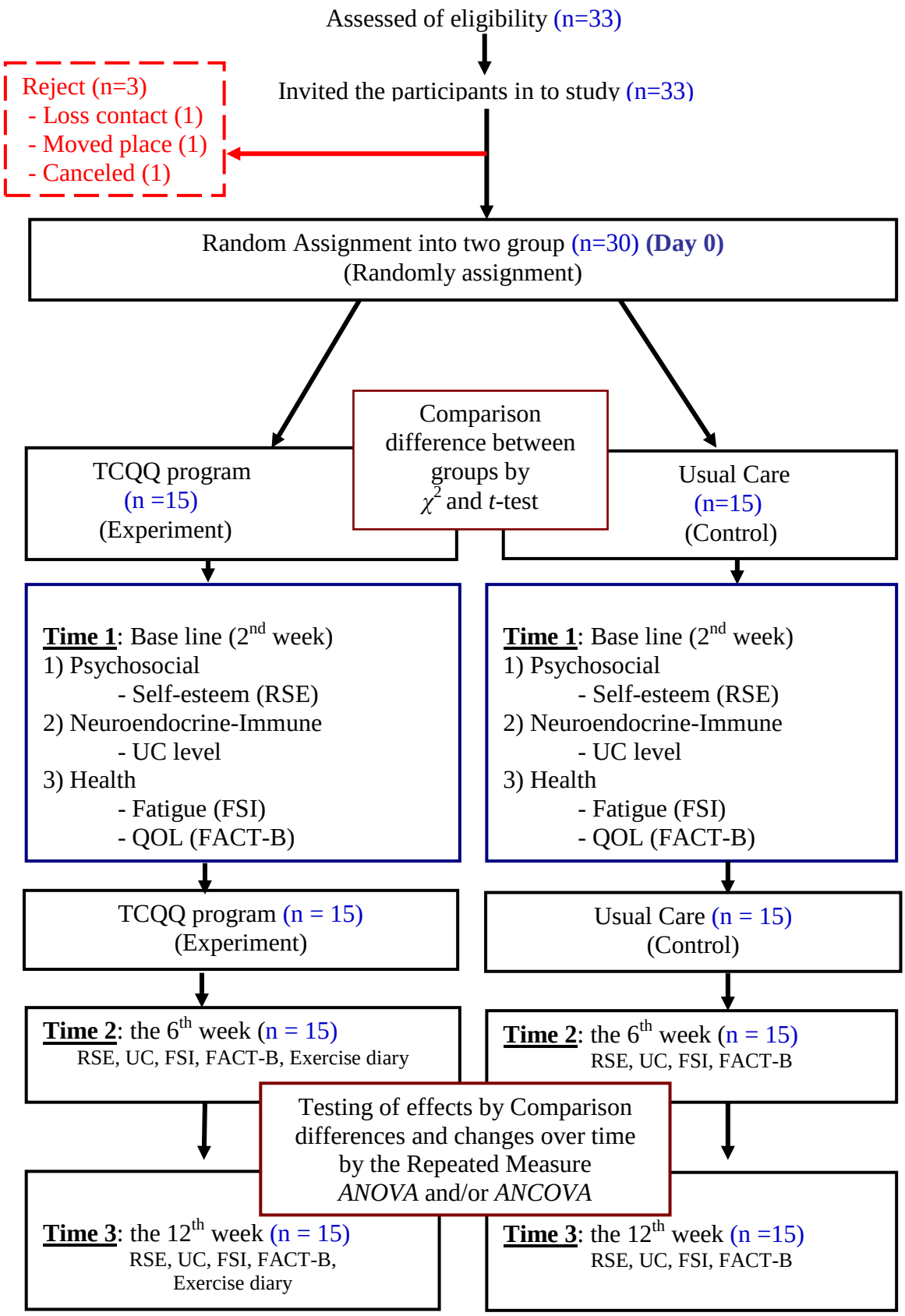


Figure 3.6 Flow diagram of study participants enrollment of TCQQ program in Thai women living with breast cancer (n = 30)

CHAPTER IV
RESULTS

This experimental study aimed to determine the effects of TCQQ program on self-esteem, UC level, fatigue, and QOL in Thai women living with breast cancer. In this chapter, the results were presented into three parts.

4.1 Part I: Demographic characteristics of Thai women living with breast cancer after treatment completion at the first year. This part presented demographic characteristics of thirty participants divided in experimental group (n = 15 cases) and control group (n = 15 cases). Descriptive statistics were used for demographic data, dependent variables, and independent variables in both groups consisting of mean, standard deviation, and number. At base line, demographic data, dependent variables, and independent variables between two groups were done by the independent *t*-test and the *Chi-square* test regarding with data scale itself.

4.2 Part II: All basic assumptions testing of the RM-ANOVA and the RM-ANCOVA. This part presented all required assumptions of the RM-ANOVA and the RM-ANCOVA consisting of normal distribution (the *Shapiro-Wilk's* statistic; n > 50), homogeneity of variance (the *Levene's* tests and the *Box's* tests), and compound symmetry (the *Mauchly's* test of sphericity). These required assumptions of the RM-ANOVA and the RM-ANCOVA were met without statistically significances ($p > .05$), if they were violated, the non-parametric statistics would be employed instead.

4.3 Part III: The effects of TCQQ program on self-esteem (RSE), fatigue (FSI), UC level, and QOL (FACT-B) in Thai women living with breast cancer. This part presented the main study's results regarding with research objectives and hypotheses.

4.1 Part I: Demographic characteristics of Thai women living with breast cancer after treatment completion at the first year.

4.1.1 Demographic characteristics of Thai women living with breast cancer

Selection of the participants, thirty Thai women living with breast cancer meeting the eligible criteria were randomly selected from Thai women with breast cancer who routinely visited after treatment completion at the first year at the Siriraj Breast Clinic, Siriraj Hospital, and Bangkok, Thailand. They then were randomly assigned into experimental group (n = 15) and control group (n=15).

Firstly, descriptive statistics were applied consisting of mean, standard deviation (S.D.), and frequency. Comparisons of those demographic characteristics between two groups at baseline (T_1) were also tested for differences by using the independent *t*-test and the *Chi-square* test depending on data scale itself. All demographic characteristics of thirty participants in two comparison groups consisted of age (years old), weight (kilograms: kg), height (centimeters: cm), body mass index (BMI: kg/cm^2), income (Baht), educational level, occupation, marital status, caregiver type, health care payment, accommodation, exercise favor, had usual exercise, complementary therapy, coffee drinking, stage, surgery, axillary lympnode dissection, chemotherapy, radiation therapy, complication, hormonal therapy, estrogen receptor, progesterone receptor, herneu-2, menstruation and co-morbidity as described in more detail below (Table 4.5- 4.9).

With regarding to age of Thai women living with breast cancer in both groups (Table 4.5), all participants were female with the mean age of 60.73 years old (S.D. = 7.83) in control group and mean age of 57.33 years old (S.D. = 9.56) in experimental group. The youngest age was 44 years old and the oldest age was 74 years old in control group and the youngest age was 35 years old and the oldest age was 67 years old in experimental group. In addition, number of participants in control group who older than 60 years old (10 cases) were more than in experimental group (9 cases) and number of participants in control group who younger than or equal 60 years old (5 cases) were lesser than in experimental group (6 cases). Participants in control group were slightly older than participants in experimental group, however there were no

statistically significant differences between two groups both by mean age (t = -1.06, p = .29) and by age range (χ^2 = .14, p = .70), respectively.

About body size (Table 4.5), mean weight was 58.44 kg (S.D. = 9.46) and mean height was 152.80 cm (S.D. = 5.65) in control group. In control group, the lowest weight was 41.4 Kg and the highest weight was 77.5 Kg and the lowest height was 140 cm and the highest height was 166 cm. In experimental group, mean weight was 57.42 kg (S.D. = 7.49) and mean height was 152.93 cm (S.D. = 4.33). The lowest weight was 46 Kg and the highest weight was 75.5 Kg and the lowest height was 143 cm and the highest height was 159 cm in experimental group. Anyway, there were no statistically significant differences between two groups both by mean weight (t = - .32, p = .74) and by mean height (t = - .07, p = .94), respectively.

In addition, mean BMI was 25.02 kg/cm^2 (S.D. = 3.78) in control group and mean BMI was 24.53 kg/cm^2 (S.D. = 2.76) in experimental group. In control group, the lowest BMI was 17.92 kg/cm^2 and the highest BMI was 32.26 kg/cm^2. In experimental group, the lowest BMI was 19.15 kg/cm^2 and the highest BMI was 29.86 kg/cm^2. Number of participants in control group who had BMI lower than an equal 25 Kg/m^2 (7 cases) were lesser than in experimental group (8 cases) and number of participants in control group who had BMI higher than 25 Kg/m^2 (8 cases) were more than in experimental group (7 cases). Participants in control group were slightly overweight (BMI $\geq$ 25 Kg/m^2) and participants in experimental group were likely in normal weight (BMI < 25 Kg/m^2). However, there were no statistically significant differences between two groups by mean BMI score (t = - .40, p = .68) and BMI range (χ^2 = .13, p =.71), respectively.

About individual income, mean income was 44,233.33 Baht (S.D. = 126,388.13) and 12,733.33 Baht (S.D. = 8,795.02) in the control group and experimental group respectively indicating that participants had very widely range of income. In addition, there was no statistically significant difference between two groups by individual income (t = - .96, p = .34).

In conclusion (Table 4.5), there were no statistically significant differences in those demographic characteristics at baseline (T_1) testing by the independent t-test and the *Chi-square* test (p > .05). It could be concluded that Thai women living with

breast cancer in both groups were similar demographic characteristics of age, body size, and individual income at T_1 before TCQQ program implementation.

Table 4.5 Group differences between Thai women living with breast cancer in control group and experimental group classified by age, BMI, weight, height, and individual income at baseline (T_1) (n = 30)

Characteristics	All (n=30) Mean (SD)	Control (n=15)				Experiment (n=15)				*t*	*p*
		n	Min	Max	Mean (SD)	n	Min	Max	Mean (SD)		
Age (years)	59.03 (8.76)		44	74	60.73 (7.83)		35	67	57.33 (9.56)	-1.06	.29
≤ 60		5				6	χ^2= .14, *df*=1, *p* = .70				
> 60		10				9					
BMI (Kg/m^2)	24.77 (3.26)		17.92	32.26	25.02 (3.78)		19.15	29.86	24.53 (2.76)	-.40	.68
≤ 25.00		7				8	χ^2= .13, *df*=1, *p* =.71				
> 25.00		8				7					
Weight (Kg.)	57.93 (8.40)		41.4	77.5	58.44 (9.46)	46.0	75.5		57.42 (7.49)	-.32	.74
Height (cm.)	152.87 (4.95)		140	166	152.80 (5.65)	143	159		152.93 (4.33)	.07	.94
Income (Baht/month)	28,483.33 (89,473.60)		1,000	500,000	44,233.33 (126,388.13)	1,000	34,000		12,733.33 (8,795.02)	-.96	.34

No Significance, $p > .05$

In Table 4.6, a half of the participants had educated at primary school (n = 15 cases; 10 cases in control group and 5 cases in experimental group). Another half of them had already educated at undergraduate/graduated (n = 8 cases; 4 cases in control group and 4 cases in experimental group) and secondary school (n = 7 cases; 1 cases in

control group and 6 cases in experimental group), respectively. There was no statistically significant difference between two groups by education level (χ^2 = 5.23, p = .70). Most of the participants were worker/trader (n = 14 cases; 9 cases in control group and 5 cases in experimental group). The others were house-wife (n = 10 cases; 4 cases in control group and 6 cases in experimental group) and government officer (n = 6 cases; 2 cases in control group and 4 cases in experimental group), respectively. There was also no statistically significant difference between two groups by occupation (χ^2 = 2.21, p = .33).

Almost a half of participants were couple (n = 14 cases; 6 cases in control group and 8 cases in experimental group). The others were single (n = 8 cases; 5 cases in control group and 3 cases in experimental group) and window/divorce/separate (n = 8 cases; 4 cases in control group and 4 cases in experimental group) in equally cases. There was no statistically significant difference between two groups by marital status (χ^2 = .78, p = .67). For caregivers, the majority of caregivers in each group were their son/daughter (n = 12 cases; 5 cases in control group and 7 cases in experimental group). The second rank of caregivers in each group were their couple (n = 9; 4 cases in control group and 5 cases in experimental group). There was also no statistically significant difference between two groups by caregiver types (χ^2 = 1.77, p = .77).

In terms of methods of medical payment, the majority of participants in this study had mostly paid for their healthcare cost which was sponsored by the government (n = 10; 3 cases in control group and 7 cases in experimental group), self-payment (n = 10; 7 cases in control group and 3 cases in experimental group), and universal coverage (n = 9; 4 cases in control group and 5 cases in experimental group), respectively. There was no statistically significant difference between two groups by health care payment type (χ^2 = 4.31, p = .23). For living arrangement, the majority of participants in each group lived in their own house (n = 27 cases; 13 cases in control group and 14 cases in experimental group). There was also no statistically significant difference between the two groups by accommodation type (χ^2 = .37, p = .54).

Table 4.6 Group differences between Thai women living with breast cancer in control group and experimental group classified by education, occupation, marital status, caregiver, health care payment, and living arrangement at baseline (T_1) (n=30)

Characteristics	Control n (n=15)	Experiment n (n=15)	*Total* (n = 30)	χ^2	*p*-value
Education				5.23	.70
Primary school	10	5	15		
Secondary school	1	6	7		
Undergraduate/Graduate	4	4	8		
Occupation				2.21	.33
Worker/Trader	9	5	14		
Government	2	4	6		
House wives	4	6	10		
Marital Status				.78	.67
Single	5	3	8		
Couple	6	8	14		
Widow/Divorce/Separate	4	4	8		
Caregiver				1.77	.77
None	1	1	2		
Couple	4	5	9		
Son/Daughter	5	7	12		
Grad-Son/Daughter	3	1	4		
Brother/Sister	2	1	3		
Health Care Payment				4.31	.23
Government	3	7	10		
Social Security	1	0	1		
Universal Coverage	4	5	9		
Self-Payment	7	3	10		
Living arrangement				.37	.54
Own/Office house	13	14	27		
Rent house	2	1	3		

No Significance, $p > .05$

In Table 4.7, about relevant lifestyle of the participants in this study: exercise favor, usual exercise practice, adapting complementary therapy, and drinking coffee, they could be described as followed.

For exercise favor, most of participants in each group liked some exercise (n = 20 cases; 8 cases in control group and 12 cases in experimental group). Other participants didn't like any exercise (n = 10 cases; 7 cases in control group and 3 cases in experimental group). However, there was no statistically significant difference between two groups by exercise favor ($\chi^2 = 2.4$, $p = .12$).

The participants mostly had no usual exercise practice (n = 21 cases; 12 cases in control group and 9 cases in experimental group). They just only 9 cases who already had their some usual exercise practice (n = 9 cases; 6 cases in control group and 3 cases in experimental group) consisting of walking (n = 7 cases; 2 cases in control group and 5 cases in experimental group), hula-hoop dance (n = 1 case in experimental group), and aerobic dance (n = 1 case in control group). Anyway, there was no statistically significant difference between two group by usual exercise practice ($\chi^2 = .18$, $p = .66$).

About adapting complementary therapy, the participants mostly had no any adapting complementary therapy (n = 27 cases; 14 cases in control group and 13 cases in experimental group). There were just only 3 cases who already had their some adapting complementary therapy as massage (n = 3 cases; 1 cases in control group and 2 cases in experimental group). Anyway, there was no statistically significant difference between two group by adapting complementary therapy ($\chi^2 = 1.15$, $p = .28$).

Drinking coffee habit per day, the majority of the participants had ever drunk coffee (n = 17 cases; 7 cases in control group and 10 cases in experimental group). Other participants didn't drink coffee (n = 13 cases; 8 cases in control group and 5 cases in experimental group). However, there was no statistically significant difference between two group by drinking coffee ($\chi^2 = 1.22$, $p = .26$).

Table 4.7 Group differences between Thai women living with breast cancer in control group and experimental group classified by exercise favor, usual exercise practice, adapting complementary therapy, and drinking coffee habit per day at baseline (T_1) (n=30)

Life style	**Control**	**Experiment**	***Total***	χ^2	***p*-value**
	(n=15)	**(n=15)**	**(n = 30)**		
	n	**n**	**n**		
Exercise Favor				2.4	.12
No	7	3	10		
Yes	8	12	20		
Usual Exercise Practice				.18	.66
No	12	9	21		
Yes	3	6	9		
Walking	2	5			
Hula-Hoop dance	0	1			
Aerobic dance	1	0			
Adopting Complementary therapy				1.15	.28
No	13	14	27		
Yes	1	2	3		
Massage	1	2			
Drinking Coffee Habit				1.22	.26
No	8	5	13		
Yes	7	10	17		

NS = No Significance, $p > .05$

For table 4.8, the participants in this study mostly were in stage II (n = 14 cases; 8 cases in control group and 6 cases in experimental group) and stage I (n = 12 cases; 5 cases in control group and 7 cases in experimental group), respectively. There

was also no statistically significant difference between two groups by cancer staging ($\chi^2 = 4.61$, $p = .20$).

The mostly operation type of the participants were modified radical mastectomy (MRM) (n = 18 cases; 9 cases in control group and 9 cases in experimental group) and total mastectomy (TM)/lumpectomy with SLNBx (n = 10 cases; 5 cases in control group and 5 cases in experimental group), respectively. Hence, there was no statistically significant difference between two groups by operation type ($\chi^2 = .00$, $p = 1.00$). In consistent, axillary lympnode dissection was the most node dissection type in this study (n = 20 cases; 10 cases in control group and 10 cases in experimental group). However, there was no statistically significance difference between two groups by axillary dissection ($\chi^2 = .00$, $p = 1.00$).

About chemotherapy and radiation therapy, the majority of the participants had already received chemotherapy (n = 23 cases; 11 cases in control group and 12 cases in experimental group) and radiation therapy (n = 17 cases; 9 cases in control group and 8 cases in experimental group) as a standard treatment of breast cancer in stage I and II. There was also no statistically significant difference between two groups by chemotherapy ($\chi^2 = .18$, $p = .66$) and radiation therapy ($\chi^2 = .13$, $p = .71$), respectively.

For individual complications after breast cancer treatment, the majority of the participants have been living without any complications (n = 24 cases; 13 cases in control group and 11 cases in experimental group). Complications after breast cancer treatment were mostly numbness (n = 2 cases; 1 cases in control group and 1 cases in experimental group), wound pain (n = 2 cases; 1 cases in control group and 1 cases in experimental group), and mild arm lymphedema (n = 2 cases in only experimental group), respectively. There were also no statistically significance differences between two groups by complications ($\chi^2 = .83$, $p = .36$) and complication types ($\chi^2 = 2.16$, $p = .53$), respectively (Table 4.8).

Table 4.8 Group differences between Thai women living with breast cancer in control group and experimental group classified by stage, surgery, axillary lymph node dissection, chemotherapy, radiation therapy, and complication (n=30)

Characteristics	**Control**	**Experiment**	***Total***	χ^2	***p*-value**
	(n=15)	**(n=15)**			
	n	**n**			
Stage				4.61	.20
Insitu (0)	2	0	2		
1	5	7	12		
2	8	6	14		
3	0	2	2		
Surgery				.00	1.00
MRM	9	9	18		
TM/Lumpectomy with AD	1	1	2		
TM/Lumpectomy with SLNBx	5	5	10		
Axillary Lymphnode Dissection				.00	1.00
No	5	5	10		
Yes	10	10	20		
Chemotherapy				.18	.66
No	4	3	7		
Yes	11	12	23		
Radiation Therapy				.13	.71
No	6	7	13		
Yes	9	8	17		
Complications				.83	.36
No	13	11	24		
Yes	2	4	6		
Numbness	1	1			
Wound Pain	1	1		2.16	.53
Arm Lymphedema	0	2			

No Significance, $p > .05$

About Table 4.9, most of the participants in this study had received hormonal therapy (n = 18 cases; 9 cases in control group and 9 cases in experimental group). For estrogen receptor, more than a half of the participants had the positive estrogen receptor (n = 16 cases; 8 cases in control group and 8 cases in experimental group) and progesterone receptor (n = 16 cases; 8 cases in control group and 8 cases in experimental group), respectively; however, there were no statistically significant differences between two groups by estrogen receptor (χ^2 = .00, p = 1.00) and progesterone receptor (χ^2 = .00, p = 1.00), respectively.

In addition, the majority of participants had the negative herneu-2 receptor (n = 23 cases; 12 cases in control group and 11 cases in experimental group), there was also no statistically significant differences between two groups by herneu-2 receptor (χ^2 = .18, p = .66). For menstruation, the majority of the participants had had no menstruation and there was no statistically significant difference between two groups by menstruation status (χ^2 = 2.14, p = .14).

The participants had been living with some comorbidity (n = 15 cases; 5 cases in control group and 10 cases in experimental group) and without comorbidity (n = 15 cases; 10 cases in control group and 5 cases in experimental group) equally in each group. However, there were no statistically significant differences between two groups by complications (χ^2 = 3.33, p = .07). The participants mostly had diagnosed HT (n = 5 cases; 4 cases in control group and 1 cases in experimental group). Other comorbidities of the participants in this study consisted of DM (n = 1 case in control), DM and HT (n = 2 cases; 1 cases in control group and 1 cases in experimental group), HT and HCHOL (n = 2 cases in control group), DM and HT and HCHOL (n = 1 cases; 1 cases in control group and 1 cases in experimental group), DM and HT and HD (n = 1 case in experimental group), and hyper thyroid (n = 2 cases; 1 cases in control group and 1 cases in experimental group), respectively (Table 4.9).

Table 4.9 Group differences between Thai women living with breast cancer in control group and experimental group classified by hormonal therapy, estrogen receptor, progesterone receptor, herneu-2 receptor, menstruation, and co-morbidity at baseline (T_1) (n=30)

Characteristics	**Control**	**Experiment**	***Total***	χ^2	***p*-value**
	(n=15)	**(n=15)**			
	n	**n**			
Hormonal Therapy				.00	1.00
No	6	6	12		
Yes	9	9	18		
Estrogen Receptor				.00	1.00
Positive	8	8	16		
Negative	7	7	14		
Progesterone Receptor				.00	1.00
Positive	8	8	16		
Negative	7	7	14		
Herneu-2 receptor				.18	.66
Positive	3	4	7		
Negative	12	11	23		
Menstruation				2.14	.14
No	15	13	28		
Yes	0	2	2		
Co-Morbidity				3.33	.07
No	5	10	15		
Yes	10	5	15		
DM	1	0	1		
HT	4	1	5		
DM+HT	1	1	2		
HT+HCHOL	2	0	2		
DM+HT+HCHOL	1	1	2		
DM+HT+HD	0	1	1		
Hyper Thyroid	1	1	2		

No Significance, $p > .05$

In conclusion (Table 4.6 – 4.9), there were no statistically significant differences in those demographic characteristics at baseline (T_1) ($p > .05$). It could be concluded that Thai women living with breast cancer in both groups were similar characteristics of education, occupation, marital status, caregiver type, health care payment, living arrangement, exercise favor, usual exercise practice, adopting complementary therapy, coffee drinking habit, stage, surgery, axillary lymphnode dissection, chemotherapy, radiation therapy, complications, hormonal therapy, estrogen receptor, progesterone receptor, herneu-2, menstruation, and co-morbidity at T_1 before TCQQ program implementation.

4.1.2 Dependent variables at baseline (T_1)

All dependent variables of experimental and control group consisting of self-esteem (RSE), fatigue (FSI), UC level, and QOL (FACT-B: physical, FACT-B: social, FACT-B: emotional, FACT-B: functional, FACT-B: symptom, summary FACT-B, summary FACT-G, and summary FACT-TOI) were demonstrated by mean score and standard deviation at baseline (T_1). Group differences of all dependent variables between two groups at baseline (T_1) were tested by independent *t*-test as demonstrated below (Table 4.10).

At baseline (T_1), mean RSE scores of control group were 19.00 (S.D. = 2.59) and mean RSE scores of experimental group were 18.80 (S.D. = 2.14). Mean FSI scores of control group were 19.00 (S.D. = 2.59) (T_1) and mean FSI scores of experimental group were 18.80 (S.D. = 2.14) (T_1). Mean UC level of control group were 19.00 (S.D. = 2.59) and mean UC level of experimental group were 18.80 (S.D. = 2.14). There was no statistically significant differences between two groups by mean RSE scores (t = -1.83, ρ = 0.07), mean FSI scores (t = -.26, ρ = 0.79), and mean UC level (t = -.79, ρ = 0.43) at baseline (T_1), respectively.

About QOL level by the FACT-B score at baseline (T_1), mean FACT-B scores of control group were 110.21 (S.D. = 13.08) and mean FACT-B score of experimental group were 104.27 (S.D. = 18.78). About the FACT-G scores at baseline (T_1), mean FACT-G scores of control group were 82.67 (S.D. = 11.85) and mean FACT-G scores of experimental group were 78.34 (15.33). About the FACT-TOI

score at baseline (T_1), mean FACT-TOI score of control group were 69.06 (S.D. = 9.84) and mean FACT-TOI score of experimental group were 67.20 (S.D. = 11.68). In conclusion, there was no statistically significant differences between two groups at baseline by mean FACT-B score (T_1) (t = .67, ρ = 0.50), mean FACT-G scores (t = -.86, ρ = 0.39), and mean FACT-TOI score (t = -.47, ρ = 0.64), respectively.

About QOL level in physical well-being dimension (PWB) at baseline (T_1), mean PSW scores of control group were 22.13 (S.D. = 5.01) and mean PWB scores of experimental group were 21.73 (S.D. = 3.49). About social well-being dimension (SWB) at baseline (T_1), mean SWB scores of control group were 18.94 (S.D. = 4.19) and mean SWB scores of experimental group were 17.74 (S.D. = 5.93). About emotional well-being dimension (EWB) at baseline (T_1), mean EWB scores of control group were 20.33 (S.D. =3.63) and mean EWB scores of experimental group were 19.33 (S.D. = 4.01). About functional well-being (FWB) dimension at baseline (T_1), mean FWB scores of control group were 21.27 (S.D. = 4.25) and mean FWB scores of experimental group were 19.53 (S.D. = 6.06). About breast cancer subscale (BCS) dimension at baseline (T_1), mean BCS scores of control group were 25.67 (S.D. = 4.18) and mean BCS scores of experimental group were 25.93 (S.D. = 4.25). In conclusion, there was no statistically significant difference between two groups at baseline (T_1) by mean PWB scores (t = -.25, ρ = 0.80), mean SWB scores (t = -.63, ρ = 0.52), mean EWB scores (t = -.71, ρ = 0.48), and mean FWB scores (t = - .90, ρ = 0.37), respectively.

In conclusion, there were no statistically significant differences in those all dependent variables at baseline (T_1) testing by independent t-test ($p > .05$). It could be concluded that Thai women living with breast cancer in both groups were similar characteristics of RSE, FSI, UC level, summary FACT-B, summary FACT-G, summary FACT-TOI, PSW, SWB, EWB, FWB, and BCS at T_1 before TCQQ program implementation as demonstrated below (Table 4.10).

Table 4.10 Group differences between Thai women living with breast cancer in control group and experimental group classified by RSE, FSI, UC level, summary FACT-B, summary FACT-G, summary FACT-TOI, PWB, SWB, EWB, FWB, and BCS at baseline (T_1), 6th week (T_2), and 12th week (T_3) (n =30)

Characteristics (Total score)	Control (n=15) Mean(SD)	Experiment (n=15) Mean(SD)	*t*	*p*- value
RSE (10-40)				
T_1	19.00(2.59)	18.80(2.14)	-1.83	.07
T_2	20.47(1.84)	19.73(2.40)		
T_3	20.40(2.97)	25.60(1.80)		
FSI (0-131) [a]				
T_1	36.40(28.18)	33.67(28.60)	-.26	.79
T_2	28.13(27.53)	16.20(14.17)		
T_3	23.53(17.67)	18.87(16.20)		
UC [b]				
T_1	148.71(68.02)	125.42(90.06)	-.79	.43
T_2	155.61(73.49)	89.31(65.13)		
T_3	131.75(77.22)	73.08(49.49)		
FACT-B (0-144)				
T_1	110.21(13.08)	104.27(18.78)	.67	.50
T_2	108.77(10.05)	109.93(15.79)		
T_3	109.79(10.48)	111.35(20.32)		
FACT-G (0-108)	82.67(11.85)	78.34(15.33)	-.86	.39
FACT-TOI (0-92)	69.06(9.84)	67.20(11.68)	-.47	.64
PSW (0-28)	22.13(5.01)	21.73(3.49)	-.25	.80
SWB (0-28)	18.94(4.19)	17.74(5.93)	-.63	.52
EWB (0-24)	20.33(3.63)	19.33(4.01)	-.71	.48
FWB (0-28)	21.27(4.25)	19.53(6.06)	-.90	.37
BCS (0-36)	25.67(4.18)	25.93(4.25)	.17	.86

No Significance, $p > .05$

a. 0 = No fatigue, 36 = Mild fatigue, 65 = Moderate fatigue, 85 = Severe fatigue, and 110+ = Excessive fatigue (Donovan, & Jacobsen, 2011)

b. Normal UC level = 0 – 150 μg/day

4.2 Part II: Basic assumptions testing of the repeated measures analysis of variance

4.2.1 Basic assumptions of the RM-ANOVA and the RM-ANCOVA

Before the data analyses were carried out, data were screened to ensure their completion and accuracy. To ensure a powerful interpretation of the study results, the basic assumptions for the RM-ANOVA and the RM-ANCOVA were tested before further inferential analysis was conducted. All required assumptions of those two statistics were examined as follows (Munro, 2005; Stevens, 2009; Tabachnick & Fidell, 2007).

4.2.1.1 Independence of the observations. A violation of this assumption is very serious. This is achieved by randomly assigning subjects to mutually targeted groups (Munro, 2005; Stevens, 2009). The samples should be independent of each other. In this study, the participants both groups were selected by a random sampling in incessantly populations and they were then random assigned into the experimental and the control group. Therefore, this research was designed and applied randomization technique to reduce selection bias and also to meet the assumption of the RM-ANOVA and the RM-ANCOVA about the independence of the observation.

4.2.1.2 Normal Distribution. The dependent variable in each group should be normal distribution. Before the data were analyzed, the normal distribution of dependent variables was tested by statistical and graphical analyses. The *Shapiro-Wilk's* statistic was used for testing ($n < 50$) and the combination of using the *Fisher's* measures of skewness and kurtosis were calculated for estimates of symmetry or normal distribution (values should be between +1.96 and –1.96). In addition, histogram, *Q-Q* plot, and box-plot were presented to approve the normal distribution.

In this study, handling outliers were organized (Munro, 2005; Tabachnick & Fidell, 2007). All dependent variables of Thai women living with breast cancer in both comparison groups showed the normal skewness and the normal

kurtosis values between +1.96 and –1.96 or the *Shapiro-Wilks* statistic testing presented the results as normal distribution (*p*-value > .05).

4.2.1.3 Homogeneity of variance. Variance of the dependent variable and covariance matrices of dependent variable in each group should be equal. After considered the normality, the equality of variances and covariance of the groups should be confirmed. The equality of variances and covariance matrices of dependent variable in each group were determined by using the *Levene's* test and the *Box's* test across all levels of the between-subjects factor (Munro, 2005; Stevens, 2009). No statistically significance in the *Levene's* tests of equality of error variance for the between-subject factors (type of training) that indicated the equivalent variance on all four of the measures. These mean that the homogeneity of variance did not violate the basic assumption.

4.2.1.4 Compound symmetry. The dependent variances should be equal across measurements. In addition, the correlation between the measures occurred with repeated measure analysis, because they resulted from the same participants (Munro, 2005). The compound symmetry was approved by the *Mauchly's* test of sphericity that explained the effect of the within-subjects factors in equivalent variance on all four measures (times). The tests were not statistically significance ($p > 0.05$), indicated that the assumption had been met. In case of violated assumption, either the multivariate test or the univariate test with an epsilon correction was appropriate for the variance analysis. The *Huynh-Feldt epsilon* should be reported in the corrected results for the equality across measurements for small sample size. The *p*-values of the *Huynh-Feldt epsilon* should show that there was no statistically significant difference.

4.2.2 The tests of basic assumptions on all four measures

The tests of all basic assumption of homogeneity of variance for the equivalent variance in each group and the compound symmetry for the equivalent variance on all four measures were described in two-variable groups as follows.

4.2.2.1 The Self-Esteem Variable (RSE). The *Box's t*ests of equality of covariance matrices of the RSE, there was no statistically significant

difference between two groups which could be indicated the observed covariance matrices of the dependent variables was in equal levels across groups (*Box's M* = 9.35, p = 0.22). Therefore, it could be indicated that this required assumption had been met for the RM-ANOVA and the RM-ANCOVA. In addition, the *Levene's* tests of equality of error variances of the RSE at three times assessments (Baseline, the 6th week, and the 12th week), there was no statistically significant difference between two groups which could be indicated that the error variance of those dependent variables were in equal across groups ($F_{baseline}$= .00, p = 0.98, $F_{6^{th}\,week}$= .43, p = 0.51, $F_{12^{th}\,week}$ = 2.43, p =0.13), respectively. These mean that the homogeneity of variance of the RSE at three times assessments were met the basic assumptions for the RM-ANOVA and the RM-ANCOVA. As regarded the assumption of the compound symmetry, the *Mauchly's* test of sphericity of the RSE, there was no statistically significant difference between two groups (*Mauchly's W* = .85, p = 0.11). It meant that the error covariance matrix of the orthonormalized transformed dependent variables could be proportional to an identity matrix. Therefore, it could be indicated that this basic assumption had been met for the RM-ANOVA and the RM-ANCOVA

4.2.2.2 The Fatigue Variable (FSI). The *Box's* tests of equality of covariance matrices of the FSI, there was no statistically significant difference between two groups which could be indicated the observed covariance matrices of the dependent variables was in equal levels across groups (*Box's M* = 9.26, p = 0.22). Therefore, it could be indicated that this basic assumption had been met for the RM-ANOVA and the RM-ANCOVA. In addition, the *Levene's* tests of equality of error variances of the FSI at three times assessments (Baseline, the 6th week, and the 12th week), there was no statistically significant difference between two groups which could be indicated that the error variance of those dependent variables were in equal across groups ($F_{baseline}$= .24, p = 0.62, $F_{6^{th}\,week}$= 7.02, p = 0.01, $F_{12^{th}\,week}$ = 2.34, p = 0.13, respectively). These mean that the homogeneity of variance of the fatigue variable at two times assessments were also met the assumption except at the 6th week assessment of the FSI might be violated the basic assumptions for the RM-ANOVA and the RM-ANCOVA. It was found the slightly violated assumption at the 6th week fatigue score (FSI). Within the equal group size, a violation of the equal covariance

matrices assumption was not serious and rigorous. The testing statistic was still robust (with respect to Type I error) against a violation of this basic assumption (Stevens, 2009). As regarded this basic assumption of the compound symmetry, the *Mauchly's* test of sphericity of the FSI was presented that there was no statistically significant difference between two groups (*Mauchly's W* = .80, p = 0.054). It meant that the error covariance matrix of the orthonormalized transformed dependent variables could be proportional to an identity matrix. Therefore, it could be indicated that this basic assumption had already been met for the RM-ANOVA and the RM-ANCOVA.

4.2.2.3 The Urine Cortisol Variable (UC level). The *Box's* tests of equality of covariance matrices of the UC level, there was no statistically significant difference between two groups which could be indicated that the observed covariance matrices of the dependent variables was in equal levels across groups (*Box's M* = 13.33, p = 0.06). Therefore, it could be indicated that this basic assumption had been also met for the RM-ANOVA and the RM-ANCOVA. In addition, the *Levene's* tests of equality of error variances of the UC level at three times assessments (Baseline, the 6thweek, and the 12thweek), there was no statistically significant difference between two groups which could be indicated that the error variance of those dependent variables were in equal across groups ($F_{baseline}$= .90, p = 0.34, $F_{6^{th}\,week}$= 1.17, p = 0.28, $F_{12^{th}\,week}$ = 2.64, p =0.11, respectively). These mean that the homogeneity of variance of the urine free cortisol variable at three-times assessments could be also met the basic assumption for the RM-ANOVA and the RM-ANCOVA. As regarded the assumption of the compound symmetry, the *Mauchly's* test of sphericity of the UC level, there was no statistically significant difference between two groups (*Mauchly's W* = .89, p = 0.23). It meant that the error covariance matrix of the orthonormalized transformed dependent variables was proportional to an identity matrix. Therefore, it could be indicated that this basic assumption had been met for the RM-ANOVA and the RM-ANCOVA.

4.2.2.4 The QOL Variables (FACT-B). The *Box's* tests of equality of covariance matrices of the QOL, there was no statistically significant difference between two groups which could be indicated that the observed covariance matrices of the dependent variables was in equal levels across groups (*Box's M* = 7.36,

p = 0.37). Therefore, it could be indicated that this assumption had been met for the RM-ANOVA and the RM-ANCOVA. In addition, the *Levene's* tests of equality of error variances of the QOL at three times assessments (Baseline, the 6th week, and the 12th week), there was no statistically significant difference between two groups which could be indicated that the error variance of those dependent variables were in equal across groups ($F_{baseline}$= .38, p = 0.54, $F_{6^{th}\,week}$ = .69, p = 0.41, $F_{12^{th}\,week}$ = 1.65, p = 0.20, respectively). These mean that the homogeneity of variance of the QOL at three times assessments could be also met the basic assumptions for the RM-ANOVA and the RM-ANCOVA. As regarded the assumption of the compound symmetry, the *Mauchly's* test of sphericity of the QOL, there was no statistically significant difference between two groups (*Mauchly's* W = .89, p = 0.23). It meant that the error covariance matrix of the orthonormalized transformed dependent variables was in proportional to an identity matrix. Therefore, it could be indicated that this basic assumption had been met for the RM-ANOVA and the RM-ANCOVA.

As summary, all required assumption testing for the RM-ANOVA and the RM-ANCOVA had been already done. All dependent variables in this study had been already met the basic assumptions for the RM-ANOVA and the RM-ANCOVA and they were then analyzed by applying the RM-ANOVA and the RM-ANCOVA as demonstrated follow.

4.3 Part III: The effects of TCQQ program on self-esteem (RSE), fatigue (FSI), UC level, and QOL (FACT-B) in thirty Thai women living with breast cancer

Based on the psychoneuroimmunology model (PNI-model), those dependent variables consisting of self-esteem (RSE), fatigue (FSI), UC level, and QOL (FACT-B) could be affected by TCQQ program in Thai women living with breast cancer at the first year after treatment completion. All dependent variables had been met the basic assumptions of the RM-ANOVA and the RM-ANCOVA and they were then analyzed base on the purposes and hypotheses of the study as presented below.

In this study, the group differences of demographic characteristics and four dependent variables between two groups at baseline (T_1) had been tested by the independent *t*-test and the *Chi-square* test; indeed, they might have some additional quantitative variables (covariates) which could related to those results and they didn't be obtained in this data collection (by measurement, questionnaire, demographic form). Therefore, the ANCOVA which included score of four dependent variables at baseline (T_1) as covariate to reduce the error variance in experimental designs by accounting for individual differences in responses and provide more precise measurement of the treatment effects would be also applied in this study for testing of the results differences and change over times between these two comparison groups as presented below (Table 4.11- 4.12).

4.3.1 Hypotheses

Thai women living with breast cancer who completed TCQQ program would have higher self-esteem, lower urine cortisol level, lower fatigue, and higher QOL than Thai women living with breast cancer who received the usual care.

As regarding with the effects of TCQQ program on self-esteem, fatigue, UC level and QOL in 15 Thai women living with breast cancer comparing with 15 Thai women living with breast cancer who received the usual care, the studied results were presented with regards to the proposed hypotheses. With two-way repeated measure design on dependent variables approach, mean RSE scores, mean FSI score, mean UC level, and mean FACT-B score between two groups were compared with statistically significant difference across times period for proving hypotheses by the RM-ANOVA.

There were statistically significant differences at least one pair condition at three time points of the mean RSE score ($p = 0.000$) (Table 4.11) and the interaction effect on time and group was also statistically significant differences ($p = 0.000$) (Table 4.11). There were statistically significant differences at least one pair condition at three time points of the mean FSI score ($p = 0.000$) (Table 4.11) and the interaction effect on time and group was also no statistically significant differences ($p = 0.147$) (Table 4.11). There were statistically significant differences at least one pair condition

at three time points of the mean UC level (p = 0.010) (Table 4.11) and the interaction effect on time and group was no statistically significant differences (p = 0.125) (Table 4.11). There were statistically significant differences at least one pair condition at three time points of the mean QOL score (p = 0.017) (Table 4.11) and the interaction effect on time and group was also no statistically significant differences (p = 0.059) (Table 4.11).

Table 4.11 Repeated measures analysis of variance on mean RSE score, mean FSI score, mean UC level, and mean FACT-B score across time points of assessments (n=30)

Source of Variance	SS	df	MS	F^r	p-value
RSE					
Within subjects	488.667	60			
Time	103.089	2	51.544	11.064	0.000*
Time × Group	124.689	2	62.344	13.382	0.000*
Time × Within group (error)	260.889	56	4.659		
Total	38763.511	61			
FSI					
Within subjects	17657.33	60			
Time	4488.022	2	2244.011	10.220	0.000*
Time × Group	872.822	2	436.411	1.987	0.147
Time × Within group (error)	12296.489	56	219.580		
Total	75925.111	61			
UC level					
Within subjects	128725.089	60			
Time	18159.751	2	2244.011	10.220	0.010*
Time × Group	7900.865	2	436.411	1.987	0.125
Time × Within group (error)	102664.473	56	219.580		
Total	1438846.548	61			
QOL					
Within subjects	5652.165	60			
Time	699.659	2	349.829	4.376	0.017*
Time × Group	475.943	2	237.971	2.977	0.059
Time × Within group (error)	4476.563	56	79.939		
Total	1086652.311	61			

Note: ^{r} = Two-way repeated measures ANOVA,

* $\rho < 0.05$, No Significance ($p > .05$)

With regards the results after controlling mean RSE score, mean FSI score, UC level, and mean FACT-B score at T_1 as covariate (Table 4.12), the results were indicated statistically significant differences of mean RSE score (p = 0.026), mean FSI score (p = 0.007), mean UC level (p = 0.005), and mean FACT-B score (p = 0.048) between two comparison groups, respectively.

Table 4.12 Repeated measures analysis of covariance of the mean RSE score, mean FSI score, mean UC level, and mean FACT-B score across time points of assessments after controlling of each mean score at T_1 as covariate (n = 30)**.**

Source of Variance	SS	df	MS	F[c]	*p*-value
RSE					
Between subjects	179.751	1			
RSE (T_1) (covariate)	53.555	1	53.555	6.462	0.017*
Groups	46.130	1	46.130	5.566	0.026*
Within group (error)	223.778	27	8.288		
Total	389.752	30			
FSI					
Between subjects	853.723	1			
FSI (T_1) (covariate)	7766.364	1	7766.364	23.615	0.000*
Groups	2753.817	1	2753.817	8.374	0.007*
Within group (error)	8879.436	27	8879.436		
Total	6276.3	31			
UC level					
Between subjects	21110.204	1			
UFC (T_1) (covariate)	104464.872	1	104464.872	26.596	0.000*
Groups	36494.454	1	36494.454	9.291	0.005*
Within group (error)	106053.683	27	106053.683		
Total	63524.045	31			
QOL					
Between subjects	4664.903	1			
FACT-B (T_1) (covariate)	3736.013	1	3736.013	28.595	0.000*
Groups	562.035	1	562.035	4.302	0.048*
Within group (error)	3527.682	27	3527.682		
Total	389.752	31			

Note: [c] = Two-way repeated measures ANCOVA,

* $\rho < 0.05$

4.3.2 Additional analysis on effect size of the study

Effect size (ES) is a statistical analyses applying to determine the magnitude of the main effect in the analysis of variance (Cohen, 1988). In this study, the ES of the treatment effect were calculated in four main outcomes at completely TCQQ program implementation as demonstrated below (Table 4.13).

The results revealed that the treatment effects at completely TCQQ program implementation was in large effect for self-esteem (ES = 1.29) and fatigue (ES = 0.91) and medium effect for UC level (ES = 0.75) and QOL (ES = 0.68), respectively. They were indicated that TCQQ program had treatment effects in Thai women living with breast cancer at the 1st year of treatment completion in large and medium level (Table 4.13).

Table 4.13 Effect sizes of the outcome measurement after TCQQ program implementation at T_3 (n = 30)

Outcomes	Experimental Mean(SD.)	Control Mean(SD.)	ES	Interpretation
RSE	23.87(3.54)	20.33(2.74)	1.29	Large effect
FSI	9.27(10.09)	27.20(19.68)	0.91	Large effect
UC	131.75(77.22)	73.08(49.49)	0.75	Medium effect
FACT-B	116.72(14.02)	109.53(10.57)	0.68	Medium effect

4.4 Summary

Thirty Thai women living with breast cancer were randomly selected from Thai women living with breast cancer after treatment completion at the first year who routinely visited at the Siriraj Breast Clinic, Siriraj Hospital, and Bangkok, Thailand. They then were randomly assigned into two groups (n = 15 cases/group). There were fifteen Thai women living with breast cancer in experimental and control group who had agree to participate in this prospective experimental study. Finally, thirty Thai women living with breast cancer didn't meet any exclusion criteria after program implementation.

All demographic characteristics of thirty Thai women living with breast cancer in these two groups consisted of age, weight, height, BMI, income, educational level, occupation, marital status, caregiver type, health care payment, living arrangement, exercise favor, had usual exercise, adopting complementary therapy, coffee drinking habit, stage, surgery, axillary lymphnode dissection, chemotherapy, radiation therapy, complication, hormonal therapy, estrogen receptor, progesterone receptor, herneu-2, menstruation, and co-morbidity. Descriptive statistics of all demographic characteristics had been tested. Group differences of those demographic characteristics at baseline (T_1) were also tested by the independent *t*-test and the *Chi*-square test based on data scale itself. There were no any statistically significant differences in all demographic characteristics at baseline (T_1) between two comparison groups ($p > .05$) (Table 4. 5- 4.9). Therefore, it could be concluded that thirty Thai women living with breast cancer were similar in all demographic characteristics at baseline (T_1) before TCQQ program implementation.

All required assumption of the RM-ANOVA and the RM-ANCOVA consisting of the normal distribution (the *Shapiro-Wilk's* test), the homogeneity of variance (the *Levene's* tests and the *Box's* test*s*), and the compound symmetry (the *Mauchly's* test of sphericity) were also met with statically significant differences ($p > .05$). The effects of TCQQ program on all dependent variables; self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer base on purposed hypotheses was carried out by the RM-ANOVA and the RM-ANCOVA.

As regard with the self-esteem variable (RSE score), there was statistically significant difference at least one pair of time assessment two comparison groups both in time ($p = 0.000$) and group ($p = 0.000$) (Table 4.11). Moreover, after controlling the mean RSE score at T_1 as covariate, there was statistically significant difference in the RSE score between T_2 and T_3 of assessment between two groups ($p = .026$) (Table 4.12). Evidently, Thai women living with breast cancer in the experimental group improved the RSE scores at 6^{th} week and 12^{th} week after program implementation, while Thai women living with breast cancer in the control group presented slightly decreasing the RSE score. There was a positive effect on self-esteem by TCQQ program in the experimental group. On the contrary the interaction effects, there was

statistically significant interaction between TCQQ program and self-esteem changed over time.

As regard with the fatigue variable, there was no statistically significant difference in fatigue (the FSI score) changed over time of assessment between two comparison groups (p = .139) but there was statistically significant difference at least one pair of time assessment two comparison groups (p = .000) (Table 4.11). Moreover, after controlling the mean FSI score at T_1 as covariate, there was statistically significant difference in the FSI score over time of assessment between the two breast cancer survivor groups (p = .007) (Table 4.12). The FSI score decreased significantly at each of the time of assessment. Evidently, the breast cancer survivor in the experimental group represented improvement in the FSI score at 6th week and 12th week after program implementation, while the breast cancer survivor in the control group presented slightly increasing the FSI score at the same time. There was a positive trend for fatigue improvement by TCQQ program in the experimental group. On the contrary the interaction effects, there was statistically significant interaction between TCQQ program and fatigue over time.

As regard with the cortisol variable, there was statistically significant difference in cortisol (the UC level) changed over time of assessment between two comparison groups (p = .039) and there was statistically significant difference at least one pair of time assessment two comparison groups (p = .010) (Table 4.11). Moreover, after controlling the mean UC level at T_1 as covariate, there was statistically significant difference in the UC level over time of assessment between two groups (p = .005) (Table 4.11). The UC level decreased significantly at each of the time of assessment. Evidently, the participants in experimental group represented improvement in the UC level at 6th week and 12th week after program implementation, while the participants in the control group presented slightly increasing the UC level at the same time. There was a positive trend for fatigue improvement by TCQQ program in the experimental group. On the contrary the interaction effects, there was statistically significant interaction between TCQQ program and UC level over time.

As regard with the QOL variable, there was no statistically significant difference in QOL (the FACT-B score) changed over time of assessment between two

comparison groups (p = .751) but there was statistically significant difference at least one pair of time assessment two comparison groups (p = .017) (Table 4.11). Moreover, after controlling the mean FACT-B score at T_1 as covariate, there was statistically significant difference in the FACT-B score over time of assessment between the two breast cancer survivor groups (p = .048) (Table 4.12). The FACT-B score increased significantly at each of the time of assessment. Evidently, the breast cancer survivor in the experimental group represented improvement in the QOL mean scores at 6^{th} week and 12^{th} week after program implementation, while the breast cancer survivor in the control group presented slightly decreasing means scores at the same time. There was a positive trend for QOL improvement by TCQQ program in the experimental group. On the contrary the interaction effects, there was statistically significant interaction between TCQQ program and QOL scores over time.

Eventually, fifteen participants in the experimental group could participate with TCQQ program more than 8 sessions out of 12 sessions. They also practiced TCQQ program about 2-3 times per week. In Summary, fifteen participants of experimental group could participate continuously with TCQQ program with the appropriated applicability.

CHAPTER V
DISCUSSION

This experimental study aimed to determine the effects of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer. In this chapter, the interpretation of the findings are presented and discussed according to the purposes and hypotheses of the study

5.1 Characteristics of the main study variables: self-esteem, fatigue, cortisol, and QOL

5.1.1 Self-esteem (RSE)

Self-esteem level of 30 Thai breast cancer survivors in both groups was likely in lower level at baseline (T_1) (Table 4.10). They showed slightly higher increasing of the mean RSE scores in the experimental group during T_2 and T_3 after TCQQ implementation when compared to the control group (Table 4.10). Consistent with previous studies, self-esteem was found in lower level in women with breast cancer in previous study (Berterö, 2002; Helgeson, Snyder, Seltman, 2004). In addition, declination of self-esteem in individuals with breast cancer could be changed overtime at the diagnosis until the survivorship period (Bartoces, Severson, Rusin, Schwartz, Ruterbusch, & Neale, 2009; Berterö, 2002; Courneya, & Friedenreich, 2007). Possible explanation of this situation was decreasing perceived self-worth or self-value because of cancer diagnosis, radical cancer treatment and its adverse side effects, emotional stress and physical distress, including lack of some intervention to improve it (Berterö, 2002; Courneya, & Friedenreich, 2007).

Another explanation may be that self-esteem of long-term cancer survivors may be more influenced by difficulties in reintegrating into valued social roles (Bartoces, et al., 2009) Research has demonstrated that self-esteem is positively

correlated with, and is the psychological factor explaining most of the variance in QOL and well-being among individuals with breast cancer (Bartoces et al., 2009; Courneya, & Friedenreich, 1997; Mustian et al., 2004; Servaes et al., 2002). Self-esteem represents the evaluative and affective components of self-concept (how an individual views the self) and can be described as the negative and positive views individuals hold regarding themselves (Dirksen, 2000). It could be explained that people with lower self-esteem do not believe in their abilities and strengths and self-esteem has not been linked to better adjustment and less helplessness in people with a variety of health problems.

In addition, several previous studies supported that some psychosocial resources including self-esteem was positively correlated with physical activity level (PA) in various population (Courneya, & Friedenreich, 2007; Elavsky, McAuley, Motl, Konopack, Marquez, Hu, et al., 2006; McAuley, Blissmer, Katula, Terry, & Shannon, 2000; Mustian et al., 2004; Tremblay, Inman, & Willms, 2000; Strauss, Rodzilsky, Burack, Colin, 2001). Higher self-esteem associated with higher physical activity relating to non-sedentary life-style and self-esteem was a positive psychological resource which could increase individual QOL (Bartoces et al., 2009; Courneya, & Friedenreich, 1997; Fagundes et al., 2011; Mustian et al., 2004; Servaes et al., 2002). It was compatible with the findings, the majority of participants in this study did not have usual exercise activity before program implementation (Table 4.7); therefore, they were found in lower self-esteem level. Consistently, most of individual with breast cancer were not meeting the PA recommendations proposed for the general adult population (Andrykowski, Beacham, & Jacobsen, 2007; Irwin et al., 2003; Irwin et al., 2004) because of breast cancer diagnosis and cancer treatment. Interestingly, current guidelines for physical activity for cancer survivors suggested that in the absence of any physical contraindications, any physical movement or activity is beneficial, and any steps to move from a sedentary to a more physically active lifestyle should be encouraged such as by some exercise and/or leisure activity (Andrykowski, Beacham, & Jacobsen, 2007).

5.1.2 Fatigue (FSI)

Overall fatigue level among women with breast cancer in this study was found in mild to moderate level (Table 4.10). There was no statistically significant differences between the participants in two groups found by the mean FSI scores at baseline (T_1) (ρ = 0.79) (Table 4.10). Consistent with previous studies, fatigue was still found in women with breast cancer after treatment completion (Bower et al., 2000; Bower et al., 2002; Bower, 2005; Bower et al., 2006; Bower, 2008; Reinertsen et al., 2010). Reinertsen and colleagues (2010) revealed that 23% of women with breast cancer had persistent fatigue and they were diagnosed with chronic fatigue at 2.5–7 years after their cancer treatment. One possible explanation is that although many cancer survivors return to normal functioning after the completion of treatment and are able to live with relatively symptom-free lives. However, cancer and its treatment can also result in a wide range of physical and psychological problems that do not recede with time. Some of these problems emerge during or after cancer treatment and persist in a chronic, long-term manner such as fatigue symptom (Stein and colleagues (2008). Another possible explanation may be related to sedentary life style which is one of the factors contributing to fatigue in addition to cancer disease itself, cancer treatment, psychological stress, altered cortisol, sleep disturbance, and altered immune function (Anderson, et al., 2003; Bower et al., 2000; Bower, 2005; Bower et al., 2006; Bower, 2008b; Reinertsen et al., 2010). The majority of women with breast in this study had no usual exercise practice before program implementation (Table 4.5). In particular, the possible role of cortisol in cancer-related fatigue has been also documented. Some investigations of patients with cancer have reported a significant association between fatigue and cortisol both by cancer treatment and cancer itself. Cancer treatment has been associated with induce dysregulation of the HPA axis and dyscortisolemia (Bower et al., 2006; Bower, 2008b). For example, patients with breast cancer receiving chemotherapy show significant differences in cortisol level compared with both disease-free individuals and patients with cancer who are not receiving treatment (Payne, 2002; Payne, Piper, Rabinowitz, 2003).

5.1.3 Cortisol (UC level)

The cortisol level of Thai women living with breast cancer in this study was in nearly high level in both groups (normal level = 0 – 150 μg/day) (Table 4.10). The mean UC level of control group showed slightly higher than that of experimental group at T_1. However, there was no statistically difference between two groups by the mean UC level at baseline (T_1) (ρ = 0.43) (Table 4.10). Consistently, women living with breast cancer was found altered cortisol level in previous studies (Bower et al., 2005a; Bower et al., 2005b; Bower, 2008; Carlson et al., 2007; Turner-Cobb et al., 2000; Schmid-Büchi et al., 2010). Possible explanation of an alteration of cortisol level is due to two main tracts: centers for brain-body interaction and the hypothalamus-pituitary-axis (HPA). When brain perceives a stress stimulus, these two communicating structures throw the adrenal glands into high gear for "fight or flight" to immediately releases adrenaline from the adrenal glands, and corticotrophin-releasing hormone (CRH) from nerve cells in the hypothalamus. CRH travels to the pituitary gland, where it triggers the release of adrenocorticotrophic hormone (ACTH), which then stimulates the production of cortisol in the adrenal glands. Cortisol sustains energy, but it also curbs the surge of adrenaline and turns off CRH.

Therefore, one possible cause in altered cortisol level in Thai women with breast cancer is the joint effects of physical and psychological stress stimulus. The majority of Thai women living with breast cancer had low self-esteem (psycho) and mild to moderate fatigue (physical) before program implementation (Table 4.10). Those physical and psychological stress stimuli could exist and induce dysregulation of the HPA axis and hypercortisolemia (Bower et al., 2005a; Bower et al., 2005b; Bower et al., 2006; Bower, 2008b). Consistent with the findings of previous studies which revealed that UC level in cancer survivors are associated with lower self-esteem (Servaes et al., 2002) and alteration of fatigue (Bower et al., 2005a; Bower et al., 2005b; Bower, 2008; Collado-Hidalgo et al., 2006; Miller et al., 2008). In addition, patients with primary breast cancer who are fatigued have greater cytokines (Bower et al., 2002), chronic cellular immune response (Bower et al., 2003) and cortisol response to stress (Bower et al., 2005). Moreover, relationship between UC level, mood states, stress symptom and QOL in breast cancer was found (Carlson et al., 2007). Therefore,

UC level is a significant stress marker that reflects some disorders in women living with breast cancer.

5.1.4 QOL (FACT-B)

The overall QOL level of 30 Thai women living with breast cancer in this study showed a moderate to high level by FACT-B score, FACT-G scores, and FACT-TOI score. Consistent with two descriptive studies in at least 3-years Thai women with breast cancer revealed that they had a moderate level of QOL and mostly concerned about weight gain and fatigue (physical well-being), high uncertainty (psychosocial well-being), high challenge (stress appraisal), and seeking social support (coping) (Wonghongkul et al., 2000, Wonghongkul et al., 2006). In another study revealed that QOL was in moderate level; symptom distress, social support, and uncertainty were able to jointly explain 46.7% of variance on QOL in Thai women living with breast cancer after 1 year post-treatment completion (Sivarux et al., 2012).

However, when classified by groups, there was no statistically significant difference between them by mean of those three category scores of QOL at T_1 (Table 4.10). Possible explanation regarding this situation is that individual living with limited physical resources and psychosocial resources are likely to perceive more negative well-being as well as QOL. Psychological long-term effects (positive or negative) varies widely across cancer survivor groups based on their coping ability which could be influenced by two classes of variables; cancer stress and burden (psychological and physical, interpersonal, financial, and existential) and resources (interpersonal, intrapersonal, informational, and tangible) (Stein et al., 2008). It was hypothesized in this study that Thai women living with breast cancer with better physical and psychosocial resources would have better HRQOL. Thai women with breast cancer in this study were mostly in middle class living in an urban area with full-equipped health care resources and accessibility of utilizing health care services at the super tertiary care. About socioeconomic resources, they mostly had their own house, educated, employed, earning income, married, having own accommodation, and able to pay health care cost (Table 4.6). They also mostly live with their couple and have caregiver consisting of their son/daughter, couple, grandson/daughter, and brother/sister, respectively (Table 4.6). Availability of these good resources and social

support could positive related to better QOL among Thai women with breast cancer participated in this study.

Moreover, lower self-esteem, mild to moderate fatigue, and some psychological distress in nature (high UC level) of these women may jointly affect their QOL. In addition, the majority of Thai women with breast cancer in this study were in early stage of cancer (mostly in stage I and stage II with only few cases in stage III (Table 4.8). Women who were diagnosed with breast cancer in their early stage generally receive lesser severe treatment, as a result; they would have better QOL (Andersen, 2002; Ganz et al., 1998; Granz et al., 2002; Hewitt et al., 2006; Knobf et al., 2007; Knobf et al., 2008; Miller et al., 2008; Servaes et al., 2002).

Generally, QOL consists of multiple domains including physical well-being, functional well-being, and emotional/psychological well-being, and spiritual well-being. The participants in both groups had similar score of the PWB, SWB, EWB, FWB, and BCS before TCQQ program implementation; they reported moderate QOL level in each dimension now (Table 4.10). It could be explained that the participants in this study are considered good living with some sufficient basic resources (in terms of own accommodation, education, information, tangible, financial, and existential) and social support (married, living with couple, and having caregiver), but they still have some intrapersonal stress (lower self-esteem), physical and psychological deficit in nature (mild to moderate fatigue and high UFC level). All of these factors could negatively affect QOL in each dimension as well.

5.2 Part II: The effects of TCQQ program on self-esteem (RSE score), cortisol (UC level), fatigue (FSI score), and QOL (FACT-B score) in Thai women living with breast cancer

The effects of TCQQ program on self-esteem, UC level, fatigue, and QOL in Thai women living with breast cancer were discussed based on research hypotheses as follows:

Hypothesis: Thai women living with breast cancer who completed TCQQ program would have higher self-esteem, lower urine cortisol level, lower fatigue, and higher QOL than Thai women living with breast cancer who received the usual care.

With regard to the effects of TCQQ program implementation on the study outcomes, after controlling the baseline study variables (T1) as covariate (including mean RSE score, mean FSI score, mean UC level, and mean FACT-B score), the results showed statistically significant differences of all study outcomes which included mean RSE score (p = 0.026), mean FSI score (p = 0.007), mean UC level (p = 0.005), and mean FACT-B score (p = 0.048), between two comparison groups at T_2, and T_3 after TCQQ program implementation (Table 4.12). These meant that Thai women living with breast cancer who completed TCQQ program had higher self-esteem, lower fatigue, lower UC level, and higher QOL than those who received the usual care at 6th week and 12th week after controlling the mean of those variable scores at the 1st week as covariate. In addition, large effect sizes for the RSE (ES = 1.29) and the FSI (ES = 0.91) and moderate effect size for the UC level (ES = 0.75) and QOL (ES = 0.68) were also detected (Table 4.13). Based on the study findings, the proposed hypothesis was supported.

As expected (Table 4.10 and Table 4.11), mean RSE score showed statistically significant differences between T_2 and T_3, and also the interaction effect between times and groups. For fatigue, the experimental group showed greater decrease in FSI score than that of the control group. Similar finding was obtained for urine cortisol, the mean UC level continuously decreased more in the experimental group than that in the control group. Lastly, Quality of life indicated by mean FACT-B scores were significantly higher in the experimental group, compared to the control group. These findings have demonstrated that Thai women living with breast cancer who completed TCQQ program have greater increasing magnitude of self-esteem, reducing fatigue, decreasing UC level, and increasing QOL than those who received the usual care between at 6th week and at 12th week.

Possible explanation of significant differences in higher magnitude of increasing self-esteem, decreasing fatigue, decreasing UC level, and increasing QOL in experimental group after 6th week of TCQQ program implementation, but did not find at the earlier weeks, may be associated with dose and duration of TCQQ program.

Firstly, Most of Thai women with breast cancer in this study were beginners to TCQQ practice, therefore; they need training time to memorize 18-forms of TCQQ. In addition, training several key TCQQ skills such as breathing technique, technically hand and foot movement and mind-body concentration took more time. Basically, a mind and body intervention need time to meet duration and dose after program implementation. Consistent with a previous meta-analysis which indicated that the sufficient dose and duration of TC program should be at least 30 minute/time, 3 times per week, and at least 12 week continually (Taylore-Pilliae & Froelicher, 2004). Therefore, their effect on self-esteem in Thai women living with breast cancer was detected after the 6th week after program implementation. In addition, TCQQ program had many forms (18-forms) that may make some difficulty for breast cancer women who were mostly in age of middle adult and elderly to remember and practice in a short period of time. Dividing into 6-forms per week for women participating in this study made easier training and better memory. The participants, therefore, had to practice at least 4 week to cover all of 18-form TCQQ, its dose might be not enough at early time, and treatment effects might be found after the 4th week demonstrated by the result of this study..

Secondly, the participants in experimental group gained more experiences at later sessions (5th -12th week), they then were able to practice well and accurately. Lastly, possible explanation of this situation may be due to support from telephone follow up provided in this study. The participants in both group who received regular telephone visit once a week for 12 weeks by the researcher to monitor and encourage them to practice some usual exercise (control group) and to practice TCQQ (experimental group). Although improving outcomes may be achieved in both groups by increasing physical activity and exercise and psychological support, stronger effects of TCQQ program was showed in higher magnitude changing over time in experimental group (Awikunprasert, Vongjaturapat, Li, & Sittiprapaporn, 2012; Taylore-Pilliae & Froelicher, 2004; Taylor-Piliae, 2008;).

Based on the PNI model and the system of the complexity of TCQQ indicated that TCQQ practicing could induce the mind-body interpenetration based on incorporating and uniting principles of slow intentional movements, often coordinated with breathing, and meditation. The “mind” component of TCQQ includes a number

of interrelated aspects that may each confer therapeutic value. One central concept of TC is concentration or focus, whereby the mind becomes unified in its purpose for an extended period of time. This focused attention can direct one's own body as well as to the external environment. A typical TC phrase that exemplifies this principle is: "Cleanse your mind and concentrate on the slowness and evenness of your movements" (Wayne & Kaptchuk, 2008). Characterized as a self-study or self-evaluation through a series of specific TC forms and personal concentration, attention, mindfulness, and intention were internal developed. In addition, psychosocial interactions could be the better function due to balancing between peaceful psychological and social perception with more relax, thought to bring the personal tranquility and balance internally for healing (Wayne & Kaptchuk, 2008). From those principles, that Thai breast cancer survivor's self-evaluation could be improved, individuals could better come to see themselves and to evaluate themselves as they think others see and evaluate them.

As TCQQ practicing could induce self-esteem as resourceful cognitive functioning (more concentration and intention with problem solving and coping selection), individual Thai breast cancer survivor's stress could be also adjusted (stress neutralization) (Wayne & Kaptchuk, 2008). Consistent with a previous study, self-esteem is a self-worth evaluation pass through several processes that were identified as important to the development of self-esteem in general: reflected appraisals, social comparisons, and self-attributions (Mustian et al., 2004). Possible explanation could be that Thai women living with breast cancer with higher self-esteem believe in their abilities and strengths, and self-esteem has been linked to better adjustment and less helplessness in people with a variety of health problems. This suggests that self-esteem plays a critical role in the ability of Thai women living with breast cancer to thrive and go on to live normal lives (Courneya, & Friedenreich, 1999; Dirksen, 2000; Lee et al., 2001; Servaes et al., 2002), and may be an appropriate target for interventions designed to improve QOL (Dirksen, 2000; Mustian et al., 2004). Our findings of positive relationship between improving self-esteem level and TCQQ program practicing in Thai women living with breast cancer suggested the importance of self-esteem in the long-term clinical management of these Thai women living with breast cancer.

The results were congruent with several previous studies which conducted in breast cancer patients and in others. Sufficient practicing TC are prone to have better self-esteem in women with breast cancer and other populations (Kutner et al., 1997; Lee et al., 2007; Lee et al., 2010; Mustian et al., 2004; Sandlund & Norlandar, 2000; Verhagen et al., 2004; Wang et al., 2004; Wang et al., 2010). Two reviews included only studies of older adults (Verhagen et al., 2004; Wang et al., 2 004) while two reviews focused on individuals with breast cancer (Lee et al., 2007; Lee et al., 2010). Mustian and colleagues (2004) revealed that self-esteem measured by the RSE was gained and reported a significant improvement in the TC group rather than a psychosocial support intervention in randomized women with breast cancer($p < .01$). However, Kutner and colleagues (1997) conducted in randomized older adults to TC, balance training, or an educational group for a 15-week TC program and measured self-esteem using the RSE, but found no significant differences between groups ($p > .05$).

Self-esteem of long-term individuals with cancer may be more affected by difficulties in reintegrating into valued social roles (Bartoces, et al., 2009) Research has demonstrated that self-esteem is the psychological factor explaining most of the variance in QOL and well-being among women living with breast cancer (Bartoces et al., 2009; Courneya, & Friedenreich, 1997; Mustian et al., 2004; Servaes et al., 2002). Self-esteem represents the evaluative and affective components of self-concept (how an individual views the self) and can be described as the negative and positive views individuals hold regarding themselves (Dirksen, 2000). This could be explained that people with lower self-esteem tend to not believe in their abilities and strengths and self-esteem has not been linked to better adjustment and less helplessness in people with a variety of health problems.

Regarding research guided by the PNI model in breast cancer survivors, two systematic reviews consistently reveal the relationship between TC and some physiological stress responses including cortisol level. Li and colleagues (2001) included a study by Jin (1989) in which individuals with more than one year of TC experience were compared to those who had less than eight months of TC experience. The investigators found that those who had been doing TC for at least one year showed decrease salivary cortisol level following TC when compared to those who

were beginning practitioners. Wang and colleagues (2004) included a paper by Jin (1992) in which older adults were randomly assigned to TC, brisk walking, meditation, or reading. Cortisol levels in all four groups dropped and there were no significant differences between groups.

In addition, previous research has provided empirical support that TC practice also could reduce cortisol level in various populations (Jin, 1989; Jin, 1992; Li et al., 2001; Sandlund & Norlandar, 2000; Wang et al., 2004). Regarding its mechanism, TC practice could reduce psychosocial stress stimulus in the same manner of stress management and relaxation technique. While TC practicing, TC practitioners are in peaceful movement, relaxing, and mindfulness-raise; therefore, stress stimulus is decreasingly stimulated the HPA-axis. As a result, cortisol level after TC practicing is reduced. In addition, efficient breathing is another central focus of many TC practicing systems, and breath is often directly associated with the concept of cultivation of *qi*: “The inhalation and exhalation are long and deep and the *qi* sinks to the *dan tian*” (*dan tian* means “cinnabar fields” and is located slightly beneath and behind the navel) (Wayne & Kaptchuk, 2008). While TC practicing, TC practitioner will be in peaceful movement, relax, and mindfulness-raise; therefore, stress stimulus will less influence the HPA-axis.

Based on the findings of this study, conclusion can be made that TCQQ practicing have potential positive effects on both physical resources and psychosocial resources synergistically resulting in QOL in Thai women with breast cancer. Firstly, TCQQ practicing could induce lower stress stimulus into the HPA (relaxation and stress management) (Jin, 1989; Jin, 1992; Sandlund & Norlandar, 2000; Wang et al., 2009; Wang et al., 2010) could induce lower cortisol level (Jin, 1989; Jin, 1992; Sandlund & Norlandar, 2000; Wang et al., 2004). Combination with higher perceived self-esteem as well as better psychosocial resources after TCQQ practicing (Kutner et al., 1997; Lee et al., 2007; Mustain et al., 2004; Sandlund & Norlandar, 2000; Wang et al., 2010). Meantime, TCQQ practicing enhance physical activity and relaxing resulting in , lower fatigue (Galantino et al., 2003; Galatino et al., 2005; Mustain et al., 2004), as well as better physical resources. Finally, both resources may synergistically affect to improve QOL in TCQQ practitioners.

Consistently, improving physical health, psychological health, and QOL by mind-body intervention increase overall health through socialization, goal setting, participation, or decreased fatigue are now widely documented. As many issues contribute to decreased QOL in women with breast cancer, some review examined some group interventions to improve overall QOL in women with breast cancer. Indeed, several previous studies supported that TC practicing could improve QOL in individuals with cancer (Fisher, Li, & Shirai, 2003; Galatino et al., 2005; Lee et al., 2007, 2009; Mansky et al., 2006; Mustain et al., 2004; Wang et al., 2004).

All fifteen participants could participate successfully with TCQQ program. Regarding with the times of TCQQ practicing, almost participants could participate in TCQQ program consistently within the acceptable session number (at least 8 sessions out of 12 sessions). The results were congruent with several previous studies which reported good adherence rate in TC practicing in various populations including in women with breast cancer (Lee et al., 2010, 2007; Taylor-Piliae, & Froelicher, 2004a; Taylor-Piliae et al., 2006, 2008). In consistent with a previous study by Leddy and colleagues (1997) who explored about incentives and barriers to exercise in women with history of breast cancer. Firstly, incentives to exercise consisted of expectation of benefit, responsibility, enjoyment of interest, previous exercise experience, spouse or family, professional, fear of recurrence, and guilt, respectively. In addition, barrier to exercise were mentioned about lack of time, inertia, not in routine, no partner, dislike, afraid, hard, and expensive, respectively. Hence, in designing some exercise intervention in women living breast cancer, barriers and incentives to exercise should be in concern.

In conclusion, given the findings obtained by this study, the notion that the PNI Model (McCain, 2005) has provided a useful framework for explaining the positive effect of TCQQ program on self-esteem, cortisol level, fatigue, and QOL in the context of Thai women with breast cancer at least for one year after treatment. Further, the effectiveness of TCQQ program on positive health outcomes and QOL suggest that TCQQ program may be an efficacious intervention for improving QOL and some other health outcomes in Thai women with breast cancer after treatment completion.

CHAPTER VI
CONCLUSION

This chapter presented conclusion of study which was divided into two parts: a summary of the study and implications of research findings to nursing knowledge development as follow.

6.1 Summary of the Study

This study was a prospective experimental study aiming to determine the effects of TCQQ program on self-esteem, fatigue, UC level, and QOL in Thai women living with breast cancer. The theoretical framework used to guide a study was the psychoneuroimmunology (PNI) model (McCain et al., 2005). The study was conducted at the breast clinic of one university hospital in Bangkok, Thailand. The participants were thirty Thai women with breast cancer who routinely visited at the breast clinic during mid-December 2011 to September 2012. The inclusion criteria included the participants who had normal perception, cognition, communication performance and complete treatment for their cancer at least for one year; were willing and voluntary to participate in the study. Participants were randomly assigned into two groups; experimental group (n = 15 cases) and control group (n = 15 cases). Data collection was done by one research assistant that was blind to which group the patients belonged to, in order to avoid measuring biases. The outcomes were assessed at three time points: at baseline (T_1), 6^{th} week (T_2), and 12^{th} week (T_3) after the program implementation. This study was no drop-out and withdraws cases. The instruments were two sets consisting of the instruments for data collection and TCQQ program. Four psycho-behavioral measurement used in this study including the RSE, the FSI, and the FACT-B (total score) had good internal consistency with alpha conbrach coefficiency of 0.576, 0.945, and 0.890, respectively. Data analyses were

employed consisting of descriptive statistics, the independent *t*-test, the *Chi–Square* test, the RM-ANOVA and the RM-ANCOVA.

The majority of Thai women living with breast cancer at the 1st year after treatment completion was in middle adult women (older than 40 years old) and was in normal body size (BMI $\leq$ 25 Kg/m^2). Most of them were married and having family caregiver. The majority of participants completed primary education and worked as worker/trader. The majority of them preferred some exercise; although, they had no routine adopting exercise. A few participants had some routinely adopting exercise consisting of walking, hula-hoop dance, and aerobic-dance. Moreover, the majority of participants didn't have any regular adopting complementary therapy; a few participants had regular massage one a week. About coffee drinking habit, more than a half of participants drank coffee.

Regarding with medical history, most of participants were in stage I and II and the majority of them got MRM surgery. The associated hormone receptors: estrogen receptor, progesterone receptor, and herneu-2 receptor were mostly negative results and the majority of participants were already in menopausal period. Most of them received chemotherapy, radiation, and hormone therapy. However, they were living without any complications; a few participants developed some mild complications such as numbness, wound pain, and mild arm lymphedema. About their co-morbidities, a half of them lived with normal condition and others lived with some co-morbidity. However, they were in controllable treatment and adherent medication.

At baseline, four dependent variables were revealed low self-esteem, mild to moderate fatigue, high UC level, and moderate QOL. The participants had slightly low self-esteem score (RSE < 20 scores) and high UC level in both group. Indeed, they lived with some psychological distress. In addition, they had mild fatigue and lived with moderate QOL.

The results revealed that after controlling dependent variables at baseline (T_1) as covariates Thai women with breast cancer who completed TCQQ program had more positive outcomes of self-esteem, fatigue, UC level, and QOL than those who received the usual care at 6th and 12th week after program implementation. They also had good adherence rate with TCQQ program. The participants in experimental group felt voluntary participating in the TCQQ program and willing to visit in every

week regularly as well. Therefore, it can be concluded that the TCQQ program could be recommended as safe and available nursing intervention to Thai women living with breast cancer and may have positive effects on health outcomes including QOL. In addition, the findings obtained from this study supporting the notion that the psychoneuroimmunology (PNI) model is a useful framework for explaining self-esteem, fatigue, UC level, and QOL as health outcomes of the TCQQ program in Thai women living with breast cancer. Moreover, this study has provided the empirical evidence of the effectiveness of TCQQ itself on promoting health and QOL in this group of population.

6.2 Implications and Recommendations

6.2.1 Implication for Nursing Practice

Based on the study's findings, it could be noted that TCQQ program for women living with breast cancer was well responded in process to improve self-esteem, fatigue, UC level, and QOL. However, strategies to motivate those participants to participate and sustain with the program should be further explored. Moreover, the results were revealed that some challenges in breast cancer survivors.

1) Oncology nursing practice should pay greater attention to other possible alternative nursing care such as complementary therapy, as physical exercise, mind-body intervention, meditation, yoga, massage, acupuncture, reflexology, herbal and nutrition, and le-ki etc. In addition, some traditional or local interventions which could be safe, viable, and valid implemented in cancer patients such as folk dance, Thai dancing, and some martial art etc. However, the new nursing practice could be based on sufficient evidence, and it must be validated and tested by research process rigorously. Based on the results of this study TCQQ program should be considered as one alternative way for nurses to apply this new nursing intervention for enhancing health and QOL in oncology patients by concerning their health condition, limitation, individual interest including patient preference, lifestyle, and needs.

2) Active and powerful nursing practice is an important feature of intervention achievement. The better strategies for attracting Thai women living with

breast cancer and adherence them with TCQQ program are apparent information about clear objective and obvious content, validated effects, accessible and viable program support. For instances, transportation fee, some facilities, incentives: refreshment, gift, certification, some snack or food, empowerment, closely monitoring (e.g., telephone visit one a week to monitor and provide some necessary information), and tailor or adjustable programs. Encouragement and empowerment breast cancer survivors are the better technique to stimulate them participating consistently and accurately.

3) Integrating nursing practice in Thai women living with breast cancer should include multidisciplinary team and relevant persons. Maintenance of program fidelity could be extremely difficult if nurse practice alone. Care management in Thai women living with breast cancer is continuity interesting issues which nurses should play significant role to deal with this work continuously. Close collaboration and active facilitation between hospital and home, or between patients, health care personnel, and family could also enhance the better outcomes in Thai women living with breast cancer in long-term. A targeted home-base and community-base TCQQ program is one of tools that should be utilized as available and feasible nursing intervention in breast cancer patients particularly in survivorship period.

6.2.2 Implication for nursing education

Health promotion in chronic illness is the powerful world view focusing on enhancing the positive health outcomes in health limitation. TCQQ program in hospital-based setting was developed based on health promotion concept as well. Nurses play significant role in promoting health of people both in wellness and illness condition. Therefore, nursing student should be well educated with sufficient knowledge. The updated nursing curriculum should be based on health promotion concept for undergraduate and postgraduate nursing students regarding motivation people to practice health promoting behavior. In addition, nursing education should also pay greater attention on method/strategies to approach chronic illness patients promote their health in long-term.

TCQQ program and also other health promotion intervention in chronic illness should be included in health promotion intervention and knowledge as an elective course for undergraduate and graduate program. In-services and continuing

education should be provided to assist nurses or other health care providers to better approach the target population of interest in promoting health.

6.2.3 Recommendation for further study

1) TCQQ program should be conducted in larger sample size to investigate it effectiveness on interested health outcomes in Thai women living with breast cancer. Regarding the limitation of the enrollment time and resources; therefore, further study should be enrolled in larger group of Thai women living with breast cancer including from other hospitals or community.

2) This TCQQ program was tested for its effects in Thai women living with breast cancer who at the 1st year after treatment completion. The TCQQ program should be expanded to study in Thai women with breast cancer at active treatment period in various times; for instance, diagnostic period, surgery period, chemotherapy period, radiation period, and in longer-time survivor period. The TCQQ program may be beneficial nursing intervention which could be used improving health and reducing some side-effects of cancer treatment in Thai women with breast cancer.

3) Alternative program is another challenge point which could be further studied. For instance, combined program, tailor intervention, and preferred intervention should be developed aiming to improving health in breast cancer patients including other cancer site patients.

4) Other perspective outcomes about the advantages of the TCQQ program should be conducted in further study such as its effective, effectiveness, sustainability, reducing health care cost, reducing rage of stay, increasing service satisfaction, and other health outcomes in breast cancer survivors.

5) Based on the obtained findings that controlled the baseline dependent variables (T_1) as covariates, the findings were then statistically significant differences between two comparison groups at T_2 and T_3. Challenging, the further study should be used this points to more figure out what else those confounding variables might be such as intelligent quotient (IQ), memory, cognitive, some physical performance, some psychological stage, and some unique social support etc. To fill this gap of knowledge and verify the actual effects of TCQQ program in Thai women living with breast cancer based on the PNI model explanation as well.

Contribution to nursing knowledge development

The effects of TCQQ program on some health outcomes and QOL in Thai women living with breast cancer have been proved by these research findings. As an intervener of TCQQ program in this study, it could be noted that nurses are in the best position to expand their nursing role as an inventor or creator who develops some new nursing knowledge by empirical method. In this study, a new nursing knowledge regarding promoting health in Thai women with breast cancer is emerged from the effects of TCQQ program on some health outcomes was using strong theory-driven and research based evidence (research paper, systematic reviews, meta-analysis, literature, articles, and text book etc.). Nursing knowledge could be developed through various provable and empiric methods; moreover, nurses should have curiosity and dare mind to invent our new nursing knowledge which is the first significant step of the next nursing professional generation.

Based on the result of the study, synergic effects of physical health, psychological health, physiological health, and overall health could be the challenging outcomes in nursing perspective. A new nursing theory which will be examined by objective concepts and empirical words is now the new trend of nursing theory development in the 21st century. For instance, linkages of self-esteem (psychological concept), fatigue (psychological and physical concept), cortisol level (stress hormone), and QOL as a new phenomena of interest should be tested by research which may be the new middle-rage nursing theory.

Considered together as the number of Thai women living with breast cancer in this country will continue to grow and that their long-term health problems and resulting needs will demand increasing attention. Close collaboration and active facilitation between hospital and home, or between patients, health care personnel, and family could also enhance the better outcomes in Thai women living with breast cancer in long-term. A targeted home-base and community-based TCQQ program is one of tools that should be utilized as available nursing intervention in Thai women living with breast cancer particularly in survivorship period.

REFERENCES

Aardal-Eriksson, E., Karlberg, B.E., Holm, A.C. (1998). Salivary cortisol-an alternative to serum cortisol determinations in dynamic function tests. *Clinical Chemistry and Laboratory Medicine, 36*(4), 215-22.

Ader, R. (2001). Psychoneuroimmunology. *Current Direction in Psychological Science, 10*(3), 94-101.

Ah, V.D., Kang, D-H., & Carpenter, J.S. (2007). Stress, optimism, and social support: Impact on immune responses in breast cancer. *Research in Nursing & Health, 30*, 72-83.

Ah, V.D., Russell, K.M., Storniolo, A.M., & Carpenter, J.S. (2009). Cognitive Dysfunction and its relationship to quality of life in breast cancer survivors. *Oncology Nursing Forum, 36*(3), 326-336.

Ainsworth, B., Haskell, W.L., Whitt, M.C., Irwin, M.L., Swartz, A.M., Strath, S.J. et al. (2000). Compendium of physical activities: an update of activity code and MET intensities. *Medicine and Science in Sport and Exercise, 32*(9), S498-516.

Al' Absi, M., Lovallo, W.R., McKey, B., Sung, B.H., Whitsett, T.L., & Wilson, M.F. (1998). Hypothalamic-Pituitary-Adrenocortical responses to psychological stress and caffeine in men at high and low risk for hypertension. *Psychosomatic Medicine, 60,* 521-527.

Alexander, S., Minton, O., Andrews, P., & Stone, P. (2009). A comparison of the characteristics of disease-free breast cancer survivors with or without cancer-related fatigue syndrome. *European Journal of Cancer, 45,* 384-392.

Althuis, et al., (2004). Etiology of hormone receptor–defined breast cancer; a systematic review of the literature. *Cancer Epidemiology, Biomarkers & Prevention, 13,* 1558-1568.

American Cancer Society: Cancer facts & figures. (2010). *Breast Cancer Facts & Figures 200*9-2010. Atlanta: American Cancer Society, Inc.

Andersen, B.L., Farrar, W.B., Golden-Kreutz, D., Kutz, L.A., MacCallum, R. & Courtney, M.E., et al. (1998). Stress and immune responses after surgical treatment for regional breast cancer. *Journal of the National Cancer Institute, 90*(1), 30-36.

Andersen, B.L., Kiecolt-Glaser, J.K., & Glaser, R. (1994). A biobehavioral model of cancer stress and disease course. *American Psychology, 49*, 389-404.

Andersen, B.L. (2002). Biobehavioral outcomes following psychological interventions for cancer patients. *Journal of Consulting and Clinical Psychology, 70*(3): 590–610.

Anderson, K.O. et al. (2003). Fatigue and sleep disturbance in patients with cancer, patients with clinical depression, and community-dwelling adults. *Journal of Pain and Symptom Management, 25*(4), 307-314.

Andrykowski, M.A., Beacham, A.O., & Jacobsen, P.B. (2007). Prospective, longitudinal study of leisure-time exercise in women with early-stage breast cancer. *Cancer Epidemiology, Biomarkers & Prevention, 16*(3), 430-438.

Antoni, M.H. (2003). Psychoneuroendocrinology and psychoneurommunology of cancer: plausible mechanisms worth pursing?. *Brian, Behavior, and Immunity, 17*, S84-S91.

Aouizerat et al., (2009). Preliminary evidence of a genetic association between tumor necrosisfactor alpha and the severity of sleep disturbance and morning fatigue. *Biological Research for Nursing,, 11*, 27-41.

Aree, P., Wonghongkul, T., Tungpunkom, P., Sawasdisingha, P., Thummathai, K., & Muttarak, M. (2007). Effect of nutritional supporting program on nutritional status in breast cancer survivors. *Nursing Journal, 34*(3), 124-133.

Arman, M., Rehnsfeldt, A., Lindholm, L., & Hamrin, E. (2002). The face of suffering among women with breast cancer-being in a field of forces. *Cancer Nursing,25*, 96–103

Arndt, V., Stegmaier, c., Ziegler, H., & Brenner, H. (2006). A population-based study of The impact of specific symptoms on quality of life in women with breast cancer 1 year after diagnosis**.** *Cancer, 107*(10), 2486-2503.

Awikunprasert, C., Vongjaturapat, N., Li, F., & Sittiprapaporn, W. (2012). Exercise program on the quality of life in cancer patients. *Journal of Natural Sciences Research, 2*(2), 18-22.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Revolution, 84*, 191-215. Bandura, (1982). Self-efficacy mechanism in human agency. *Americal Psychologiast, 37*(2), 122-147.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman. Bandura, (2004). Health promotion by social cognitive means. *Health Education & Behavior,31*(2), 143-164.

Bardwell, W.A., & Ancoli-Israel, S. (2008). Breast cancer and fatigue. *Sleep Medical Clinic, 3*(1): 61–71.

Baron, R.S., Cutrona, C.E., Hicklin, D., Russell, D.W., & Lubaroff, D.M. (1990). Social support and immune function among spouse of cancer patients. *Journal of Personality and Social Psychology, 59*(2), 344-352.

Bartoces, M.G., Severson, R.K., Rusin, B.A., Schwartz, K.L., Ruterbusch, J.J., & Neale, A. V. (2009). Quality of life and self-esteem of long-term survivors of invasive and noninvasive cervical cancer. *Journal of Women's Health, 18*(5), 655-661.

Battaglini, C., Battaro, M., Dennehy, C., Rae, L., Shields, E, Kirk, D., & Hackney, A. (2007). The effects of an individualized exercise intervention on body composition in breast cancer patients undergoing treatment. *Sao Paulo Medical Journal, 125*(1), 22-28.

Bauer-Wu, S.M. (2002a). Psychoneuroimmunology part I: Mind-body interventions. *Clinical Journal of Oncology Nursing, 6*(4), 243-246.

Bauer-Wu, S.M. (2002b). Psychoneuroimmunology part II: Mind-body interventions. *Clinical Journal of Oncology Nursing, 6*(4), 258-261.

Beeber, L. S., Seeherunwong, A., Schwartz, T., Funk, S. G., & Vongsirmas, N. (*2007).* Validity of the Rosenberg self-esteem scale in young Thai and USA women. *Thai Journal of Nursing Research, 11*(4), 240-250.

Berterö, C.M. (2002). Affected self-respect and self-value: the impact of breast cancer treatment on self-esteem and QOL. *Psycho-Oncology, 11*(4), 356–364.

Bickell, N.A., Weidmann, J., Fei, K., Lin, J.J., & Leventhal, H. (2009). Underuse of breast cancer adjuvant treatment: patient knowledge, beliefs, and medical mistrust. *Journal of Clinical Oncology, 21*(31), 5160-5167.

Bicego, D., Brown, K., Ruddick, M., Storey, D., Wong, C., & Harris, S.R. (2009). Effects of exercise on quality of life in women living with breast cancer: a systematic review. *The Breast Journal, 15*(1), 45–51.

Blanchard, C.M., Courneya, K.S., & Stein, K. (2008). Cancer survivors' adherence to lifestyle behavior recommendations and associations with health-related quality of life: results from the American Cancer Society's SCS-II. *Journal of Clinical Oncology, 26*(13), 2198-2204

Boman, L., Bjorvell, H., Langius, A., & Cedermark, B. (1999). Two model of care as evaluated by a group of women operated on for breast cancer with regard to their perceived well-being. *European Journal of Cancer Care, 8*, 87-96.

Bosompra, K., Ashikaga, T., O′Brien, P.J., Nelson, L., & Skelly, J. (2002) Swelling, numbness, pain and their relationship to arm function among breast cancer survivors: a disablement process model perspective. *The Breastt Journal, 8*(6), 338-348.

Bower, J.E., Ganz, P.A., Desmond, K.A., Rowland, J.H., Meyerowitz, B.E., & Belin, T.R. (2000). Fatigue in breast cancer survivors: occurrence, correlates, and impact on quality of life. *Journal Clinical Oncology, 18*:743-753,

Bower, J.E., Ganz, P.A., Aziz, N., & Fahey, F.L. (2002). Fatigue and proinflammatory cytokine activity in breast cancer survivors. *Psychosomatic Medicine, 64*, 604-611.

Bower, J.E., Ganz, P.A., Aziz, N., Fahey, F.L. (2003). T-cell homeostasis in breast Cancer survivors with persistent fatigue. *Journal of National Cancer Institute, 95*, 1165-1168.

Bower, J.E. (2005). Prevalence and causes of fatigue after cancer treatment: the next generation of research. *Journal of Clinical Oncology, 23*(33), 8280-8282.

Bower, J.E., Ganz, P.A., & Dickerson, S.S. (2005a). Diurnal cortisol rhythm and fatigue in breast cancer survivors. *Psychoneuroendrocrinology, 30*, 92-100.

Bower, J.E, Ganz, P.A., & Aziz, N. (2005b). Altered cortisol response to psychological stress in breast cancer survivors with persistent fatigue. *Psychosomatic Medicine, 67*, 277–280.

Bower, J.E., Wooley, A., & Sternlieb, B. (2005c). Yoga for cancer patients and survivors. *Cancer Control, 12*, 165-171.

Bower, J.E., Ganz, P.A., Desmond, K.A., Bernaards, C., Roeland, J.H., & Meyerowitz, B.E. et al. (2006). Fatigue in long-term breast carcinoma survivors: a longitudinal investigation. *Cancer, 106*(4), 751-758.

Bower, J.E., Ganz, P.A., & Aziz, N. (2007). Inflammatory response to psychological stress in fatigued breast cancer survivors: Relationship to glucocorticoids. *Bran Behavioral Immune, 21*, 251-258.

Bower, J.E. (2008a). What's causing fatigue and cognitive dysfunction? *The Journal Of Supportive Oncology, 6*(3), 135-136.

Bower, J.E. (2008b). Behavioral symptoms in patients with breast cancer and survivors. *Journal of Clinical Oncology, 26*(5), 768-777.

Bower, J.E., Garet, D., & Sternlieb, B. (2011). Yoga for persistent fatigue in breast cancer survivors: results of a pilot study. *Evidence-Based Complementary and Alternative Medicine*, Article ID 623168, doi:10.1155/2011/623168, 1-8.

Bozentka, D.J., Berdjiklian, P.K.,Chan, P., Schmidt, S., Buzby, G.P., & Bora, F. (2001). Hand Related disorders following axillary dissection for breast cancer. *The University of Pennsylvania Orthopedic Journal, 14*, 35-37.

Brady, M.J., Cella D.F., Mo, F., Bonomi, A.E., Tulsky, D.S., Lloyd, S.R., et al., (1997). Reliability and validity of the Functional Assessment of Cancer Therapy-Breast (FACT-B) quality of life instrument. *Journal of Clinical Oncology*, 15, 974-986.

Bray, F., McCarron, P., & Parkin, D.M. (2004). The changing global patterns of female breast cancer incidence and mortality. *Breast Cancer Research, 6*(6), 229-239.

Brennan, M.E., & Houssami, N. (2011). Overview of long term care of breast cancer survivors. *Maturitas*, doi:10.1016/j.maturitas.2011.03.010.

Brown, K.W., Levy, A.R., Rosberger, Z., & Edgar, L. (2003). Psychological distress and cancer survival: A follow-up 10 years after diagnosis. *Psychosomatic Medicine, 65*, 636-643.

Buranaruangrote, S., Kasemkitwattana, S., Pongthavornkamol, K., & Keerativitayanant, N. (2006). Experience and self-management for fatigue in breast cancer patients receiving chemotherapy. *Thai Journal of Nursing Council, 21*(2), 47-62.

Calder, P.C. (2007). Immunological parameters: what do they mean?. *The Journal of Nutrition. 137*, 773S–780S.

Cantarero-Villanueva, I., Fernández-Lao, C., Fernández-DE-Las-Peñas, C., Díaz-Rodríguez, L., Sanchez-Cantalejo, E., Arroyo-Morales, M. (2011). Associations among musculoskeletal impairments, depression, body image and fatigue in breast cancer survivors within the first year after treatment. *European Journal of Cancer Care*, doi: 10.1111/j.1365-2354.2011.01245.

Cappiello, M., Cunningham, R.S., Knobf, M.T., & Erdos, D. (2007). Breast cancer survivors: Information and support after treatment. *Clinical Nursing Research, 16*(4), 278-293.

Carlson, L.E., Campbell, T.S., Garland, S.N., & Grossman, P. (2007). Associations among salivary cortisol, melatonin, catecholamine, sleep quality and stress in women with breast cancer and healthy controls. *Journal of Behavioral Medicine, 30*(1), 45-58.

Cella, D.F., & Cherin, E.A. (1998). Quality of life during and after cancer treatment. *Comprehensive Therapy, 4*, 69-75.

Chae, Y.R., & Seo, K. (2010). Health-related quality of life in women with breast cancer in Korea: Do sociodemographic characteristics and time since diagnosis make a difference? *Oncology Nursing Forum, 37(*4), 295-303.

Chan, A.W., Lee, A., Suen, L.K., & Tam, W. (2011). Tai chi Qigong improves lung functions and activity tolerance in COPD clients: a single blind randomized controlled trial. *Complementary Therapies in Medicine, 19*(1), 3-11.

Chao, Y-F., Chen, S-Y., Lan, C., & Lai, J-S. (2002). The cardiorespiratory response and energy expenditure of Tai-Chi-Qui-Gong. *The American Journal of Chinese Medicine, 30*(4), 451-461.

Chen, K.M & Snyder, M. (1999). A research-based of Tai Chi/movement therapy as a nursing intervention. *Journal of Holistic Nursing, 17*(3), 267-279.

Cho, O-H., Yoo, Y-S., & Kim, N-C. (2006). Efficacy of comprehensive group Rehabilitation for women with early breast cancer in South Korea. *Nursing and Heath Sciences, 8,* 140-146.

Coe, C., & Laudenslager, M. L. (2007). Psychosocial influences on immunity, including effects on immune maturation and senescence. *Brain, Behavior, and Immunity, 21,* 1000-1008.

Cohen, L. & Holliday, M. (1982). *Statistics for Social Scientists an Introductory Text With Computer Programs in BASIC,* London: Haper & Row, Publishers.

Colditz, G.A., Sellers, T.A., & Trapido, E. (2006). Epidemiology – identifying the causes and preventability of cancer?. *Nat Rev, 6,* 75-83.

Collado-Hidalgo, A., Bower, J.E., Ganz, P.A., Cole, S.W., & Irwin, M.R. (2006). Inflammatory biomarkers for persistent fatigue in breast cancer survivors. *Clinical Cancer Research, 12,* 2759-2766.

Compass, B.E., Stoll, M.F., Thomsen, A.H., Oppedisano, G., Epping-Jordan, J.E., & Krag, D.N. (1999). Adjustment to breast cancer: age-related differences in coping and emotional distress. *Breast Cancer Research and Treatment, 54*(3), 195-203.

Costanzo, E.S., Lutgendorf, S.K., & Mattes, M.L., et al. (2007). Adjusting to life after treatment: distress and quality of life following treatment for breast cancer. *British Journal Cancer 97,* 1625-163.

Courneya, K.S., & Friedenreich, C.M. (1999). Physical exercise and quality of life following cancer diagnosis: a literature review. *Annual Behavior of Medicine, 21*(2), 171-9.

Courneya, K.S., Jones, L.W., Mackey, J,R., & Fairey, A.S. (2006). Exercise beliefs of breast cancer survivors before and after participant in a randomized controlled trial. *International Journal of Behavioral Medicine, 13*(3), 259-264.

Courneya, K.S., Mackey, J.R., Bell, G.J., Jones, L.W., Field, C.J., & Fairey, A.S. (2003). Randomized controlled trial of exercise training in postmenopausal breast cancer survivors: cardiopulmonary and quality of life outcomes. *Journal of Clinical Oncology, 21*(9), 1660-1668.

Daley, A.J., Crank, H., Saxton, J.M., Mutrie, N., Coleman, R., & Roalfe, A. (2007). Randomized trial of exercise therapy in women treated for breast cancer. *Journal of Clinical Oncology, 25*(13), 1713-1721.

Daley, A.J., Mutrie, N., Crank, H., Coleman, R., & Saxton, J. (2004). Exercise therapy In women who have had breast cancer: design of the Sheffield women's exercise and well-being project. *Health Education Research, 19*(6), 686-697.

Davis, C., Kellett, S., Beail, N., & Turk, J. (2009). Utility of the rosenberg self-esteem scale. *American Journal on Intellectual and Developmental Disabilities, 114(*3), 172-178.

Dechamps, A., Lafont, L., & Bourdel-Marchasson, I. (2007). Effects of Tai chi exercise on self-efficacy and psychological health. *Europe Revolution Aging Physical Action, 4*, 25-32.

Demark-Wahnefried, W., Pinto, B.M., & Gritz, E.R. (2006). Promoting health and physical function among cancer survivors: potential for prevention and questions that remain. *Journal 0f Clinical Oncology, 24*(32), 5125-5131.

DeSanto-Madeya, S., Bauer-Wu, S., & Gross, A. (2007). Living full lives: activities of daily living of women with advance breast cancer. *Oncology Nursing Forum, 34*(4), 841-846.

Deshields, T., Tibbs, T., Fan, M-Y, Bayer, L., Taylor, M., & Edwin Fisher, E. (2005). Ending treatment: the course of emotional adjustment and quality of life among breast cancer survivors immediately following radiation therapy. *Supportive Care in Cancer, 13*(12), 1018-1026.

Deutsh, V., Lerner-Gava, L., Reches, A., Boyko, V., Limor, R., & Grisaru, D. (2007). Sustained leukocyte count during rising cortisol level. *Acta Haematologica, 118*(2), 73-76.

Dirksen, S.R. (2000). Predicting well-being among breast cancer survivors. *Journal of Advanced Nursing, 32*(4), 937-943.

Dorn, L.D., Lucke, J.F., Loucks, T.L., Berga, S.L. (2007). Salivary cortisol reflects serum cortisol: analysis of circadian profiles. *Annals of Clinical Biochemistry, 44*(pt 3), 281-284.

Doyle, N. (2008). Cancer survivorship: Evolutionary concept analysis. *Journal of Advanced Nursing, 62*(4), 499-509.

Doyle, et al. (2008). Nutrition and physical activity during and after cancer treatment: An American cancer society guide for inform choices. *CA Cancer Journal Clinical, 56*(6), 323-353.

Duijts, S.F.A., Faber, M.M., Oldenburg, H. S.A., Beurden, M., & Aaronson, N.K. (2010). Effectiveness of behavioral techniques and physical exercise on psychological functioning and health-related quality of life in breast cancer survivors-a meta-analysis. *Psycho-Oncology.*

Dugue, B., Leppanen, E.A., Teppo, A.M., Fyhrquist, F., & Grasbeck, R. (1993). Effects of psychological stress on plasma interleukins-1 beta and 6, C-reactive protein, tumour necrosis factor alpha, anti-diuretic hormone and serum cortisol. *Scandinavian Journal of Clinical and Laboratory of Investigation, 53*(6), 555-561.

Edwards, L.C. (2004). Mind-body-spirituality and health interactions. *The Rose & Croix Journal, 1*, 61-76. Retrieved on September 31, 2008, from www.rosecroixjournal.org.

Elavsky, S., McAuley, E., Motl, R.W., Konopack, J.F., Marquez, D.X., Hu, L., et al. (2005). Physical activity enhances long-term quality of life in older adults: efficacy, esteem, and affective influences. *Annals of Behavioral Medicine, 30*(2), 138-145.

Eom, A. (2007). Effects of a Tai Chi program for early Mastectomy patients. *Korean Journal of Women Health Nursing, 13*(1), 43-50.

Esch, T., Duckstein, J., Welke, J., Stefano, G.B., & Braun, V. (2007). Mind/body Techniques for psychological and psychological stress reduction: Stress management via Tai Chi training- a pilot study. *Medical Science Monitor, 13*(11), 488-497.

Evans, S., Cousns, L., Tsao, J.C., Sterlieb, B., & Zeltzer, L.K. (2011). Protocol for a randomized study of leyngar yoga for youth with irritable bowel syndrome. Retrieved from open access: http://www.trialsjournal.com/ content on January 1, 2011.

Fagundes,C.P., Murray, D.M., Hwang, B.S., Gouin, J-P., Thayer, J.F., Sollers, J.J. et al. (2011). Sympathetic and parasympathetic activity in cancer-related fatigue: more evidence for a physiological substrate in cancer survivors. *Psychoneuroendocrinology,* doi:10.1016/j.psyneuen.2011.02.005.

Ferlay, J., Shin, H-R., Bray, F., Forman, D., Mathers, C., & Parkin, D.M. (2010). stimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *International Journal of Cancer, 127*, 2893–2917.

Fisher, K.J., Li, F., & Shirai, M. (2003). Promoting health through tai chi: Results from a controlled study. *Californian Journal of Health Promotion, 1*(4), 9-87.

Fukuda, S., & Morimoto, K. (2001a). Lifestyle, stress, and cortisol responses: review I-mental stress. *Environmental Health and Preventive Medicine, 6*, 9-14.

Fukuda, S., & Morimoto, K. (2001b). Lifestyle, stress, and cortisol responses: review II-lifestyle. *Environmental Health and Preventive Medicine, 6*, 15-21.

Fontaine, K.L. (2005). *Complementary & Alternative Therapies for Nursing Practice,* second edition. New Jersey, Pearson Education, Inc., Upper Saddle River.

Fontana, J.A. (2000). The energy costs of a modified form of T'ai Chi exercise. *Nursing Research, 49*(2), 91-96.

Gruenewald, T.L., Kemeny, M.E., Aziz, N., & Fahey, J.L. (2004). Acute threat to the Social self: shame, social self-esteem, and cortisol activity. *Psychosomatic Medicine, 66*, 915–924.

Galantino, M.l., Capito, L., Kane, R.J., Ottey, N., Swozer, S., Packel, L., et al. (2003). The effects of tai chi and walking on fatigue and body mass index in women living with breast cancer: A pilot study. *Rehabilitation Oncology, 21*, 17-21.

Galatino, M.L., Shepard, K., Krafft, L., Laperriere, A., Ducette, J., Sorbello, A., et al. (2005). The effects of group aerobic exercise and T'ai Ch'ai on functional outcomes and quality of life for person living with acquired immunodeficiency syndrome. *Journal of Alternative and Complementary Medicine, 11*, 1085-1092.

Galvao, D.A., & Newton, R.U. (2005). Review of exercise intervention studies in Cancer patients. *Journal of Clinical Oncology, 23*(4), 899-909.

Ganz, P.A., Kwan, L., Stanton, A.L., Bower, J.E., & Belin, T.R. (2011). Physical and psychosocial recovery in the year after primary treatment of breast cancer. *Journal of Clinical Oncology, 29*(9), 1101-1109.

Ganz, P.A., Kwan, L., Stanton, A.L., Krupnick, J.L., Rowland, J.H., Meyerowitz, B.E. et al. (2004). Quality of life at the end of primary treatment of breast cancer: first results from the moving beyond cancer randomized trial. *Journal of the National Cancer Institute, 96*(5), 376-87.

Ganz, P.A., Rowland, J.H., & Desmond, K. (1998). Life after breast cancer: Understanding women's health-related quality of life and sexual functioning. *Journal of Clinical Oncology, 16*, 501-514.

Ganz, P.A., Rowland, J.H., Meyerowitz, B.E., & Desmond, K.A. (1998). Impact of different adjuvant therapy strategies on quality of life in breast cancer survivors. *Recent Results Cancer Research, 152*, 396-411.

Ganz, P.A. (2002). Breast cancer 2002: Where do we stand? *CA: A Cancer Journal of Clinicians, 52*, 253-255.

Ganz, P.A., Desmond, K.A., Leedham, B., Rowland, J.H., Meyerowitz, B.E., & Belin, T.R. (2002). Quality of life in long-term, disease-free survivors of breast cancer: a follow-up study. *Journal of the National Cancer Institute, 94*(1), 39-49.

Garofalo, M.P. (2000). *Taijiquan 24 form: Standard simplified Chinese National Version Tai Chi Chuan 24 movement form, 1956, in the Yang style.* Retrieved on November 6 , 2008, from http://www.egreenway.com/ taichichuan/short.htm.

Gélinas, C., & Fillion, L. (2004). Factors related to persistent fatigue following completion of breast cancer treatment. Oncology Nursing Forum, 31(2), 269-277.

Georgakis, G.V., & Younes, A. (2005). *Cytokines and Lymphomas*. In Platanias, L.C. Editor. Cytokines and Cancer. New York, Springer Science & Business Media, Inc.

Giordano, S.H., Buzdar, A.U., Smith, T.L., et al. (2004). Is breast cancer survival improving? trends in survival with recurrent breast cancer diagnosed from 1974 through 2000. *Cancer, 100*, 44-52.

Gordon, L.G., Battistutta, D., Scuffham, P., Tweeddale, M., & Newma, B. (2005). The impact of rehabilitation support services on health-related quality of life for women with breast cancer. *Breast Cancer Research and Treatment, 93*, 217–22.

Hackney, A.C., Viru, A. (2008). Research methodology: endocrinologic measurements in exercise science and sports medicine. *Journal of Athletic Training, 43*, 631–639.

Hann, D.M., Denniston, M.M., & Baker, F. (2000). Measurement of fatigue in cancer patients: further validation of the Fatigue Symptom Inventory. *Quality of Life Research, 97*(7), 847-854.

Hann, D.M., Jacobsen, P.B., Azzarello, L.M., Martin, S.C., Curran, S.L., Fields, K.K. et al. (1998). Measurement of fatigue in cancer patients: development and validation of the Fatigue Symptom Inventory. *Quality of Life Research, 7*(4), 301-310.

Harris, L., Fritsche, H., Mennel, R., Norton, L., Ravdin, P., et al. (2007). American society of clinical oncology 2007 update of recommendations for the use of tumor markers in breast cancer. *Journal of Clinical Oncology, 25*(33), 5287-5312.

Härtl, K., Schennach, R., Müller, M., Engel, J., Reinecker, H., Sommer, H., et al. (2010). Quality of life, anxiety, and oncological factors: a follow-up study of breast cancer patients. *Psychosomatics, 51*(2), 112-122.

Hayes, S., Battistutta, D., & Newman, B. (2005). Objective and subjective upper body function six months following diagnosis of breast cancer. *Breast Cancer Research and Treatment, 94*, 1–10.

Helgeson, V. S., Snyder, P., Seltman, H. (2004). Psychological and Physical adjustment to breast cancer over 4 years: identifying distinct trajectories of change. *Health Psychology, 23*(1), 3-15.

Hellhammer, D.H., Wust, S., Kudielka, B.M. (2009). Salivary cortisol as a biomarker in stress research. *Psychoneuroendocrinology, 34*, 163–171.

Hewitt, M., Greenfield, S., & Stoval, E. (2006). *From cancer patient to cancer survivor lost in transition.* Institute of Medicine and National Research Council of the National Research Academies. The National Academies Press, Washington, D.C.

Hirai, K., Suzuki, Y., Tsuneto, S., Ikenaga, M., Hosaka, T., & Kashiwagi, T. (2002). A structural model of the relationships among self-efficacy, psychological adjustment, and physical condition in Japanese advanced cancer. *Psycho-Oncology, 11*, 221-229.

Holick, C.N., Newcomb, P.A., Trentham-Dietz, A., Titus-Ernstoff, L., Bersch, A.J. et al. (2008). Physical activity and survival after diagnosis of invasive breast cancer. *Cancer Epidemiology Biomarkers Prevention, 17*(2), 379-386.

Holmes, M.D., Chen, W.Y., Feskanich, D., Kroenke, C.H., & Colditz, G.A. (2005). Physical activity and survival after breast cancer diagnosis. *JAMA, 293*, 2479-2486.

Huang, G., Wu, Y., Zhang, G., Zhang, P., & Gao, J. (2010). Analysis of the Psychological conditions and related factors of breast cancer patients. *Chinese-German Journal of Clinical Oncology, 9*(1), 53-57.

Huo, W.K. (2010). Intrapersonal and interpersonal dimensions of cancer perception: a confirmatory factor analysis of the cancer experience and efficacy scale (CEES). *Support Care Cancer, 18,* 561–571.

Hwang, I.S., & Kwak, Y.S. (2009). Tai chi exercise on MDA, SOD, and physical fitness in breast cancer patients. *Life Science Journal, 19*, 543-548.

Ingram, C., & Visovosky, C. (2007). Exercise intervention to modify physiologic risk factors in cancer survivors. *Seminar in Oncology Nursing, 23*(4), 275-284.

Irwin, M.L., Crumley, D., McTiernan, A., Bernstien, L., Baumgartner, R., Gilliland, F.D., Kirska, A., et al. (2003). Physical activivty levels before and afeter a dignosis of breast carcinoma. *Cancer, 97*(7), 1746-1757.

Irwin, M.L., McTiernan, A., Bernstein, L., Gilliland, F.D., Baumgartner, R., Baumgartner, K., & Ballard-Barbash, R. (2004). Physical activity levels among breast cancer survivors. *Medicine & Science in Sports & Exercise, 36*(9), 1484-1491.

Irwin, M.L., Olmstead, R., & Oxman, M.N. (2007). Augmenting immune response to Varicella zoster virus in older adults: a randomized, controlled trial of Tai Chi. *Journal Of American Geriatric Sociology, 55*, 511-517.

Isaksson G., & Feuk, B. (2000). Morbidity from axillary treatment in breast cancer: a follow-up study in a district hospital. *Acta Oncologica, 39*(3), 335-336.

Jacobsen, P.B., Donovan, K.A., & Small, B.J., et al. (2004). Fatigue after treatment for Early stage breast cancer: A controlled comparison. *Cancer, 110,* 1851-1859.

Jancewicz, A. (2001). Tai Chi Chuan's role in maintaining independence in ageing people with chronic disease. *Journal of Bodywork and Movement Therapies, 5*(1), 70-77.

Jahnke, R., Larkey, L., Rogers, C., & Etnier, J., Lin, F. (2010). A comprehensive review of health benefits of Qigong and Tai Chi. *American Journal of Health Promotion, 24*(6), 1-25.

Jemal, A., Siegel, R., Xu, J., & Ward, E. (2010). Cancer Statistics, 2010. *CA Cancer Journal Clinician*, 60, 277-300. Originally published online Jul 7, 2010 DOI: 10.3322/caac.20073.

Jean-Pierre, P., Figueroa-Moseley, C.D., Kohli, S., Fiscella, K., Palesh, O.g., & Morrow, G.R. (2007). Assessment of cancer-related fatigue: implications for clinical diagnosis and treatment. *The Oncologist, 12*(Supp. 1), 11-21.

Jin, P. (1989). Changes in heart rate, nonadrenaline, cortisol, and mood during Tai Chi, *Journal of Psychosomatic Research, 33*, 197-206.

Jin, P. (1992). Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing Mental and emotional stress. *Journal of Psychosomatic Research, 36*, 361-370.

Johansson, K. Ohlsson, K., Ingvar, C., Albertsson, M., & Ekdahl, C. (2002). Factors associated with the development of arm lymphedema following breast cancer treatment: A match pair case-control study. *Lymphology, 35*(2), 59-71.

Jordan, I., Hebestreit, A., Swai, B., & Krawinkel, M.B. (2013). Dietary patterns and breast cancer risk among women in northern Tanzania: a case–control study. *European Journal of Nutrition, 52*, 905–915

Julious, S.A. (2005), Sample size of 12 per group rule of thumb for a pilot study. *Pharmaceutical Statistics, 4*, 287-291.

Junda, T. (2004). Living with breast cancer: Thai women's perspective. *Thai Journal Nursing Research, 8*(3), 208-222.

Karakoyun-Celik, O., Gorken, I., Sahin, S., Orcin, E., Alanyali, H., & Kinay, M. (2010). Depression and anxiety levels in woman under follow-up for breast cancer: relationship to coping with cancer and quality of life. *Medical Oncology, 27*, 108-113.

Kiecolt-Glaser, J. K., McGuire, L., Robles, T., & Glaser, R. (2002). Psychoneuro-immunology: psychological influences on immune function and health. *Journal of Consulting and Clinical Psychology, 70*, 537-547.

Kim, S.H., Son, B.H., Hwang, S.Y., Han, W., Yang, J-H., & Lee, S. et al. (2008). Fatigue and depression in disease-free breast cancer survivors: prevalence, correlates, and association with quality of life. *Journal of Pain and Symptom Management, 35*(6), 644-655.

Kim, J., Ashing-Giwa, K.T., Kagawa, Singer, M., & Tejero, J.S. (2006). Breast cancer among Asian-Americans: is acculturation related to health-related quality of life?. *Oncology Nursing Forum, 33*(6), 90-99.

Klein, P.J., & Adams, W.D. (2004). Comprehensive therapeutic benefits of Taiji: a Critical review. *American Journal of Physical therapy, Medicine, ehabilitation,83*(9), 735-745.

Knobf, M.T. (2007). Psychosocial responses in breast cancer survivors. *Seminar in OncologyNursing, 23*(1), 71-83.

Knobf, M.T., Musanti, R., & Dorward, J. (2007). Exercise and quality of life outcomes in patients with cancer. *Seminar in Oncology Nursing, 23*(4), 285-296.

Knobf, M.T., Insogna, K., DiPietro, L., Fennie, K., & Thompson, A.S. (2008). An aerobic weight-loaded pilot exercise intervention for breast cancer survivors: bone remodeling and body composition outcomes. *Biological Research for Nursing, 10*(1), 34-43.

Knols, R., Aaronson, N.K., Uebelhart, D., Fransen, J., & Aufdemkampe, G. (2005). Physical exercise in cancer patients during and after medical treatment: A systematic review of randomized and controlled trials. *Journal of Clinical Oncology, 16*(1), 3830-3842.

Konecny, G., Pauletti, G., Pegram, M., Untch, M., & Dandekar, S., et al. (2003). Quantitative association between HER-2/neu and steroid hormone receptors in hormone receptor-positive primary breast cancer. *Journal of the National Institute, 95*(2), 142-153.

Kroenke, C.H., Rosner, B., Chen, W.Y., Kawachi, I., Colditz, G.A., & Holmes, M.D. (2004). Functional impact of breast cancer by age at diagnosis. *Journal of Clinical Oncology*, *22*(10), 1849-1856.

Kuramoto, A.M. (2006). Therapeutic benefits of Tai Chi exercise: research review. *Wisconsin Medical Journal. 105*(7), 42-46.

Kutner, N.G., Barnhart, H., Wolf, S.L., McNeely, E., & Xu, T. (1997). Self-report benefits of tai chi practice by older adults. *Journal of Gerontology, Behavior, Psychology, Science, Sociology, Science, 52*(B), 242-246.

Lan, C., Chen, S.Y., & Lai, J.S. (2008). The exercise intensity of Tai Chi Chuan. *Medical Sport Science, 52*, 12-19.

Lan, C., Chou, S-W., Chen, S-Y., Lai, J-S., & Wong, M.K. (2004). The aerobic capacity and ventilatory efficiency during exercise in Qigong and Tai Chi Chuan practitioners. *The American Journal of Chinese Medicine. 32*(1), 141-150.

Landis, Murray, Bolden, & Wingo, (1998). Cancer statistics 1998. *CA: Cancer Journal of clinicians, 48*(1), 6-29.

Lauver, D., Connolly-Nelson, K., & Vang, P. (2007). Health-related goals in female cancer survivors after treatment. *Cancer Nursing, 30*(1), 9-15.

Lawrence D.P., Kupelnick B., Miller K., Devine D., & Lau J. (2004). Evidence report on the occurrence, assessment, and treatment of fatigue in cancer patients. *Journal of the National Cancer Institute Monographs, 32*, 40-50.

Lazarus, S. & Folkman, R.S. (1994). *Stress, Appraisal, and Coping.* Springer Publishing Company, New York.

Leddy, S.K. (1997). Incentives and barriers to exercise in women with a history of breast cancer. *Oncology Nursing Forum, 24*(5), 885-890.

Lee, H.L., Ku, N.P., Dow, W.J., Pai, L. (2001). Factors related to quality of life in breast cancer patients receiving chemotherapy. *Journal of Nursing Research, 9*(3):57-68.

Lee, M.S., Choi, Ernst, E. (2010). Tai chi for breast cancer patients: a systematic review. *Breast Cancer research and Treatment, 1*20(2), 309-316.

Lee, M.S., Lee, E.N., Ernst, E. (2009). Is tai chi beneficial for improving aerobic capacity? a systematic review. *British Journal of Sports Medicine, 4*3, 569-573.

Lee, M.S., Pittler, M.H., & Ernst, E. (2007). Is tai chi an effective adjunct in cancer care? a systematic review of controlled clinical trials. *Support Care Cancer, 15*, 597-601.

Lee, L., Lee, D.T., Woo, J. (2007). Effect of Tai Chi on state self-esteem and health-related quality of life in older Chinese residential care home residents. *Journal of Clinical Nursing, 16*, 1580-1582.

Leung, E.S., & Tsang, W.W.N. (2008). Comparison of the kinetic characteristics of standing and sitting Tai Chi forms. *Disability and Rehabilitation, 30*(25), 1891-1900.

Levy, S.M., Herberman, R.B., Lippman, M., & d'Angelo, T. (1987). Correlation of stress factors with sustained depression of natural killer cell activity and predicted prognosis in patients with breast cancer. *Journal of Clinical Oncology, 5*(3), 348-353.

Levy, S.M., Herberman, R.B, Whiteside, T., Sanzo, K., Lee, J., & Kirkwood, J. (1990). Perceived social support and tumor estrogen/progesterone receptor status as predictors of natural killer cell activity in breast cancer patients. *Psychosomatic Medicine, 52*, 73–85.

Li, F., Harmer, P., Duncan, T. E., Duncan, S. C., & Chaumeton, N. R. (2002). Tai Chi as a means to enhance self-esteem: a randomized controlled trial. *Journal of Applied Gerontology*, 21, 70-89.

Li, F., Harmer, P., McAuley, E., Fisher, K.J., Duncan, T., Duncan, S. (2001). Tai Chi, self-efficacy, and physical function in the elderly. *Prevention Science, 2*(4), 229-239.

Li, F., McAuley, E., Harmer, P., Duncan, T.E., Duncan, S., & Chaumeton, N. (2001). Tai Chi enhanced self-efficacy and exercise behavior in older adults. *Journal of Aging and Physical Activity, 9*, 161-171.

Li, L.X., Hong Y., Chan K.M. (2001). Tai Chi: Physiological characteristics and beneficial effect on health. *British Journal Sports Medicine, 35*, 148-156.

Li, J., & Lambert, V.A. (2007). Coping strategies and predictors of general well-being in women with breast cancer in the People's Republic of China. *Nursing and Health Sciences, 9*, 199-204.

Lovallo, W.R., Whitsett, T.L., Al'Absi, M., Sung B.H., Vincent, A.S., & Wilson, M.F. (2005). Caffeine stimulation of cortisol secretion across the waking hours in relation to caffeine intake levels. *Pharmacology, Biochemistry, and Behaviors*, *67*(5), 734-739.

Lovalloa, W.R., Faragb, N.H., Vincentc, A.S., Thomasb, T.L., & Wilsond, M.F. (2006). Cortisol responses to mental stress, exercise, and meals following caffeine intake in men and women. *Pharmacology, Biochemistry, and Behaviors, 83*(3), 441–447.

Lueboonthavatchai, P. (2007). Prevalence and psychosocial factors of anxiety and depression in breast cancer patients. *Journal of the Medical Association of Thailand, 90*(10), 2164-2174.

Lyon, D.E., McCain, N.L., Walter, J., & Schubert, C. (2008). Cytokine comparisons between women with breast cancer and women with a negative breast biopsy. *Nursing Research, 57*(1), 51-58.

Markopoulos, C., Tsaroucha, A.K., Kouskos, E., Mantas, D., Antonopoulou, Z., & Karvelis, S. (2009). Impact of breast cancer surgery on the self-esteem and sexual life of female patients. *The Journal of International Medical Research, 37*, 182 – 188.

Macfarlane, D.J., Chou, K.-L., Cheng, W.-K. (2005). Effects of Tai Chi on the physical and psychological well-being of Chinese older women. *Journal of Exercise Science Fitness, 3*(2), 87-93.

Mamom, J. (2008). Advanced in care management in patients with breast cancer. *Thai Journal of Nursing Council, 23*(2), 11-25.

Mandelblatt, J., Figueiredo, M., & Cullen, J. (2003). Outcomes and quality of life following breast cancer treatment in older women: when, why, how much, and what do women want? *Health and Quality of Life Outcomes, 1*, 1-11.

Mansky, P., Sannes, T., Wallerstedt, D., Ge, A., Ryan, M., Johnson, L.L., et al. (2006). Tai Chi Chuan: mind-body practice or exercise intervention? studying the benefit for cancer survivors. *Integrative Cancer Therapies, 5*(3), 192-201.

Marucha, P.T., Crespin, T.R., Shelby, R.A., & Anderson, B.L. (2005). TNF-α level in cancer patients relate to social variables. *Brain Behavior Immunity, 19*(6), 521–525.

Mao, J.J., Armstrong, K., Bowman, M.A., Xie, S.X., Kadakia, R., & Farrar, J.T. (2007). Symptom burden among cancer survivors: impact of age and comorbidity. *JABFA, 20*(5), 434-443.

Mao, D.W., Hong, Y., & Li, J.X. (2006). Characteristics of foot movement in Tai Chi exercise. *Physical Therapy, 86*(2), 215-222.

McAuley, E., Blissmer, B., Katula, J., Terry, E.D., & Mihalko, S.L. (2000). Physical activity, self-esteem, and self-efficacy relationships in older adults: a randomized control trail. *Annals of Behavioral Medicine, 22*(2), 131-139.

McAuley, E., Elavsky, S., Motl, R.W., Konopack, J.F., Hu, L., & Marquez, D.X. (2005). Physical activity, self-efficacy, and self-esteem: longitudinal relationships in older adults. *Journal of Gerontology: Psychological Science, 60,* 268-275.

McCain, N.L., Munjas, B.A., Munro, C.L., Elswck Jr, R.K., Robins, J.W., Ferreira-Gonzalez, A., et al. (2003). Effects of stress management on PNI-based outcomes in persons with HIV disease. *Research Nursing Health, 26*(2), 102-117.

McCain, N.L., Gray, D.P., Walter, J.M., & Robins, J. (2005). *Advanced Nursing Science, 28*(4), 320-332.

McMurray, R. G., & Hackney, A.G. (2006). Interactions of metabolic hormone, adipose tissue, and exercise. *Sports Medicine, 35*(5), 393-412.

McNeely, M.L., Campbell, K.L., & Rower, B.H. (2006). Effects of exercise on breast Cancer patients and survivors: A systematic review and meta-analysis. CMAJ, 175, 34-41.

Meeske, K., Smith, A.W., & Alfano, C.M., et al. (2007). Fatigue in breast cancer survivors two to five years post diagnosis: A HEAL Study report. *Quality of Life Research, 16,* 947-960.

Meneses, K., & Benz, R. (2010). Quality of life in cancer survivorship: 20 years later. *Seminars in Oncology Nursing, 26*(1), 36-46.

Miller, A.H., Ancoli-Israel, S., Bower, J.E., Capuron, L., & Irwin, M.R. (2008). Neuro endocrine-immune mechanisms of behavioral comorbidities in patients with cancer. *Journal of Clinical Oncology, 26*(6), 971-982.

Minton, O., & Stone, P. (2009). A systematic review of the scales used for the measurement of cancer-related fatigue (CRF). *Annals of Oncology, 20,* 17–25.

Moadel, A.B., Shah, C., Wylie-Rosett, J., Harris, M.S., Patel, S.R., & Hall, C.B., et al. (2007). Randomized controlled trial of Yoga among a multiethnic sample of breast cancer patients: effects on quality of life. *Journal of Clinical Oncology, 25*, 4387-4395.

Mols, F., Vingerhoets, A.J.J.M., Coebergh, J.W., & Poll-Franse, L.V. (2005). Quality of life among long-term breast cancer survivors: a systematic review. *European Journal of Cancer, 41*, 2613-2619.

Montazeri, A., Vahdaninia, M., Harirchi, I., Ebrahimi, M., Khaleghi, F., & Jarvandi, S., (2008). Quality of life in patients with breast cancer before and after diagnosis: an eighteen month follow-up study. *BMC Cancer, 8*(1), 1-6.

Montazeri, A. (2008). Health-related quality of life in breast cancer patients: a Bibliographic review of the literature from 1974 to 2007. *Journal of Experimental & Clinical Cancer Research, 29*, 27-32.

Morrow, G.R., Andrews, P.L., Hickok, J.T., Rosecoe, J.A., & Matteson, S. (2002). Fatigue associated with cancer and its treatment. *Supportive Care in Cancer, 10*(5), 389-398.

Munro, B. H. (2005). *Statistical methods for health care research fifth edition*. New York: Lippincott Williams & Wilkins: A Wolters Kluwer Company.

Munshi, A., Ni, L. H., & Tiwana, M.S. (2008). Complementary and alternative medicine in present day oncology care: promises and pitfalls. *Japanese Journal of Clinical Oncology, 38*(8), 512-520.

Mustian, K.M., Katula, J.A., Gill, D.L., Roscoe, J.A., Lang, D., & Murphy, K. (2004). Tai Chi Chuan, health-related quality of life and self-esteem: A randomized trial with breast cancer survivors. *Support Care Cancer, 12*, 871-876.

Mustian, K.M., Katula, J., & Zhao, H. (2006). A pilot study to assess the influence of Tai Chi Chuan on functional capacity among breast cancer survivors. *The Journal of Supportive Oncology, 4*(3), 139-145.

Mustian, K.M., Palesh, O.G., Flecksteiner, S.A. (2008). Tai chi Chuan for breast cancer survivors. *Medicine Sport Science, 52*, 209-217.

Mutrie, N. et al. (2006). *Benefits of supervised group exercise program for women being treated for early stage breast cancer: Pragmatic randomized controlled trial*. Retrieved on September 31, 2008, from www.bmj.com.

Muttarak, M. (2007). Effect of nutritional supporting program on nutritional status in breast cancer survivors. *Nursing Journal, 34*(3), 124-133.

National Cancer Institute (NCI). (2003). *Cancer in Thailand Volume VI, 2004-2006*. Kruhaprema, T., (ed.). National Cancer Institute, Bangkok.

National Cancer Institute. (2004). *Supportive care statement for patient lymphedema* Retrieved on October 1, 2008, from http://www.meb.uni-bonn.de/cancer.gov.

National Cancer Institute (NCI). (2009). *Hospital-based Cancer Registry 2009*. Bangkok: Rumthai Press Inc.

National Center for Complementary and Alternative Medicine. (2002). *What is complementary and alternative medicine (CAM)?: National Institutes of Health*. Retrieved on October 1, 2008, from http://nccam.nih.gov/health/ whatiscam/pdf/ whatiscam.pdf.

Nesvold, I-L., Fossa, S.D., Holm, I., Naumes, B., & Dahl, A.A. (2010). Arm/shoulder problems in breast cancer survivors are associated with reduced health and poorer physical quality of life. *Acta Oncologica, 49*, 347–353.

Ohsumi, S., Shimozuma, K., Morita, S., Hara1, F., Takabatake, D., et al. (2009). Factors associated with health-related quality-of-life in breast cancer survivors: influence of the type of surgery. *Japanese Journal of Clinical Oncology, 39*(8), 491-496.

Okamoto, T., Shimozuma, K., Katsumata, N. et al. (2003). Measuring quality of life in patients with breast cancer: a systematic review of reliable and valid instruments available in Japan. *Breast Cancer, 10*(3), 204-13.

Oldervoll, L.M., Kaasa, S., Hjermstad, M.J., Lund, J.A., & Loge, J.H. (2004). Physical exercise results in the improved subjective well-being of a few or is effective rehabilitation for cancer patients?. *Europe Journal of Cancer, 40*, 951-962.

Olson, K., Turner, A.R., Courneya, K.S., Field, C., Man, G., & Cree, M. (2008). Possible links between behavioral and physiological indices of tiredness, fatigue, and exhaustion in advanced cancer. *Support Care Cancer, 16*, 241-249.

Opdahl, S., Alsaker, M.D.K., Janszky, I., Romundstad, P.R., & Vatten, L.J. (2011). Joint effects of nulliparity and other breast cancer risk factors. *British Journal of Cancer, 105*, 731-736.

Pandey, A., Thomas, B.C., Ramdas, K., & Ratheesan, K. (2006). Early effect of surgery on quality of life in women with operable breast cancer. *Japanese Journal of Clinical Oncology, 36*, 468-472.

Pasquali, R., & Vicennati, V. (2000). The abdominal obesity phenotype and insulin resistance are associated with abnormalities of the hypothalamic-pituitary-adrenal axis in humans. *Hormone Metabolic Research, 32*, 521–525.

Pasquali, R., & Vicennati, V., Cacciari, M., & Pagotto, U. (2006). The Hypothalamic-pituitary-adrenal axis activity in obesity and the metabolic syndrome. *Annals of the New York Academy of Sciences, 1083*, 111-128.

Passik, S.D.,& McDonald, M.V. (1998). Psychosocial aspects of upper extremity lymphedema in women treated for breast carcinoma. *Cancer Supplement, 83*(12), 2817-2820.

Payne J.K. (2002). The trajectory of fatigue in adult patients with breast and ovarian cancer receiving chemotherapy. *Oncology Nursing Forum, 29*, 1334–1340.

Payne J., Piper B., Rabinowitz I. et al. (2003). *Biomarkers sleep and fatigue characteristics in women with breast cancer.* Proceedings of the Seventh National Conference on Cancer Nursing Research.

Pedersen, B.K., & Hoffman-Goetz, L. (2000). Exercise and the immune system: regulation, integration, and adaptation. *Physiological Reviews, 80*(3), 1055-1081.

Pedro, L.W. (2001). Quality of life for long-term survivors of cancer: influencing *variables. Cancer Nursing, 24*(1), 1-11.

Peintinger, F., Reitsamer, R., Stranzl, H., & Ralph, G. (2003). Comparison of quality of life and arm complaints after axillary limp node dissection vs. sentinel lymph node biopsy in breast cancer patients. *British Journal of Cancer, 89*(4), 648-652.

Peppone, L.J., Mustian, K., Rosier, R.N., Piazza, K.M., Hicks, D.G., & Palesh, O.G., et al. (2009). The effects of Tai chi chuan on bone remodeling and cytokines among breast cancer survivors: A feasibility trail. *Journal of Clinical Oncology*, *27*(15S), 9610.

Pinto, B.M., Frierson, G.M., Rabin, C., Trunzo, J.J., & Marcus, B.H. (2005), Home-Based physical activity intervention for breast cancer patients. *Journal of Clinical Oncology*, *23*(15), 3577-3587.

Pinto, B.M & Floyd, A. (2007). Methodologic issues in exercise intervention research in oncology. *Seminars in Oncology Nursing, 23*(4), 297–304.

Platanias, (2005). *Cytokines and Cancer.* Chicago: Springer Science & Business Media, Inc.

Polit, D.F. & Beck, C.T. (2003) *Nursing research: principles and methods seventh edition.* New York: Lippincott Williams & Wilkins: A Wolters Kluwer Company.

Porter, Mishel, Neelon, Belyea, Pisano, & Soo, (2003). Cortisol levels and responses to mammography screening in breast cancer survivors: a pilot study. *Psychosomatic Medicine, 65*(5), 842-848.

Power, S.K. & Howley, E.T. (1990). *Exercise physiology: theory and application to fitness and performance.* Dubuque, Wm. C. Brown Publishers.

Reid-Arndt, S.A., Matsuda, S., & Cox, C.R. (2011). Tai Chi effects on neuropsychological, emotional, and physical functioning following cancer treatment: a pilot study. *Complementary Therapies in Clinical Practice, 65*(5), 842-848.

Reinertsen, K.V., Cvancarova, M., Loge, J.H., Edvardsen, H., Wist, E., & Fosså, S.D. (2010). Predictors and course of chronic fatigue in long-term breast cancer survivors. *Journal of Cancer Survivors, 4*, 405-414.

Ribi, K., Bernhard, J., Rufibach, K., Thurlimann, B., Moos, R.V., Ruhstaller, T., Glaus, A., & Bohme, C. (2007). Endocrine symptom assessment in women with breast cancer: What a simple “yes” means. *Support Care Cancer, 15*, 1349–1356.

Ribin, C., Pinto, B., Dunsiger, S., Nash, J., Trask, P. (2007). Exercise and relaxation intervention for breast cancer survivors: Feasibility, acceptability and effects. *Psycho-Oncology, 36*, 225-236.

Ries LAG, Melbert D, Krapcho M, et al., eds. *SEER Cancer Statistics Review, 1975-2004*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2004/, based on November 2006 SEER data submission, posted to the SEER Web site, 2007.

Rietman, J.S., Dijkstra, P.U., Hoekstra, H.j., Eisma, W.H., Szabo, B.G., Groothoff, J.W., et al. (2003). Late morbidity after treatment of breast cancer in relation to daily activities and quality of life: a systematic review. *European Journal of surgical Oncology, 29*(3), 229-238.

Robin, J.W., McCain, N.L., Gray, P., Elswick Jr., R.K., Walter, J.M., & McDade, E. (2006). Research on psychoneuroimmunology: Tai Chi as a stress management approach for individuals with HIV disease. *Apply Nursing Research, 19*(1), 2-9.

Robinson, F.P., Mathews, H.L., & Witek-Janusek, L. (2002). Issues in the design and implementation of psychoneuroimmunology research. *Biological Research for Nursing*, 3(4):165-175.

Rogers, L.Q., Courneya, K.S., Verhulst, S., Markwell, S., Lanzotti, V., & Shah, P. (2006). Exercise barrier and task self-efficacy in breast cancer patients during treatment. *Supportive Care in Cancer, 14*(1), 84-90.

Rosedale, M. (2009). Survivor loneliness of women following breast cancer. *Oncology Nursing Forum, 36(2), 175-180.*

Rosedale M. & Fu, H. (2010). Confronting the unexpected: Temporal, situational, and attributive dimensions of distressing symptom experience for breast cancer survivors. *Oncology Nursing Forum, 37*(1), 28-33.

Ross, Zeller, Srisaeng, Yimmee, Somchid, & Sawatphanit. (2005). Depression, stress, emotional support, and self-esteem among baccalaureate nursing students in Thailand. *International Journal of Nursing Education Scholarship, 2*(1), Doi: 10.2202/1548-923X.1165.

Rowan, T., Chlebowski, R.T., Hendrix, S.L., Langer, R.D., Stefan, M.L. & Gass, M. (2003). Influence of Estrogen plus progestin on breast cancer and mammography in healthy postmenopausal women: the women's health initiative randomized trial. *Journal of the American Medical Association, 289*(24), 3243-3253.

Rowland, J.H. (2008). Cancer survivorship: Rethinking the cancer control continuum. *Seminar in Oncology Nursing, 24*(3), 145-152.

Rowland, J.H. & Yanick, R. (2006). Cancer survivorship: The interface of aging, comorbidity, and quality care. *Journal of the National Cancer Institute, 98*(8), 504-505.

Sammaco, A., & Konecny, L.M. (2010). Quality of life, social support, and uncertainty among Latina and Caucasian breast cancer survivors: a comparative study. *Oncology Nursing Forum, 37*(1), 93-99.

Sandlund, E.S., & Norlandar, T. (2000). The effects of Tai Chi Chuan relaxation and exercise on stress responses and well-being: An overview of research. *International Journal of Stress Management, 7*, 139-149.

Sankaranarayanan, R., Black, R.J., Swaminatha, R., Prakin, D.M. (1998). In: R. Sankaranarayanan, R.J., Black R, Prakin DM, Editors. An overview of cancer Survival in developing countries. *Cancer survival in developing countries.*

Lyon, France: International Agency for Research on Cancer; 1998: 135-157.

Schroevers, M.J., Ranchor, A.V., Sanderman, R. (2003). The role of social support and self-esteem in the presence and course of depressive symptoms: a comparison of cancer patients and individuals from the general population. *Social Science and Medicine, 57*, 375-385.

Schmid-Büchi, S., Halfens, R.J., Dassen, T., van den Borne, B. (2010). Psychosocial problems and needs of posttreatment patients with breast cancer and their relatives. European Journal Oncology Nursing, http://dx.doi.org/10.1016/j. ejon.2009.11.001.

Seaward, B.L. (2002). *Managing Stress: Principles and Strategies for Health and well-being*. Third Edition. Massachusetts, Jones and Bartlett Publishers.

Schleifer, S.J. (2007). PNI and cancer: are we there yet? *Brain, Behavior, and Immunity*, *21*(4), 393-394.

Segal, R. et al. (2001). Structured exercise improves physical functioning in women with stage I and II breast cancer: Results of a randomized controlled trail. *Journal of Clinical Oncology, 19*(3), 657-665.

Segerstrom, S.C. & Miller, G.E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin, 130*(4), 601-630.

Segrin, C., Badger, T., Dorros, S.M., Meek, P., & Lopez, A.M. (2007). Interdependent anxiety and psychological distress in women with breast cancer and their partners. *Psychoncology, 16*(7), 634-643.

Servaes, P., Verhagen, S., & Bleijenberg, G. (2002). Determonants of chronic fatigue in disease-free breast cancer patients: A crossectional study. *Annals of Oncology, 13,* 589-598.

Sertöz O.O., Mete E.H., Noyan A, Alper , M, Kapkaç M. (2004). Effects of surgery type on body image, sexuality, self-esteem, and marital adjustment in breast cancer: a controlled study. *Turkish Journal of Psychiatry, 15*(4), 264-75.

Sharpe, M., & Wilks, D. (2002). ABC of psychological medicine: fatigue. *BMJ, 325,* 480.

Shimozuma, K., Ganz, P.A., Petersen, L., & Hirji, K. (1999). Quality of life in the first year after breast cancer surgery: Rehabilitation needs and pattern of recovery. *Breast Cancer Research and Treatment, 56,* 45-57.

Shimozuma, K et al. (2002). Systematic overview of quality of life studies for breast cancer. *Breast Cancer, 9*(3), 196-202.

Siriraj Cancer Center. (2008). *Siriraj Cancer Registry 2008*. Faculty of Medicine Siriraj Hospital. Mahidol university.

Sivarux, C., Pongthavornkamol, K., Wattanakitkrilert, D., Tanticharoensin, S. (2012). Factors predicting quality of life for breast cancer survivors at 1 year post-treatment, and thereafter. *Thai Cancer Journal, 32*(1), 2-14.

Solway S, Brooks D, Lacasse Y, Thomas S. (2001). A qualitative systematic overview of the measurement properties of functional walk tests used in the cardio respiratory domain. *Chest, 119*, 256–270.

Stein, K.D., Syrjala, K.L., & Andrykowski, M. A. (2008). Physical and psychological long-term and late effects of cancer. *Cancer, 112*(11), 2577-2592.

Stevinson, C., Campbell, K.L., Sellar, C.M. & Courneya, K.S. (2006). *Physical activity for Cancer Survivors Potential Benefits and Guidelines Clare.* 249-268.

Sukmak, V., Sirisoonthon, A., & Meena, P. (2001). Validity of the general perceived self-efficacy scale. *Journal of Psychiatry Association Thailand, 47*(1), 31-35.

Tabachnick, B. G., & Fidell, L.S. (2001). *Using multivariate statistics 5th edition*. Boston: Pearson Education, Inc.

Taylor-Piliae, R.E. (2008). The effectiveness of Tai Chi exercise in improving aerobic capacity: an updated meta-analysis. Hong Y. (ed.): Tai Chi Chuan State of the Art in International Research. *Medical Sport Science. Basel, Karger, 52*, 40-53.

Taylor-Pillae, R.E. (2008). The effectiveness of Tai Chi exercise in improving aerobic capacity: an updated meta-analysis. *Medical Sport Science, 52*, 44-53.

Taylor-Piliae, R.E., & Froelicher, E.S. (2004a). The effectiveness of Tai Chi exercise in improving aerobic capacity a meta-analysis. *Journal of Cardiovascular Nursing, 19*(1), 48-57.

Taylor-Piliae, R.E., & Froelicher, E.S. (2004b). Measurement properties of Tai Chi exercise self-efficacy among ethnic Chinese with coronary heart disease risk factors: a pilot study. *European Journal of Cardiovascular Nursing, 3*, 287-294.

Taylor-Piliae, R.E., Haskell, W.L., Waters, C.M., & Froelicher, E.S. (2006). Change in perceived psychological status following a 12-week Tai Chi exercise programme. *Journal of Advanced Nursing, 54*(3):313-29.

Tongnok, S., Panutai, S., & Pramoch, A. (2007). Effect of Tai Chi Qigong exercise on memory among the elderly. *Nursing Journal, 34*(4), 82-92.

Tremblay, Inman, & Willms, (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatric Exercise Science, 12*(3), 312-323.

Trentham-Dietz, A., Sprangue, B.L., Klein, R., Klein, B.E.K., Cruickshanks, K.J., Fryback, D.G., et al. (2008). Health-related quality of life before and after a breast cancer diagnosis. *Breast Cancer Research and Treatment, 109*, 379-387.

Trilling, J. (2000). Selections from current literature psychoneuroimmunology: Validation of the biopsychosocial model. *Family Practice, 17*, 90-93.

Turner-Cobb, J.M., Sephton, S.E., Koopman, C., Blake-Mortimer, J., & Spiegel, D. (2000). Social support and salivary cortisol in women with metastatic breast cancer. *Psychosomatic Medicine, 62*(3), 337-345.

Vahdaninia, M., Omidvari, S., & Montazeri, A. (2010). What do predict anxiety and depression in breast cancer patients?: a follow-up study. *Social Psychiatry and Psychiatric Epidemiology, 45*, 355-361.

Vatanasapt, V., Sriamporn, S., & Vatanasapt, P. (2002). Cancer control in Thailand. *Japanese Journal of Clinical Oncology, 32*(Supplement 1), S82-S91.

Vallance, J.K.H., Courneya, K.S., Plotnikoff, R.C., Yasui, Y., & Mackey, J.R. (2007). Randomized controlled trial of the effects of print materials and step pedometers on physical activity and quality of life in breast cancer survivors. *Journal of Clinical Oncology, 25*(17), 2352-2359.

Valenti, M, et al. (2008). Physical exercise and quality of life in breast cancer survivors. *International Journal of Medicine Sciences, 5*(1), 24-28.

Verhagen, A.P., Immink, M., van der Meulen, A., & Bierma-Zeinstra, S.M. (2004), The efficacy of Ta Chi Chuan in older adults: A systematic review. *Family Practice, 21*(1), 107-112.

Vongsirimas, N., Sitthimongkol, Y., Beeber, L., Wiratchai, N., Sangorn, S., (2009). The relationship among depressive symptom severity in mothers, gender differences and depressive symptom in Thai adolescents. *Thai Journal of Nursing Research, 13*(3), 167-180

Wall, R. B. (2005). Tai Chi and mindfulness-based stress reduction in a Boston Public Middle School. *Journal of Pediatric Health Care, 19*(4), 230-237.

Wang, C.C., Collet, J.P., & Lau, J. (2004). The effect of Tai Chi on health outcomes in patients with chronic conditions *Arch Intern Med, 164*, 493-501.

Wang, C.C., Zhang, A.L., Rasmussen, B., Lin, L.W., Dunning, T., Kang, S.W. et al., (2009). The effect of Tai Chi on psychosocial well-being: a systematic review of randomized controlled trials. *Journal of Acupuncture and Meridian Studies, 2*(3), 171-181.

Wang, C.C., Bannuru, R., Rame, J., Kupelnick, B., Scott, T., & Schmid, C. (2010). Tai Chi on psychological well-being: Systematic review and meta-analysis. *Complementary and Alternative Medicine, 10*(23), 1-16.

Warburton, D. E.R., Nicol, C.W., & Bredin, S.S.D. (2006). Health benefits of physical activity: the evidence. *CMAJ, 174*(6), 801-809.

Wayne, W.D. (2005). *Biostatistics: a foundation for analysis in the health sciences eighth edition.* New Jersey: John Wiley & Sons, Inc.

Wayne P.M., & Kaptchuk, T.J. (2008a). Challenges inherent to T'ai Chi research: Part I-T'ai Chi as a complex multicomponent intervention. *The Journal of Alternative and Complementary Medicine, 14*(1), 95-102.

Wayne P.M., & Kaptchuk, T.J. (2008b). Challenges inherent to T'ai Chi research: Part II-T'ai Chi as a complex multicomponent intervention. *The Journal of Alternative and Complementary Medicine, 14*(1), 95-102.

Weert, E., Hoekstra-Weebers, J.E.H.M., Otter, R., Posttema, K., Sanderman, R., & van der Schans, C.P. (2006). Cancer-related fatigue: predictors and effects of rehabilitation. *The Oncologist, 11*, 184-196.

Weert, E., Hoekstra-Weebers, J.E.H.M., May, A.M., Korstjens, I., Ros, W.J.G., van Der Schans, C.P. (2008). The development of an evidence-based physical self-management rehabilitation program for cancer survivors. *Patient Education and Counseling, 71*, 169-190.

Wedekind, D., Bandelow, B., Broocks, A., Hajak, G., Rüther, E. (2000). Salivary, total plasma and plasma free cortisol in panic disorder. *Journal of Neural Transmission, 107*(7), 831-837.

World Health Organization (WHO), Alma-Ata. (1978, September 6-12). *Primary health care: Report of the international conference on primary health care*, Alma-Ata,

U.S.S.R. Health for all series. Retrieved from http://www.who.int/hpr/NPH/docs/ declaration _almaata.pdf.

World Health Organization (WHO). (2008). Globocan 2008 Fast Stats, Retrieved February 1, 2009, from http://globocan.iarc.fr/factsheets/populations/ factsheet.asp?uno=900.

Wonghongkul, T., Moore, S.M., Musil, C., Schneider, S., & Deimling, G. (2000). The influence of uncertainty in illness, stress appraisal, and hope on coping in survivors of breast cancer. *Cancer Nursing, 23*(6), 422-429.

Wonghongkul, T., Dechaprom, N., Phumivichuvate, L., & Lasawatkul, S. (2006). Uncertainty appraisal coping and quality of life in breast cancer survivors. *Cancer Nursing, 29*(3), 250-257.

Wu, H., Li, Z., & Jin, W. (2008). Correlation between uncertainty in illness and social support for patients with breast cancer. *Asian Journal Nursing, 11*, 93-96.

Yarbro, C.H., Wujcik, D., & Gobel, B. H. G. (2010). *Cancer nursing: principles and practice*, 7th ed. Massachusetts: Jones and Bartle TT publishers.

Yap, K.P.L., McCready, D.R., Narod, S., Manchul, L.A., Trudeau, M., & Fyles, A. (2003). Factors influencing arm and axillary symptoms after treatment for node negative breast carcinoma. *Cancer, 97*(6), 1369-1375.

Yeh, M-L., Lee, T-I., Chen, H-H., Chao, T-Y. (2006). The influences of Chan-Chuang Qi-Gong therapy on complete blood cell counts in breast cancer patients treated with chemotherapy. *Cancer Nursing, 29*(2), 149-155.

Zeller, J.M., McCain, N.L., & Swanson, B. (1996). Psychoneuroimmunology: An Emerging framework for nursing research. *Journal of Advanced Nursing, 23*,657-664.

กนกนุช ชื่นสกุล, ทัศนา บุญทอง, ศิริรัตน์ จิรวัฒน์กุล, ศิริรอร สินธุ, และ ธนา นิลชัยโกวิท. (2543). (Chunlestskul, Boontong, Jirawatkul, Sindhu, Nilchaikovit, 2003). ประสบการณ์ชีวิตสตรีไทยที่ป่วยเป็นมะเร็งเต้านม. *วารสารคณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล, 8*(3), 1-15.

จริญญาพร สวยนภานุสรณ์. (2550). (Suaynapanusorn, J., 2007). *ไทชิ (Tai Chi)*. พิมพ์ครั้งที่ 1. สำนักพิมพ์เอ็มไอเอส: กรุงเทพฯ.

ฐปนีย์ ตั้งจิตภักดีสกุล. (2544). (Thangjitpukdeesakul, 2001). ปัจจัยที่สัมพันธ์กับการเห็นคุณค่าในตนเองและความรู้สึกสิ้นหวังในเด็กและเยาวชนที่กระทำผิดในสถานพินิจและคุ้มครองเด็กและเยาวชนกลาง. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต, สาขาจิตวิทยาคลินิก บัณฑิตวิทยาลัย. มหาวิยาลัยมหิดล.

ทิพาพร วงศ์หงส์กุล, ปิยวรรณ สวัสดิ์สิงห์, พัชราภรณ์ อารีย์, ขวัญพนมพร ธรรมไทย, ภัทราภรณ์ ทุ่งปันคำ , และ มาลัย มุตตารักษ์. (2551). (Wonghongkul, Sawasdisingha, Aree, Thummathai, Tungpunkom, & Muttarak, 2008). ผลของโปรแกรมการสนับสนุนและให้ความรู้ต่อคุณภาพชีวิตของผู้รอดชีวิตจากมะเร็งเต้านม. *วารสารวิจัยทางการพยาบาล , 12*(3), 179-194.

เทิดศักดิ์ เดชคง. (2541). (Detkhong, T., 1998). *ชี่กงวิถีแห่งพลังเพื่อการบำบัดโรค*. พิมพ์ครั้งที่ 1. สำนักพิมพ์หมอชาวบ้าน: กรุงเทพฯ.

เทิดศักดิ์ เดชคง. (2547). (Detkhong, T., 1998). *คู่มือการบริหารกาย-จิตแบบชี่กง*. พิมพ์ครั้งที่ 1. บริษัท บียอนด์ พับ ลิสชิ่ง จำกัด: กรุงเทพฯ.

ธวัชชัย วรพงศธร. (2551). (Vorapongsatorn, 2008). Repeated Measure Analysis of Variance (Repeated Measure ANOVA) (Unpublished). *เอกสารประกอบการสอนเรื่อง Repeated Measure Analysis of Variance*. กรุงเทพฯ: ภาควิชาชีวสถิติ คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล.

ประทุม สร้อยวงค์, ชวพรพรรณ จันทร์ประสิทธิ์, ทิพาพร วงศ์หงษ์กุล, มาลัย มุตตารักษ์, และ ลอเรล นอร์ทเฮ้าส์. (2551). (Soivong, Chanprasit, Wonghongkul, Muttarak, & Northouse, 2004). *ผลของการพยาบาลระบบสนับสนุนและให้ความรู้ต่อการดูแลตนเองและคุณภาพชีวิตของผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต*. วิทยานิพนธ์ปริญญาดุษฎีบัณฑิตสาขาการพยาบาลศาสตร์ บัณฑิตวิทยาลัย มหาวิทยาลัยเชียงใหม่.

ประสิทธิ์ รัตนวงศาโรจน์. (2551). (Rattanawongsaroj, P., 2008). *ชี่กง 18 ท่า เพื่อสุขภาพ*. สำนักพิมพ์เอ็มไอเอส: กรุงเทพฯ.

ประสิทธิ์ รัตนวงศาโรจน์. (2551). (Rattanawongsaroj, P., 2008). *ไท้เก็ก 24 ท่า เพื่อสุขภาพ*. สำนักพิมพ์เอ็มไอเอส: กรุงเทพฯ.

ศศิวิมล วรรณทอง วรรณา คงสุริยะนาวิน. (2550). (Wannatong & Kongsuruyanavin, 2007). ผลของโปรแกรมส่งเสริมการนอนต่อคุณภาพการนอนหลับของผู้สูงอายุ. *วารสารสถาบันกัล-ยาณ์ราชนครินทร์, 3*(1), 62.

สุภาวดี ทองนอก, ศิริรัตน์ ปานอุทัย, และ อัครอนงค์ ปราโมช. (2550). (Tongnok, S., Parnutai, S., & Pramoj, A., 2007). ผลของการออกกำลังกายแบบไท่จี๋ชี่กงต่อความจำในผู้สูงอายุ. *พยาบาลสาร ปีที่ 34* ฉบับที่ 4, 82-91.

APPENDICES

APPENDIX A
LIST OF EXPERTS CONSULTED ON VALIDATION OF THE INSTRUMENTS

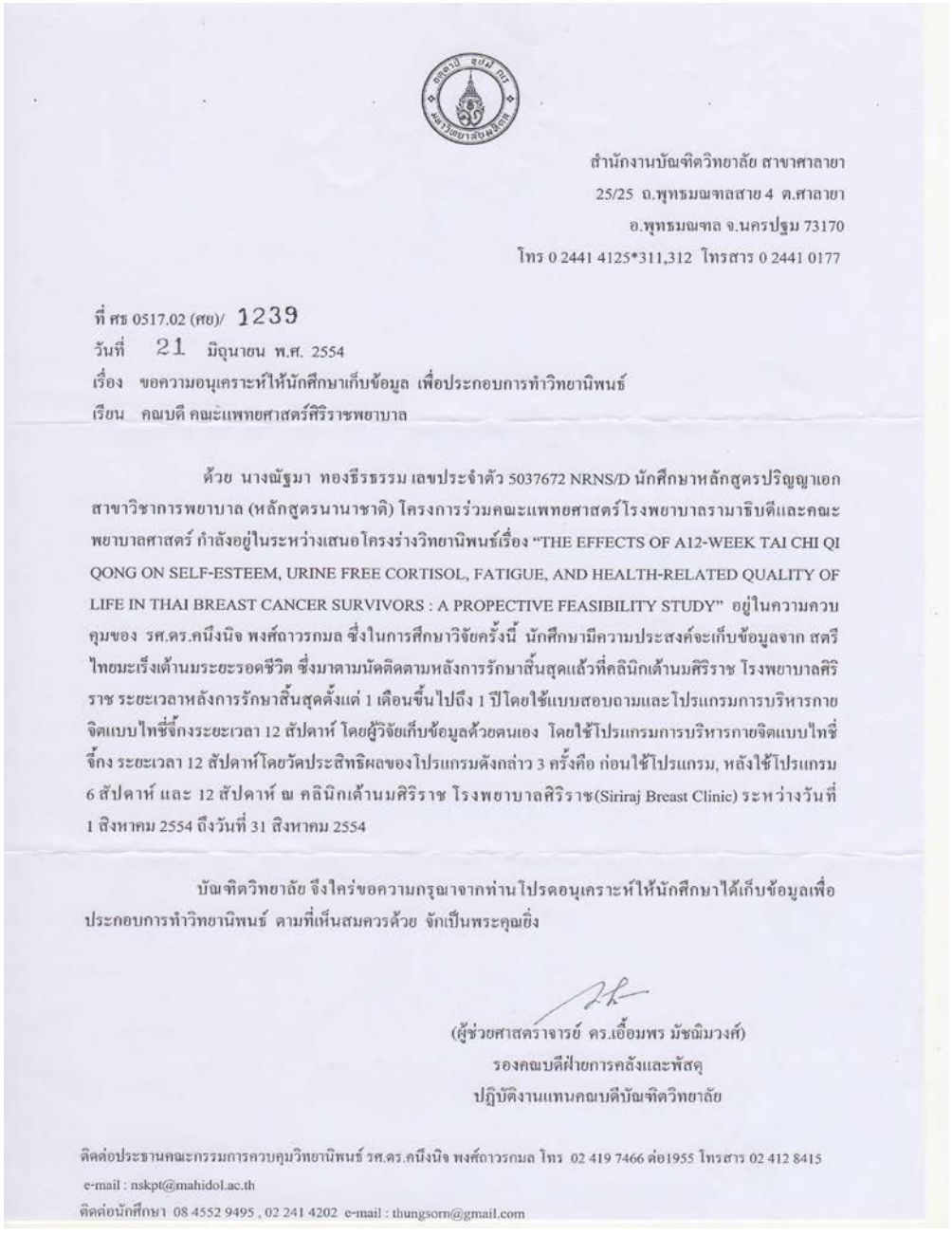
The contents of TCQQ program on self-esteem, urine cortisol, fatigue, and QOL in Thai women living with breast cancer, a booklet of TCQQ training, the Rosenberg Self-Esteem Scale (RSE), the Fatigue Symptom Inventory (FSI), the Functional Assessment of Cancer Therapy-Breast (FACT-B), TCQQ program feasibility form, the TCQQ exercise diary, and the questions for a weekly telephone follow-up were consulted on content validation of the study program, research instruments, and all questionnaires by these three experts as follows.

1. Dr. Terdsak Deatkong, M.D. Dip. in psychology
Department of Mental Health
Ministry of Public Health

2. Asst. Prof. Chompunoot Suwanasri, B.Sc., M.Sc. (Physiotherapy)
Deputy Dean for Clinical Services
Faculty of Physical Therapy
Mahidol University

3. Ms. Pachanee Srisawat, M.N.S. (Adult Nursing)
Advance Practice Nurse (APN), Siriraj Breast Clinic, Siriraj Hospital
Faculty of Medicine
Mahidol University

APPENDIX B
SIRIRAJ INSTITUTIONAL REVIEW BOARD
CERTIFICATE OF APPROVAL (SIRB)



สำนักงานบัณฑิตวิทยาลัย สาขาศาลายา
25/25 ถ.พุทธมณฑลสาย 4 ต.ศาลายา
อ.พุทธมณฑล จ.นครปฐม 73170
โทร 0 2441 4125*311,312 โทรสาร 0 2441 0177

ที่ ศธ 0517.02 (ศย)/ 1239
วันที่ 21 มิถุนายน พ.ศ. 2554
เรื่อง ขอความอนุเคราะห์ให้นักศึกษาเก็บข้อมูล เพื่อประกอบการทำวิทยานิพนธ์
เรียน คณบดี คณะแพทยศาสตร์ศิริราชพยาบาล

ด้วย นางณัฐมา ทองธีรธรรม เลขประจำตัว 5037672 NRNS/D นักศึกษาหลักสูตรปริญญาเอก สาขาวิชาการพยาบาล (หลักสูตรนานาชาติ) โครงการร่วมคณะแพทยศาสตร์โรงพยาบาลรามาธิบดีและคณะพยาบาลศาสตร์ กำลังอยู่ในระหว่างเสนอโครงร่างวิทยานิพนธ์เรื่อง "THE EFFECTS OF A12-WEEK TAI CHI QI QONG ON SELF-ESTEEM, URINE FREE CORTISOL, FATIGUE, AND HEALTH-RELATED QUALITY OF LIFE IN THAI BREAST CANCER SURVIVORS : A PROPECTIVE FEASIBILITY STUDY" อยู่ในความควบคุมของ รศ.ดร.ดนึงนิจ พงศ์ถาวรกมล ซึ่งในการศึกษาวิจัยครั้งนี้ นักศึกษามีความประสงค์จะเก็บข้อมูลจาก สตรีไทยมะเร็งเต้านมระยะรอดชีวิต ซึ่งมาตามนัดติดตามหลังการรักษาสิ้นสุดแล้วที่คลินิกเต้านมศิริราช โรงพยาบาลศิริราช ระยะเวลาหลังการรักษาสิ้นสุดตั้งแต่ 1 เดือนขึ้นไปถึง 1 ปีโดยใช้แบบสอบถามและโปรแกรมการบริหารกายจิตแบบไทชี่จี้กงระยะเวลา 12 สัปดาห์ โดยผู้วิจัยเก็บข้อมูลด้วยตนเอง โดยใช้โปรแกรมการบริหารกายจิตแบบไทชี่จี้กง ระยะเวลา 12 สัปดาห์โดยวัดประสิทธิผลของโปรแกรมดังกล่าว 3 ครั้งคือ ก่อนใช้โปรแกรม, หลังใช้โปรแกรม 6 สัปดาห์ และ 12 สัปดาห์ ณ คลินิกเต้านมศิริราช โรงพยาบาลศิริราช(Siriraj Breast Clinic) ระหว่างวันที่ 1 สิงหาคม 2554 ถึงวันที่ 31 สิงหาคม 2554

บัณฑิตวิทยาลัย จึงใคร่ขอความกรุณาจากท่านโปรดอนุเคราะห์ให้นักศึกษาได้เก็บข้อมูลเพื่อประกอบการทำวิทยานิพนธ์ ตามที่เห็นสมควรด้วย จักเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์ ดร.เอื้อมพร มัชฉิมวงศ์)
รองคณบดีฝ่ายการคลังและพัสดุ
ปฏิบัติงานแทนคณบดีบัณฑิตวิทยาลัย

ติดต่อประธานคณะกรรมการควบคุมวิทยานิพนธ์ รศ.ดร.ดนึงนิจ พงศ์ถาวรกมล โทร 02 419 7466 ต่อ1955 โทรสาร 02 412 8415
e-mail : nskpt@mahidol.ac.th
ติดต่อนักศึกษา 08 4552 9495 , 02 241 4202 e-mail : thungsorn@gmail.com

คณะแพทยศาสตร์ศิริราชพยาบาล
สำนักงานรองคณบดีฝ่ายวิจัย
บางกอกน้อย กรุงเทพฯ 10700
โทร. 0 2419 9407-9

ที่ ศธ 0517.07/ 18228
วันที่ 27 กันยายน 2554
เรื่อง ยินดีให้ความอนุเคราะห์เพื่อประกอบการทำวิทยานิพนธ์

เรียน คณบดีบัณฑิตวิทยาลัย
อ้างถึง หนังสือ สำนักงานบัณฑิตวิทยาลัย สาขาศาลายา ที่ ศธ 0517.02 (ศย)/1239 ลงวันที่ 21 มิถุนายน 2554

ตามที่ สำนักงานบัณฑิตวิทยาลัย สาขาศาลายา ได้ขอความอนุเคราะห์ให้ นางณัฐมา ทองธีรธรรม เลขประจำตัว 5037672 NRNS/D นักศึกษาหลักสูตรปริญญาเอก สาขาวิชาการพยาบาล (หลักสูตรนานาชาติ) โครงการร่วมคณะแพทยศาสตร์โรงพยาบาลรามาธิบดีและคณะพยาบาลศาสตร์ เข้าเก็บข้อมูลด้วยวิธีการตอบแบบสอบถามและใช้โปรแกรมการบริหารกายจิตแบบไทชี่จี้กงกับผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิตที่มาตามนัดติดตามหลังการรักษาสิ้นสุดแล้วที่คลินิกเต้านมศิริราช โรงพยาบาลศิริราช จำนวน 30 ราย โดยแบ่งกลุ่มตัวอย่างเป็น 2 กลุ่มๆ ละ 15 ราย เพื่อเป็นข้อมูลประกอบการทำวิทยานิพนธ์ เรื่อง "ประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ต่อการรับรู้คุณค่าแห่งตน ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต: การศึกษาความเป็นไปได้ของโปรแกรมแบบติดตามไปข้างหน้า" ความละเอียดดังแจ้งแล้วนั้น

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล พิจารณาแล้วยินดีอนุมัติให้ นางณัฐมา ทองธีรธรรม เก็บข้อมูลได้ตามที่ขอความอนุเคราะห์มา ทั้งนี้ได้ผ่านการรับรองโครงการวิจัยจากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล เมื่อวันที่ 13 กันยายน 2554

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(รองศาสตราจารย์ นายแพทย์อนุพันธ์ ดันติวงศ์)
รองคณบดี ปฏิบัติงานแทน
คณบดีคณะแพทยศาสตร์ศิริราชพยาบาล

สำเนาเรียน รองคณบดีฝ่ายวิจัย, ผู้อำนวยการโรงพยาบาล, หัวหน้าภาควิชาศัลยศาสตร์, หัวหน้าฝ่ายการพยาบาล

สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน
รองคณบดีฝ่ายวิจัย คณะแพทยศาสตร์ศิริราชพยาบาล
ตึกอดุลยเดชวิกรม ชั้น 6 โทร.02-4196405-6

ที่ ศธ 0517.071/วจ/EC 004158
วันที่ 19 ก.ย. 2554
เรื่อง ขอส่งเอกสารรับรองและเอกสารที่เกี่ยวข้องสำหรับโครงการวิจัย

เรียน นางณัฐมา ทองธีรธรรม
สิ่งที่ส่งมาด้วย : -แนวทางการปฏิบัติ 11 ข้อ สำหรับโครงการวิจัยที่ได้รับการรับรองแล้ว

ในนามของคณะกรรมการจริยธรรมการวิจัยในคนขอแสดงความยินดีที่โครงการวิจัยของท่าน เรื่อง "ประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ ต่อ การรับรู้คุณค่าแห่งตน ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต: การศึกษาความเป็นไปได้ของโปรแกรมแบบติดตามไปข้างหน้า" รหัสโครงการ 476/2554(EC3) **ได้รับการรับรอง** จากคณะกรรมการจริยธรรมการวิจัยในคนแล้ว เมื่อวันที่ 13 กันยายน 2554 ดิฉันจึงขอส่งเอกสารรับรอง (Certificate of Approval หรือ COA) ทั้งภาษาไทยและภาษาอังกฤษ และเอกสารแนบอื่นๆ ดังเอกสารแนบ มายังท่าน

พร้อมกันนี้คณะกรรมการจริยธรรมการวิจัยในคนได้ส่งแนวทางการปฏิบัติสำหรับโครงการวิจัยที่ได้รับการรับรองแล้ว 11 ข้อ ซึ่งหัวหน้าโครงการวิจัยจะต้องปฏิบัติและดูแลให้ผู้วิจัยร่วมหรือผู้ช่วยผู้วิจัยทุกท่านปฏิบัติตามด้วย ตามเอกสารที่ส่งมาด้วย (สีชมพู)

คณะกรรมการจริยธรรมการวิจัยในคน ขออำนวยพรให้ท่านประสบความสำเร็จในการดำเนินการวิจัยสมความมุ่งหมายเพื่อความก้าวหน้าทางวิชาการ และเพื่อประโยชน์ของมนุษยชาติต่อไป

ขอแสดงความนับถือ

(ศาสตราจารย์แพทย์หญิงจารุพิมพ์ สูงสว่าง)
ประธานคณะกรรมการจริยธรรมการวิจัยในคน

ปิยะรัตน์/พิมพ์
พิรยาตรวจทาน
ศุภกานต์/ตรวจสอบ

2 PRANNOK Rd. BANGKOKNOI
BANGKOK 10700

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

MAHIDOL UNIVERSITY
Since 1889

Siriraj Institutional Review Board

Certificate of Approval

COA no. Si 494/2011

Protocol Title : The effects of a 12-week Tai Chi Qi Qong on self-esteem, urine free cortisol, fatigue, and health-related quality of life in Thai breast cancer survivors: a prospective feasibility study

Protocol number : 476/2554(EC3)

Principal Investigator/Affiliation : Mrs. Natma Thongteratham
Faculty of Nursing, Mahidol University

Research site : Faculty of Medicine Siriraj Hospital

Approval includes :

1. SIRB Submission Form
2. Proposal
3. Informed Consent Form
4. Guideline management manual Tai Chi Qi Qong
5. A 12-week Tai Chi Qi Qong Program on Self-esteem, Urine Free Cortisol, Fatigue, and Health-Related Quality of Life in Breast Cancer Survivors
6. Questionnaire and Assessment
7. Principle Investigator's curriculum vitae

Approval date : September 13, 2011

Expired date : September 12, 2012

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

หน่วยพิมพ์โรงพยาบาลศิริราช 2341 / 3,000 แผ่น / ก.ย 51 / Mat. 10023252

(Prof. Jarupim Soongswang, M.D.)
Chairperson

September 13, 2011
date

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

19 SEP 2011
date

All Siriraj Institutional Review Board Approved Investigators must comply with the Following :

1. Conduct the research as required by the Protocol ;
2. Use only the Consent Form bearing the Siriraj Institutional Review Board "APPROVED" stamp ;
3. Report to Siriraj Institutional Review Board all of serious illness of any study subject ;
4. Promptly report to Siriraj Institutional Review Board any new information that may adversely affect the safety of the subjects or the conduct of the trial ;
5. Provide reports to Siriraj Institutional Review Board concerning the progress of the research, when requested ;
6. Conduct the informed consent process without coercion or undue influence, and provide the potential subject sufficient opportunity to consider whether or not to participate.

บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

ใบรับรอง เพื่อแสดงว่า

นางณัฐมา ทองธีรธรรม รหัสนักศึกษา 5037672 NRNS/D

คณะพยาบาลศาสตร์ และภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

เป็นผู้ผ่านการเรียนชั่วโมง " จริยธรรมการวิจัยในคน "

ในรายวิชา SCID 518 Generic Skills in Science Research

คณะวิทยาศาสตร์ มหาวิทยาลัยมหิดล

เมื่อวันที่ 30 ตุลาคม 2551

ลงนาม .....

(รองศาสตราจารย์ ดร.สุขุมาล จงธรรมคุณ)

อาจารย์ผู้รับผิดชอบรายวิชา / ผู้ประสานงานรายวิชา

ลงนาม .....

(ศาสตราจารย์ แพทย์หญิง พรรณแข มไหสวริยะ)

อาจารย์ผู้สอน

APPENDIX C
CONSENT FORM

หนังสือแสดงเจตนายินยอมเข้าร่วมโครงการวิจัย
(Informed Consent Form)

วันที่..... **เดือน**..... **พ.ศ**.....

ข้าพเจ้า..... **อายุ**.....**ปี**
อาศัยอยู่บ้านเลขที่.....**ถนน**..... **แขวง/ตำบล**.....
เขต/อำเภอ.....**จังหวัด**.....**รหัสไปรษณีย์**.....
โทรศัพท์ .....

ขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัยเรื่อง ประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชีจี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ ต่อการรับรู้คุณค่าแห่งตน ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต: การศึกษาความเป็นไปได้ของโปรแกรมแบบติดตามไปข้างหน้า

ชื่อผู้วิจัย นาง ณัฐมา ทองธีรธรรม

สถานที่ทำวิจัย คลินิคเต้านมศิริราช ตึกพระศรีฯ ชั้น 7 โรงพยาบาลศิริราช

สถานที่ทำงานและหมายเลขโทรศัพท์ของหัวหน้าโครงการวิจัยที่ติดต่อได้ทั้งในและนอกเวลาราชการ
คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล หมายเลขโทรศัพท์ 084-5529495

ผู้สนับสนุนทุนวิจัย ไม่มี

ระยะเวลาในการวิจัย กรกฎาคม 2554 ถึงเดือน ตุลาคม 2555 รวมเวลา 1 ปี 4 เดือน

โครงการวิจัยนี้ทำขึ้นเพื่อ ศึกษาและเปรียบเทียบประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชีจี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ ต่อการรับรู้คุณค่าแห่งตน ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต และเพื่อศึกษาความเป็นไปได้ของโปรแกรมแบบติดตามไปข้างหน้า ในบริบทของผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต

ประโยชน์ที่คาดว่าจะได้รับจากการวิจัย คือ จะได้ทราบประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชีจี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ ต่อการรับรู้คุณค่าแห่งตน ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต และเพื่อศึกษาความเป็นไปได้ของโปรแกรมแบบติดตามไปข้างหน้า ในบริบทของผู้ป่วยสตรีไทยมะเร็งเต้านมระยะรอดชีวิต

ข้าพเจ้าได้รับเชิญให้เข้าร่วมการวิจัยนี้เพราะ ข้าพเจ้าเป็นโรคมะเร็งเต้านมครั้งแรกระยะศูนย์ถึงสามบี ที่มีอายุมากกว่าหรือเท่ากับ 20 ปีขึ้นไป และอยู่ในระหว่างการติดตามผลหลังการรักษาเสร็จสิ้นทั้งหมดแล้วตามขั้นตอนการรักษา ซึ่งแพทย์เจ้าของไข้เป็นผู้วางแผนการรักษาไว้ อันประกอบไปด้วย การผ่าตัด

ส่วนตัวของข้าพเจ้าที่ได้รับจากการวิจัยแต่จะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล โดยจะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

ข้าพเจ้าได้รับทราบข้อมูลของโครงการข้างต้น ตลอดจนข้อดี ข้อเสีย ที่จะได้รับจากการเข้าร่วมโครงการในครั้งนี้และข้าพเจ้ายินยอมที่จะเข้าร่วมในโครงการดังกล่าว จึงลงลายมือชื่อไว้

ลงชื่อ..... ผู้เข้าร่วมการวิจัย/ผู้แทนโดยชอบธรรม/วันที่.....

(.....)

ลงชื่อ.....ผู้ให้ข้อมูลและขอความยินยอม/หัวหน้าโครงการวิจัย/วันที่.....

(.....)

ในกรณีผู้เข้าร่วมการวิจัยอ่านหนังสือไม่ออก ผู้ที่อ่านข้อความทั้งหมดแทนผู้เข้าร่วมการวิจัย คือ .....

จึงได้ลงลายมือชื่อไว้เป็นพยาน

ลงชื่อ..... พยาน/วันที่.....

(.....)

รับรองโดย คณะกรรมการจริยธรรมการวิจัยในคน
คณะแพทยศาสตร์ศิริราชพยาบาล
รหัสโครงการ 476/2554(EC3)
วันที่รับรอง 13 ก.ย. 2554

APPENDIX D
QUESTIONNAIRES

แบบสอบถามและแบบประเมินในการวิจัยเรื่อง
ประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า ระยะเวลา 12สัปดาห์
ต่อการรับรู้คุณค่าในตนเอง ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต
ในผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต

คำชี้แจงเกี่ยวกับแบบสอบถาม

แบบสอบถามและแบบประเมินในการวิจัยเรื่องประสิทธิผลของโปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า ระยะเวลา 12 สัปดาห์ ต่อการรับรู้คุณค่าในตนเอง ระดับคอร์ติซอลอิสระในปัสสาวะ อาการอ่อนล้า และคุณภาพชีวิต ในผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต ประกอบด้วย 6 ชุด ดังนี้

ชุดที่ 1. แบบสอบถามข้อมูลส่วนบุคคล และ ข้อมูลประวัติการเจ็บป่วยของผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต ประกอบด้วย 2 ส่วน คือ
ส่วนที่ 1. แบบสอบถามข้อมูลส่วนบุคคล
ส่วนที่ 2. แบบบันทึกข้อมูลประวัติการเจ็บป่วย
ชุดที่ 2 แบบประเมินความรู้สึกมีคุณค่าในตนเอง
ชุดที่ 3. แบบประเมินอาการอ่อนล้า
ชุดที่ 4 แบบประเมินคุณภาพชีวิต
ชุดที่ 5 แบบสอบถามความเหมาะสมของการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า
ชุดที่ 6 สมุดบันทึกการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า

ขอให้ท่านกรุณาตอบแบบสอบถามและแบบประเมินทั้งหมดนี้ให้ตรงกับความเป็นจริงให้มากที่สุด และขอขอบคุณในความร่วมมือของท่านในการตอบแบบสัมภาษณ์ครั้งนี้

นาง ณัฐมา ทองธีรธรรม
นักศึกษาหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต สาขาการพยาบาล (นานาชาติ)
โครงการร่วมภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี
และคณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

A PERSONEL CASE RECORD FORM (P-CRF)

ชุดที่ 1. แบบสอบถามข้อมูลส่วนบุคคลและข้อมูลประวัติการเจ็บป่วยของผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต

<u>คำชี้แจง</u> เพื่อสอบถามข้อมูลส่วนบุคคลจากผู้ป่วย/ญาติ และข้อมูลประวัติการเจ็บป่วยจากแฟ้มประวัติของผู้ป่วย

<u>ส่วนที่ 1.</u> **แบบสอบถามข้อมูลส่วนบุคคล**

1. ที่อยู่……

2. อายุปัจจุบัน (ปี) ……..……..……..

3. ส่วนสูง (เมตร) ……..…น้ำหนักปัจจุบัน (กิโลกรัม)……..……..……

4. ดัชนีมวลกายก่อนผ่าตัด

(กิโลกรัม/เมตร^2)……...……..……

5. การศึกษา

☐ ประถมศึกษา ☐ มัธยมศึกษาตอนต้น ☐ มัธยมศึกษาตอนปลาย

☐ อนุปริญญา/ปริญญาตรี ☐ ปริญญาโท/เอก ☐ อื่นๆ ระบุ ……..……

☐ ไม่สามารถประเมินได้ ระบุ ……..…….....

6. อาชีพ……..7. รายได้ต่อเดือน.....บาท

8. สถานภาพสมรส

☐ โสด ☐ คู่ ☐ หม้าย/หย่า/แยก

☐ อื่นๆ ระบุ ……..……..…….

☐ ไม่สามารถประเมินได้ ระบุ ……..…….....

9. ผู้ดูแล

☐ ไม่มี ระบุ……

☐ มี ระบุ……...…….

☐ สามี/ภรรยา/คู่ชีวิต ☐ บุตร ☐ หลาน ☐ พี่/น้อง

☐ เพื่อน ☐ ญาติ ☐ บุคลากรทางสุขภาพ

☐ ลูกจ้าง ☐ อื่นๆระบุ…….....

☐ ไม่สามารถประเมินได้ ระบุ …….

10……...

15……...……

<u>ส่วนที่ 2.</u> แบบบันทึกข้อมูลประวัติการเจ็บป่วย

1. การวินิจฉัย……...

2.การรักษาที่ได้รับทั้งหมด

1) วิธีการผ่าตัดที่ได้รับ……วันที่ผ่าตัด……

2) เคมีบำบัดที่ได้รับ……ระยะเวลา…...……...

3) รังสีรักษาที่ได้รับ……ระยะเวลา……..

4) ฮอร์โมนบำบัดที่ได้รับ……ระยะเวลา……..

5) อื่นๆ ระบุ……ระยะเวลา……..

3. ER/PR……..

4. ต่อมน้ำเหลือง

☐ ไม่เลาะออก ระบุ……...……

☐ เลาะออก ระบุ……..……...

☐ ไม่สามารถประเมินได้ ……..……....

5. ภาวะแทรกซ้อนหลังผ่าตัดที่พบ (ถ้ามี)

☐ ไม่มี ระบุ……...……...……..……

☐ มี ระบุ……...……...……..……..

☐ แผลติดเชื้อแผลผ่าตัด ☐ ชา ☐ ปวด ☐ น้ำเหลืองค้างแผลผ่าตัด

☐ ข้อไหล่ติด ☐ แขนบวม ☐ อื่นๆ ระบุ……..…

☐ ไม่สามารถประเมินได้ ……..……....

6. การวินิจฉัยโรคร่วมอื่นๆ ☐ ไม่มี ☐ มี ระบุ……

การรักษาโรคร่วมอื่นๆที่ได้รับปัจจุบัน

☐ ไม่มี ระบุ…….....

☐ มี ระบุ……..……

1) วิธีการผ่าตัดที่ได้รับ……วันที่ผ่าตัด……

2) ยาที่ได้รับ……ระยะเวลา…...……...

3) อื่นๆ ระบุ……ระยะเวลา……..

☐ ไม่สามารถประเมินได้ ……..……....

7. ……

8. ……

9. **ค่าสัญญาณชีพ**

รายการ	เวลา	ผลการวัด	การแปรผล
Blood pressure (BP) (mmHg)	ครั้งที่1……	…… ……	…… ……
	ครั้งที่2……	…… ……	…… ……
	ครั้งที่3……	…… ……	…… ……
Heart rate (HR) (times/min)	ครั้งที่1……	…… ……	…… ……
	ครั้งที่2……	…… ……	…… ……
	ครั้งที่3……	…… ……	…… ……
Temperature (^{0}C)	ครั้งที่1……	…… ……	…… ……
	ครั้งที่2……	…… ……	…… ……
	ครั้งที่3……	…… ……	…… ……

10. **ค่าผลตรวจทางห้องปฏิบัติการที่เกี่ยวข้อง**

รายการ	เวลา	ผลตรวจ	การแปรผล
Urine Free cortisol (UFC)	ครั้งที่1……	…… ……	…… ……
	ครั้งที่2……	…… ……	…… ……
	ครั้งที่3……	…… ……	…… ……

THE ROSENBERG SELF-ESTEEM SCALE (RSE)

แบบประเมิน ชุดที่ 2 แบบประเมินการรับรู้คุณค่าในตนเอง

คำชี้แจง แบบประเมินชุดนี้มีวัตถุประสงค์เพื่อต้องการทราบความรู้สึกและความคิดเห็นของท่านที่มีต่อตนเองอย่างไรบ้าง แต่ละข้อไม่มีคำตอบที่ถูกหรือผิด ขอให้ท่านทำเครื่องหมาย (√) ลงในช่องที่ท่าน อธิบายความรู้สึกของท่านได้ตรงที่สุด มีเกณฑ์ในการเลือกตอบดังนี้

เห็นด้วยอย่างยิ่ง	หมายถึง ข้อความนั้นตรงกับความรู้สึกของผู้ตอบมากที่สุด
เห็นด้วย	หมายถึง ข้อความนั้นตรงกับความรู้สึกของผู้ตอบมาก
ไม่เห็นด้วย	หมายถึง ข้อความนั้นตรงกับความรู้สึกของผู้ตอบเพียงเล็กน้อย
ไม่เห็นด้วยอย่างยิ่ง	หมายถึง ข้อความนั้นไม่ตรงกับความรู้สึกของผู้ตอบเลย

ข้อความ	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
1. ฉันรู้สึกว่าฉันมีคุณค่าเท่าเทียมคนอื่น				
2. ……..				
3. ……..				
4. ……..				
5. ……..				
6. ……..				
7. ……..				
8. ……..				
9. ……..				
10. ……..				

THE FATIGUE SYMPTOM INVENTORY (FSI)

แบบประเมิน ชุดที่ 3 แบบประเมินอาการอ่อนล้า

คำชี้แจง กรุณาอ่านข้อความข้างล่างนี้ทีละข้อ แล้วพิจารณาว่า **ในรอบ1 สัปดาห์ที่ผ่านมา** ท่านมีประสบการณ์ตรงกับข้อความนั้นหรือไม่? ถ้ามีอยู่ในระดับ ? จากนั้น **วงกลม** ตัวเลขที่ตรงกับประสบการณ์ที่เกิดขึ้นกับท่านมากที่สุด โดยคำว่า **"อาการอ่อนล้า"** หมายถึง **อาการอ่อนเพลีย อ่อนเปลี้ย เหน็ดเหนื่อย ละเหี่ยใจ ไม่กระชุ่มกระชวย เบื่อหน่าย ไม่มีแรง/หมดแรงที่จะทำงานหรือทำกิจกรรม ต่างๆ**

1. **ใน 1 สัปดาห์ที่ผ่านมา** วันใด? ที่เกิดอาการอ่อนล้า**มากที่สุด**

1 2 3 4 5 6 7

วัน วัน

2. **ใน 1 สัปดาห์ที่ผ่านมา** วันที่ท่านมีอาการอ่อนล้า**มากที่สุด** ความอ่อนล้าอยู่ในระดับใด

0 1 2 3 4 5 6 7 8 9 10

ไม่อ่อนล้าเลย อ่อนล้ามากที่สุดเท่าที่เคยเป็นมา

3. …….
4. …….
5. …….
6. …….
7. …….
8. …….
9. …….
10. …….
11. …….
12. …….
13. …….
14. …….

THE FUNCTIONAL ASSESSMENT OF CANCER THERAPY-BREAST (FACT-B)

แบบประเมิน ชุดที่ 4 แบบประเมินคุณภาพชีวิตใจผู้ป่วยมะเร็งเต้านม

คำแนะนำ ข้อความข้างล่างนี้ เป็นข้อความที่ผู้ป่วยโรคเดียวกับท่านกล่าวว่ามีความสำคัญ ขอให้ท่านอ่านแล้วเลือก วงกลม **(O)** เพียงหนึ่งหมายเลข ในแต่ละหัวข้อ ตามความรู้สึกที่แท้จริงของท่าน

ในระยะเวลา 7 วันที่ผ่านมา ท่านรู้สึกว่าเป็นอย่างไรบ้าง

	ความผาสุกด้านร่างกาย	ไม่เลย	เล็กน้อย	ปานกลาง	ค่อนข้างมาก	มากที่สุด
GP 1	ข้าพเจ้ารู้สึกหมดเรี่ยวแรง.....	0	1	2	3	4
GP 2	.....	0	1	2	3	4
GP 3	.....	0	1	2	3	4
GP 4	.....	0	1	2	3	4
GP 5	.....	0	1	2	3	4
GP 6	.....	0	1	2	3	4
GP 7	.....	0	1	2	3	4
	ความผาสุกด้านสังคม/ ครอบครัว	**ไม่เลย**	**เล็กน้อย**	**ปานกลาง**	**ค่อนข้างมาก**	**มากที่สุด**
GS 1	**ข้าพเจ้ารู้สึกใกล้ชิดสนิทสนมกับเพื่อนๆ .....**	**0**	**1**	**2**	**3**	**4**
GS 2	.....	0	1	2	3	4
GS 3	.....	0	1	2	3	4
GS 4	.....	0	1	2	3	4
GS 5	.....	0	1	2	3	4
GS 6	.....	0	1	2	3	4
Q1	.....					
GS 7	.....	0	1	2	3	4

ขอให้ท่านอ่านแล้วเลือกวงกลมเพียงหนึ่งหมายเลขในแต่ละหัวข้อ ตามความรู้สึกที่แท้จริงของท่าน

ในระยะเวลา 7 วันที่ผ่านมา ท่านรู้สึกว่าเป็นอย่างไรบ้าง

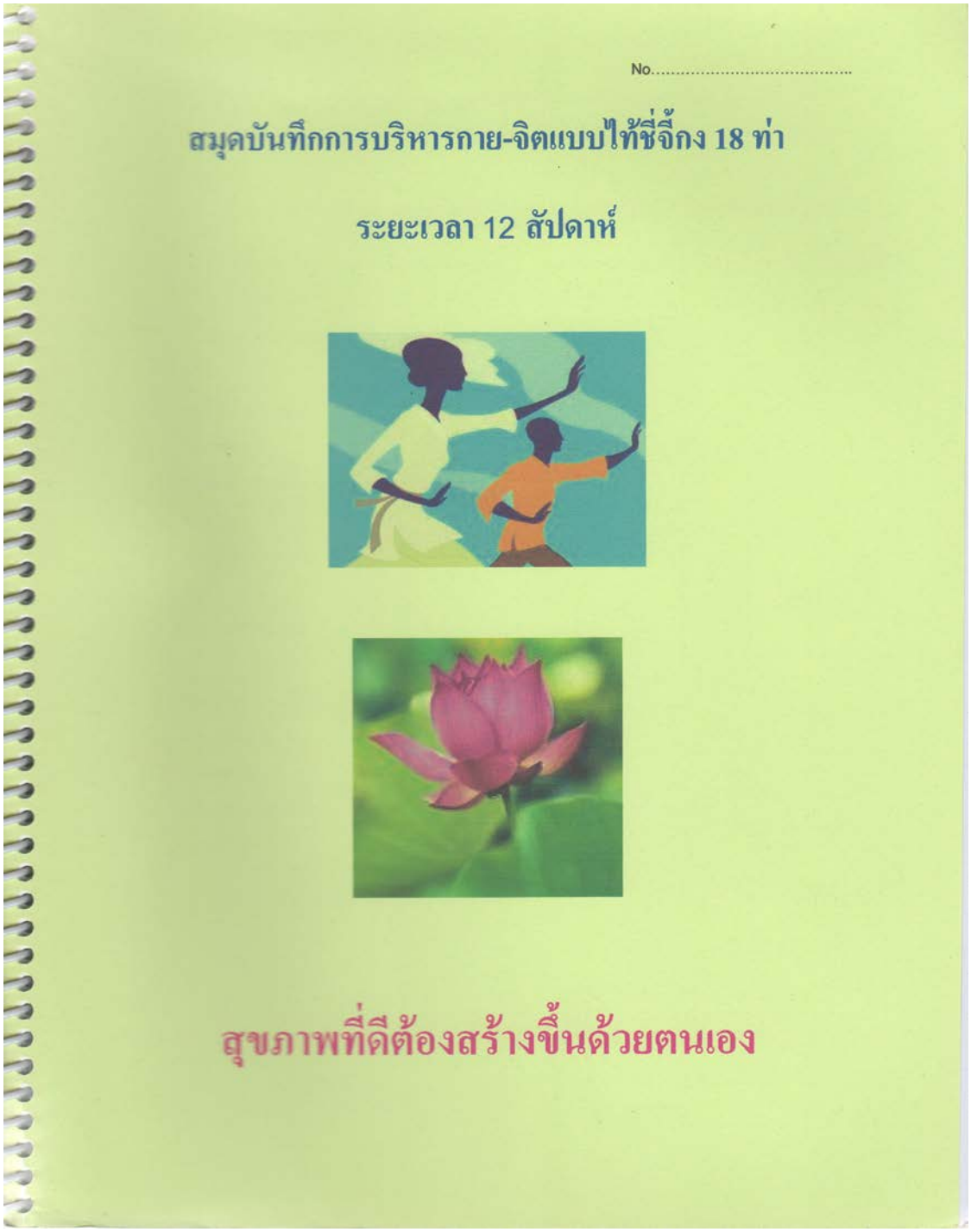
	ความผาสุกด้านอารมณ์ จิตใจ	**ไม่เลย**	**เล็กน้อย**	**ปานกลาง**	**ค่อนข้างมาก**	**มากที่สุด**
GE 1	ข้าพเจ้ารู้สึกเศร้าใจ	0	1	2	3	4
GE 2	.....	0	1	2	3	4
GE 3	.....	0	1	2	3	4
GE 4	.....	0	1	2	3	4
GE 5	.....	0	1	2	3	4
GE 6	…….	0	1	2	3	4

	ความผาสุกด้านการปฏิบัติกิจกรรม	**ไม่เลย**	**เล็กน้อย**	**ปานกลาง**	**ค่อนข้างมาก**	**มากที่สุด**
GF 1	ข้าพเจ้าสามารถทำงานทั่วไปได้ (รวมถึงงานบ้าน)	0	1	2	3	4
GF 2	…….	0	1	2	3	4
GF 3	……	0	1	2	3	4
GF 4	…….	0	1	2	3	4
GF 5	…….	0	1	2	3	4
GF 6	…….	0	1	2	3	4
GF 7	……	0	1	2	3	4

ขอให้ท่านอ่านแล้วเลือกวงกลมเพียงหนึ่งหมายเลขในแต่ละหัวข้อ ตามความรู้สึกที่แท้จริงของท่าน **ในระยะเวลา 7 วันที่ผ่านมา ท่านรู้สึกว่าเป็นอย่างไรบ้าง**

	ด้านอื่นๆ เพิ่มเติม	**ไม่เลย**	**เล็กน้อย**	**ปานกลาง**	**ค่อนข้างมาก**	**มากที่สุด**
B 1	ข้าพเจ้าหายใจหอบ.....	0	1	2	3	4
B 2	……...	0	1	2	3	4
B 3	……..	0	1	2	3	4
B 4	……	0	1	2	3	4
B 5	……..	0	1	2	3	4
B 6	……	0	1	2	3	4
B 7	……..	0	1	2	3	4
B 8	……..	0	1	2	3	4
B 9	…….	0	1	2	3	4
P2	……..	0	1	2	3	4

TCQQ EXERCISE DIARY



TCQQ EXERCISE DIARY (cont.)

แบบประเมิน ชุดที่ 6 สมุดบันทึกการบริหารกาย-จิตแบบไทชี่จี้กง 18 ท่า

สัปดาห์ ที่ 1

คำแนะนำ กรุณาบันทึกวันที่ทุกครั้งและควรบันทึกตามการปฏิบัติจริงของท่านมากที่สุดเท่านั้น

สัปดาห์ ที่ 1 **กิจกรรม**	**จันทร์** **…….**	**อังคาร** **……..**	**พุธ** **……**	**พฤหัสบดี** **……**	**ศุกร์** **…….**	**เสาร์** **…….**	**อาทิตย์** **……**
การฝึกสมาธิระหว่างฝึก							
การฝึกหายใจแบบ…							
……..							
……..							
……							
รวม (วัน)							
รวม (นาที)							
รวม (ครั้ง)							
เตรียมประเมินผล ครั้งที่ 1	**เก็บปัสสาวะวันอาทิตย์**						
หมายเหตุ							

TCQQ EXERCISE DIARY (cont.)

สัปดาห์ ที่ **4, 6, 7, 8, 9, 10, 12**

คำแนะนำ กรุณา **"วงกลม" (O)** ล้อมรอบสัปดาห์และควรบันทึกตามการปฏิบัติจริงมากที่สุด

สัปดาห์ที่	4	6	7	8	9	10	12
กิจกรรม	**จันทร์**	**อังคาร**	**พุธ**	**พฤหัสฯ**	**ศุกร์**	**เสาร์**	**อาทิตย์**
การฝึกสมาธิระหว่างฝึก							
……....							
……....							
……....							
……....							
๑ …….							
๒ …….							
๓ …….							
๔ …….							
๕ …….							
๖ …….							
๗ …….							
๘ …….							
๙ …….							
๑๐ …….							
๑๑ …….							
๑๒ …….							
๑๓ …….							
๑๔ …….							
๑๕ …….							
๑๖ …….							
๑๗ …….							
๑๘ …….							
รวม (วัน)							
รวม (นาที)							
รวม (ครั้ง)							
หมายเหตุ							

QUESTIONS FOR A WEEKLY TELEPHONE FOLLOW-UP

ชุดที่ 7 แนวคำถามสำหรับการโทรศัพท์เพื่อสอบถามสตรีไทยมะเร็งเต้านมระยะรอดชีวิตที่บ้าน เรื่องการบริหารกายจิตแบบไทชี่จี้กง 18 ท่า และการออกกำลังกายตามคำแนะนำ

ลำดับ	**<u>กลุ่มทดลอง</u>** ปฏิบัติการบริหารกาย-จิต แบบไทชี่จี้กง 18 ท่า	**<u>กลุ่มควบคุม</u>** ปฏิบัติการออกกำลังกาย ตามคำแนะนำปกติ (Usual care)
1	ภายในสัปดาห์นี้ ท่านปฏิบัติการบริหารกายจิตแบบไทชี่จี้กง 18 ท่าหรือไม่ และเหตุผล (ถ้ามี)?	ภายในสัปดาห์นี้ ท่านปฏิบัติการออกกำลังกายหรือไม่ และเหตุผล (ถ้ามี)?
2	.....	.....
3	.....	.....
4	.....	.....
5	.....	.....
6	.....	.....
7	.....	.....
8	ภายในสัปดาห์นี้ ท่านปฏิบัติการบริหารกายจิตแบบไทชี่จี้กง 18 ท่า แล้วมีปัญหาและอุปสรรคอย่างไรบ้าง และเหตุผล (ถ้ามี)?	ภายในสัปดาห์นี้ ท่านปฏิบัติการออกกำลังกายแล้วมีปัญหาและอุปสรรคอย่างไรบ้าง และเหตุผล (ถ้ามี)?

APPENDIX E
INSTRUMENTS/PROGRAM
FOCUS OF WEEKLY TCQQ PROGRAM SESSIONS

Day0: Initiation and preparation (30 minutes)

1. Establishing relationship and trust
2. Introduction among group members
3. Brief discussion about 18-form TCQQ as an approach to mind and body program
4. Teaching and demonstration about UC collecting technique and give them two clean 1,500 cc. drinking bottle to collect a 24-hour urine at their home and they then obtained only 3-5 cc. out of all 24-hour urine volume (by small plastic tube) to the breast clinic on next week.
5. Make an appointment with the participants on next week

A.1. Week 1: Introduction of TCQQ program (45-60 minutes)

1. Data collection at baseline (T_1)
2. Introduction among group members; discussion of the group process and expectations for participants
3. Brief discussion of the nature of TCQQ as an approach to stress management. Discuss use of diaphragmatic breathing and a balance posture to maximize body balance and minimize joint stress. Emphasize all movement beginning and ending in the grounded position with bent knee, hip width part, and hands resting at the side of body.
4. Warm-up and beginning TCQQ training (1^{st} Form - 6^{th} Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake.

5. Review all movments including continuous form. All movement of 1st form – 6th form of TCQQ done together in sequence, warm-down, and take a rest.
6. Make an appointment with the participants on next week

A.2. Week 2: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (7th Form - 12th Form): 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave.
3. Review all movments including continuous form. All movement of 1st form – 12th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Make an appointment with the participants on next week

A.3. Week 3: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (13th Form - 18th Form): 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Make an appointment with the participants on next week

A.4. Week 4: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the

lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong

3. Review all movments including continuous form. All movement of 1st form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Make an appointment with the participants on next week

A.5. Week 5: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Inform the participants about UFC collecting technique and give them two clean 1,500 cc. drinking bottle to collect a 24-hour urine at their home and they then obtained only 3-5 cc. out of all 24-hour urine volume (by small plastic tube) to the breast clinic on next week
5. Make an appointment with the participants on next week

A.6. Week 6: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.

2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Data collection (T_2)
5. Make an appointment with the participants on next week

A.7. - A.10. Week 7-10: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st Form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Make an appointment with the participants on next week

A.11. Week 11: Breath Work and Posture of the TCQQ training

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.

2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st Form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Inform the participants about UFC collecting technique and give them two clean 1,500 cc. drinking bottle to collect a 24-hour urine at their home and they then obtained only 3-5 cc. out of all 24-hour urine volume (by small plastic tube) to the breast clinic on next week
5. Make an appointment with the participants on next week

A.12. Week 12: Group termination

1. Discussion of the group process and some issiues about independently TCQQ practicing at home with the participants.
2. Warm-up and beginning TCQQ training (1st Form - 18th Form): 1. Starting position, 2. Opening the chest, 3. Rainbow dance, 4. Separating cloud by wheeling arm, 5. Rolling arm, and 6. Rowing the boat in the center of the lake, 7. Lifting the ball in front of the shoulder, 8. Looking at the moon by turning of the body, 9. Pushing palm, 10. Cloud hand in horse stand, 11. Scooping the sea, and 12. Pushing wave, 13. Flying pigeon, 14. Punching in horse stand, 15. Flying wild goose, 16. Rotating wheel in the circle, 17. Marching bouncing ball, and 18. Shou Gong
3. Review all movments including continuous form. All movement of 1st Form – 18th form of TCQQ done together in sequence, warm-down, and take a rest.
4. Data collection (T_3)
5. Group termination

A TAKE-HOME TCQQ BOOKLET FOR THAI WOMEN LIVING WITH BREAST CANCER

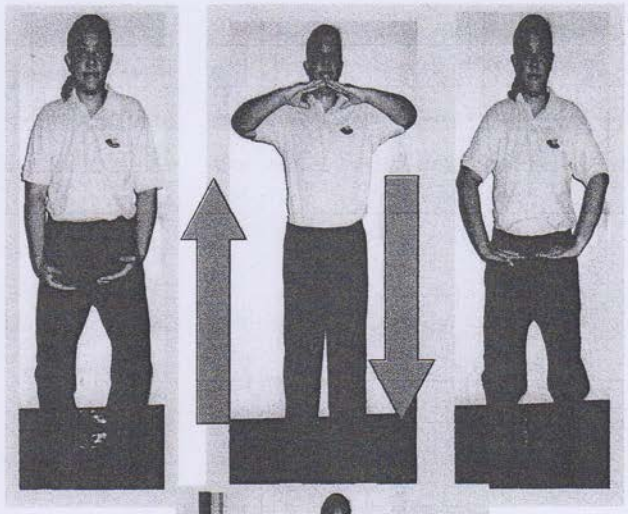
ท่าที่ ๑๘ "ท่าผ่อนคลายลมปราณ"

๑. ยืนตัวตรง มือทั้งสองข้างวาดเข้ามาวางไว้ที่ระดับสะดือ ฝ่ามือแบหงายขึ้น และปลายนิ้วมือทั้งสองข้างหันเข้าหากัน หน้ามองตรง สูดลมหายใจเข้า

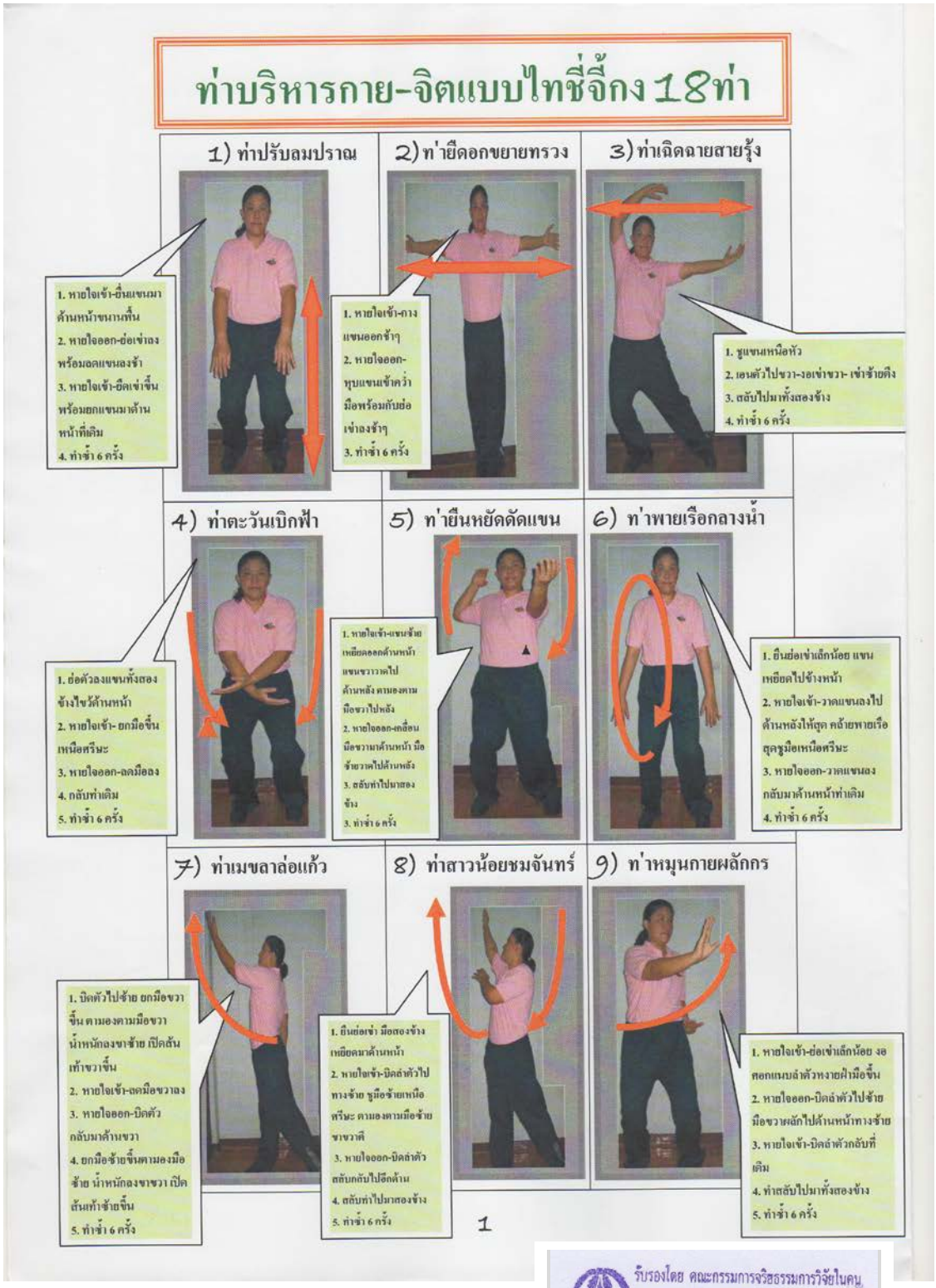
๒. ยกมือทั้งสองข้างขึ้นมาที่ระดับปลายคาง พลิกคว่ำฝ่ามือลง แล้วกดลดมือลงมาที่ระดับสะดือดังเดิม พร้อมกับย่อเข่าลงเล็กน้อย ปล่อยลมหายใจออก

๓. ยืดเข่าขึ้นตรง และกางแขนออกไปด้านข้างเล็กน้อย กลับสู่ท่าเริ่มต้น

๔. ปฏิบัติซ้ำเดิม



18-FORM TCQQ POSTER



A 12-WEEK TCQQ MANUAL PROGRAM FOR TRAINER

โปรแกรมการบริหารกาย-จิตแบบไทชี่จี้กง ระยะเวลา 12 สัปดาห์
ต่อการรับรู้คุณค่าในตนเอง ระดับคอร์ติซอลอิสระในปัสสาวะ
อาการเหนื่อยล้า และคุณภาพชีวิต ในผู้ป่วยมะเร็งเต้านมระยะรอดชีวิต

โดย ณัฐมา ทองธีรธรรม

A 12-week Tai Chi Qi Qong Program
on Self-esteem, Urine Free Cortisol, Fatigue,
and Health-Related Quality of Life
in Breast Cancer Survivors

Ms. Natma Thongteratham

BIOGRAPHY

NAME	Mrs. Natma Thongteratham
DATE OF BIRTH	9 February 1973
PLACE OF BIRTH	Surat Thani, Thailand
INSTITUTIONS ATTENED	Mahidol University, 1990–1994 Bachelor of Nursing Science Mahidol University, 2002 Certificate of Oncology Nursing Specialty Mahidol University, 2003–2006 Master of Nursing Science (Adult Nursing) University of Alberta, 2009 Academic Visitor Mahidol University, 2007–2013 Doctor of Philosophy (Nursing)
SCHOLARSHIPS	University Development Committee (U.D.C.) Scholarship, Commission on Higher Education, Ministry of Education, Thailand.
RESEARCH GRANTS	Thai Nursing Council, Thailand (TNC)
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EMPLOYMENT ADDRESS	1994 – 2003, Surgical Women Ward, Siriraj Hospital, Bangkok, Thailand 2003- Now, under the UDC Scholarship (Master and Doctoral degree)
PRESENTATION	Oral Presentation in the 16th East Asian Forum of Nursing Scholars (16th EAFONS).