The Effects Of Hung Fut Kung Fu's Ten Basic Stances On Postural Balance And Quality Of Life In Elderly Women

By

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B.Ed., University of Victoria, 1986

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Abstract

This multi method, quasi pre and post intervention design evaluated the impact of Hung Fut Gung Fu's ten basic stances (TBS) on quality of life (QOL) and postural balance in elderly females. The purpose of this inquiry was to explore the effectiveness of TBS as an appropriate and health promoting form of physical activity for senior populations. Five females aged sixty-nine to eighty-three, participated in the eight-week intervention. Pre and post intervention data were collected through a Quality of Life Profile: Seniors questionnaire, the Berg balance test, and a self-report calendar of slips, trips and falls. Post-intervention interviews captured participants' reflections of the experience. Quantitative findings indicate that the TBS sessions generated slight improvements in QOL and postural stability and significant reductions in slips trips and falls. Qualitative data analysis identified two themes as contributing to participants' QOL – acquiring knowledge and socializing with peers. The TBS appears to be a promising strategy for enhancing QOL and postural balance for senior populations.

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CHAPTER ONE

Introduction

This research experience was a direct result of a series of personal events I experienced over the past twelve years. The significant series of events includes personal development in Hung Fut Kung Fu, attaining a medical exercise specialist's certification in exercise rehabilitation and teaching Kung Fu.

In 1993, I was suffering from a lack of flexibility and suppleness despite an extreme level of fitness conditioning. As a result, I began to study Hung Fut Kung Fu. The Hung Fut training resulted in increased flexibility and suppleness and became part of my daily life and my personal training business. Previous to starting Kung Fu I operated a personal training business called Body Fix and I worked with young to middle aged individuals looking to enhance their fitness levels, or physical appearance. The Kung Fu was popular with a number of my clients as a way to augment their training. By 1998 my business was getting large numbers of requests for exercise rehabilitation and I completed a medical exercise specialist's certification to respond to the demand.

By the year 2000 my business was almost exclusively working in rehabilitation and the age of my clientele was significantly older. At this time I was seven years into my Kung Fu studies and had been teaching for two years as part of the training. Through the observation of a number of students, male and female ranging in age from eleven to seventy two, and a number of clients who used specific Kung Fu movements to help rehabilitate, I decided to do research on Hung Fut Kung Fu's Ten Basic Stances. Due to my clientele, I was used to working with the elderly and thought perhaps the greatest potential benefit would be in helping reduce the incidence of slips, trips and falls among the elderly.

Hung Fut Kung Fu is a specific style of Kung Fu originating over three hundred and fifty years ago. Within the style there are ten basic foot movements, one hundred

hand and foot movements, and numerous hand and weapons forms. The style content is similar to a number of Tai Chi styles, which emphasize hand and foot positions as well as hand and weapons forms. Studies have investigated Tai Chi (a style of Kung Fu) and its effects on balance and falling in the elderly (Hartman, Manos, Winter, Hartman, Li, & Smith, 2000; Ives & Sosnoff, 2000; Kuei-Min Chen, & Snyder, 1999; Wolf, Barnhart, Ellison, & Coogler, 1997; Wolf, Barnhart, Kutner, McNeely, Coogler, Xu, et al., 1996; Wolfson, Whipple, Derby, Judge, King, Amerman, et al., 1996), however, there are currently no studies exploring Hung Fut and what its effects on balance and falling in the elderly might be. Unique to Hung Fut are the ten basic stances, which are a method of training for postural balance and pivoting under control. Hung Fut Kung Fu's TBS have never been exposed to scientific inquiry, hence a purpose of this study.

One third to one half of elderly persons fall once or more per year resulting in one half of all accidental injuries to the elderly (Iverson, Grossman, Shaddeau, & Turner, 1990). Ten percent of non-disabled adults aged seventy-five or older lose independence in one or more basic activities of daily living per year (Beissner, Collins, & Holmes, 2000) affecting their quality of life. It is approximated that 40% of nursing home admissions are a direct result of implications resulting from a fall (Minister of Public Works and Government Services Canada, 2001). Most importantly, accidental falls are the number one cause of accidental deaths among the elderly (Iverson, et al.,1990; Perrin, Gauchard, Perrot, & Jeandel, 1999). In Canada, falling accounts for 57% of deaths due to injury among females and 36% for males (Minister of Public Works and Government Services Canada, 2001). In 2004, 517 women and 35 men died in BC as a result of falling (British Columbia Ministry of Health, 2006). The cost to society in dollars due to falling in the elderly was estimated at 2.8 billion in 1994; however, this estimate did not include long-term costs, such as loss of independent life, loss of function and ongoing rehabilitation (Minister of Public Works and Government Services Canada 2001; Piotrowski-Brown, 1999). Hospitalization costs in British Columbia during 2004 were

$151 million with fifty percent of the hospitalization costs arising from falls related hip fractures. The average cost of these hip fractures was $18,508 bringing the total cost to $75 million (British Columbia Ministry of Health, 2006). The problem becomes even more alarming when considering that the number of seniors in Canada may almost double between 1996 and 2041 (Minister of Public Works and Government Services Canada, 2001). Despite these disquieting statistics, there has been a significant decrease in death rates directly or indirectly related to falls in British Columbia since 1990. These results have been attributed to devoted attentive work on the part of falls prevention staff within health care systems and communities (British Columbia Ministry of Health, 2006).

Therefore, a purpose of this research was to determine if training in the TBS would result in improved postural balance and quality of life for elderly participants. This was accomplished through qualitative and quantitative measures of participants' perceptions of their quality of life and a quantitative measure of balance before and after the eight-week intervention. Implications of this study are that this form of training could assist the elderly in further reducing the incidence of slips, trips and falls and enabling the maintenance of an independent life. The chapters that follow present a review of the literature relating to quality of life and falling, as well as life long learning and social support (Chapter 2). The research questions close the second chapter. Methods are described in Chapter 3, including sampling, recruitment, and data collection and analysis strategies. Both the quantitative and qualitative data are presented in Chapter 4 and discussed in terms of the literature in Chapter 5. The final chapter offers some implications for practice and future research.

CHAPTER TWO

Literature Review

The literature review opens with a discussion of quality of life. This is followed by research investigating balance and falling, and an overview of exercise programs and their relation to falling. A discussion of the concepts of life long learning and social support systems concludes the literature review. Lastly, the presentation of the research questions, research propositions, and hypotheses are presented.

Quality of Life Overview

The aging of the population is associated with an increase in age-related illness and disability and consequently a corresponding rise in the demands for health care services to seniors (King, Pruitt, Phillips, Oka, Rodenberg, & Haskell, 2000; Piotrowski-Brown, 1999; Raphael, Brown, Renwick, Cava, Weir, & Heathcote, 1998; Thomas, 2001). Raphael et al. (1998) report this is occurring at a time when limited resources force health care providers to rationalize their service allotment while still providing quality care.

Self-report measures of health status as outcomes of health care, in addition to outcomes such as the 5-D's (death, disease, disability, days in bed and dollars) are gaining favour with medical researchers (Spiro & Bosse, 2000). Accordingly, this has led to a number of measures of health related quality of life (HQL) including, assessing outcomes in clinical trials, monitoring quality of care in medical practice, comparing inputs and outputs of different medical systems, characterizing or comparing populations and examining changes within a population over time. Further it is reported that validity and reliability of measures of HQL have been well established (Raphael et al., 1998; Spiro & Bosse, 2000).

Spiro and Bosse (2000) investigated the distinctions between the construct of HQL and well being (WB). They performed this investigation on twelve scales assessing HQL and seven scales assessing WB, and concluded not only that HQL is a distinct

construct, but also that gerontologists should utilize HQL, which maintains continuity with the construct of WB. They qualify this conclusion by reporting that gerontologists assessing the impact of health on physical abilities and activities should consider HQL, while medical researchers assessing the effects of medical care or interventions should consider WB as an outcome.

Thomas (2001) reviewed the complexities of nutrition and exercise in relation to the possibility of extending life span, delaying the effects of aging, preventing chronic disease and augmenting the body's immune system. Thomas suggested that, if exercise is to have an effect on HQL, participants should be assisted in changing their lifestyle. The central question is then how to facilitate active living among sedentary persons, so they may continue exercising through out their lives. The conclusion of the review is that our understanding of the age related changes in physical activity, nutrition, and their effect on HQL is critical to providing prescriptive care for the aging population (Thomas). This suggests it is important to consider health related quality of life (HQL) when evaluating a physical activity designed for use among the elderly.

Two common definitions of QOL in the literature are: 1) "High quality of life means that individuals feel better, function better on a daily basis, and for most, live independently" (Spirduso & Cronin, 2000, p. S598); and, 2) "QOL is the degree to which a person enjoys the important possibilities of his/her life" (Raphael et al., 1998, p. 4). Underpinning these definitions is the assumption that QOL is enhanced when individuals engage in activities that are both enjoyable and health promoting.

For Raphael et al. (1998), conceptualizations of QOL offered in the literature were limited by a focus on specific populations, and on illness or disability as well as narrow QOL domain definitions. In addressing these limitations Raphael et al. developed three guiding principles: 1) QOL components are the same for all people regardless of age, physical ability or disability; 2) QOL includes physical, psychological, spiritual, social and environmental dimensions; 3) Important components of QOL are personal

control and potential opportunities. The North York Community Health Promotion Research Unit and the University of Toronto developed a conceptual model to reflect these principles (Raphael et al., 1998).

The QOL conceptual framework has three domains – Being, Belonging and Becoming. The "Being" domain or "who one is" (Raphael et al., 1998, p. 3) has three sub-domains - physical, psychological and spiritual being. Physical Being includes physical health, personal hygiene, nutrition, exercise, grooming, clothing and general physical appearance. Psychological Being encompasses psychological health and adjustment, cognitions, feelings, self-evaluations such as self-esteem, self-concept and self-control. Spiritual Being relates to personal values, personal standards of conduct and the spiritual beliefs held by an individual.

The "Belonging" domain refers to a person's fit with their environment and has sub domains of physical belonging, social belonging and community belonging. Physical Belonging is the person's connection with their physical environments, home, workplace, neighbourhood, school and community. Social Belonging includes links with social environments and involves acceptance by intimate others, family, co-workers, and neighbourhood and community. Community Belonging relates to access to resources, adequate income, health and social services, employment, educational and recreational programs and community events and activities.

The "Becoming" domain concerns purposeful activities carried out to achieve personal goals, hopes and aspirations and are Practical Becoming, Leisure Becoming and Growth Becoming. Practical Becoming is day-to-day activities such as, domestic activities, paid work, school or volunteer activities, and seeing to health and social needs. Leisure Becoming involves activities, which promote relaxation and stress reduction. Growth Becoming relates to the maintenance or improvement of knowledge and skills and adapting to change.

The Quality of Life Profile: Seniors Version (QOLPSV) is a paper and pencil

self-report measure of importance and enjoyment of 111 topics identified as relevant to seniors and was found to have promising reliability and validity (Raphael, Brown, Smith & Renwick, 1998) (Appendix A). During its development and testing, respondents expressed concern about the length of the questionnaire. The authors also felt that, for screening and research purposes, the long version provided more detail than was necessary, and thus created a short version. The short version questionnaire has 54 items based on three domains; Being, Belonging and Becoming each with three sub-domains where six questions are asked within each sub-domain (Appendix B). The questions are answered on a likert scale, 1 meaning not very important and 5 meaning very important. The higher the recorded score the higher the assumed quality of life. In addition, the questionnaire examines: the importance attributed to the three domains, and enjoyment and the overall environment in which the person lives.

Spirduso and Cronin (2001) critically reviewed the effects of physical activity on QOL and independent living in older adults. One of these studies indicated that persons with a higher physical activity at baseline were less disabled years later and that equal benefit was realized from walking, gardening, or vigorous exercise. This is relevant because physical activity is related to physical function, which is predictive of dependence and the relative risk of admission to nursing homes (Spirduso & Cronin). Another study indicated that physical activity appeared to protect the mobility-impaired from further disability. This critical review concludes that individuals (disabled or non-disabled) who expend more energy on a consistent basis are more likely to have optimal physical function. Most recently, a random digit telephone survey of 3,843 adult respondents examining multiple indicators of Health Related Quality of Life (HRQL) by demographic characteristics and selected health behaviours found a significant negative relationship of inactivity with HRQL when compared to those adults who report regularly participating in leisure time activities (Jiang & Hesser, 2006).

The likelihood that participants could receive improvements in QOL from a short-

term exercise intervention was addressed by Damush and Damush (1999). Sixty- two community-dwelling women with a mean age of 68 years were divided into a resistance-training group and a control group. All participated in an eight week intervention. The control group attended classes and acted as an exercise partner who gave encouragement and counted repetitions but did not participate in the resistance training, which was an attempt to control for the socialization factor. It was found that there was a significant change in strength levels in the training group but no significant change in their self reported QOL. There was an insignificant increase in self-reported QOL from both the control group and the resistance training group and improvements to QOL were in the predicted direction for alleviating anxiety and depression. It was concluded in this study that improvements in QOL were related to peer group activity outside the home, which provided a sense of belonging, something meaningful to do and a social network.

The relevance of social interaction to QOL was addressed by Degenholtz, Kane, Kane, Bershadsky and Kling (2006). These researchers suggest that due to the subjective and personal nature of QOL information is best gathered from individuals, yet this method is expensive and time consuming. As a result the purpose of their research was to develop indicators of QOL, providing a more convenient and less expensive way to gather data. Utilizing interview data from 2,829 nursing facility residents the association of QOL with potential indicators was assessed. It was found that QOL is negatively associated with physical function (visual acuity, continence, being bedfast, depression, conflict in relationships), and positively associated with social engagement at the individual resident level.

Postural Balance

The importance of balance in maintaining postural stability should not be ignored as it plays an important role in developing and maintaining an active lifestyle. Balance is one of the prerequisites of performance in healthy elderly persons and "physical exercise may help to maintain balancing abilities in old age; good balance, in turn, may also

enable a physically active way of life" (Era, Avlund, Jokela, Nilsson, Heikkinen, Steen, & Schroll, 1997, p. 21). Iverson et al. (1990) found age to be negatively correlated with balance performance and force production, and that when force production increased, balance increased. Moreover, Iverson et al. found that as muscular force production increases, balance performance increases suggesting that any exercise behaviour, which increases muscular force, is effective if maintained. In a critical review of research articles Spirduso and Cronin (2000) concluded that physical activity and disability are inversely related among adults 65 years and older, and that physical activity is related to function in particular to walking speed and participating in outdoor activities. According to Wolfson, Whipple, Derby, Judge, King, Amerman and Smyers (1996), " ...there is no consensus regarding which of the critical elements of motor behavior need to be trained to result in improved balance or what measures of balance validity reflect its complexity and multidimensionality" (p. 498).

The Berg Balance Test (BBT) is regularly used to evaluate and identify balance impairment in elderly persons and is considered an objective measure of balance abilities (The Canadian Physiotherapy Association, 1999). Shumway-Cook, Brauer and Woollacott (2000) report that the BBT rates performance from 4 (normal performance) to 0 (cannot perform) on 14 different tasks, including ability to sit, stand, reach, lean over, turn and look over each shoulder, turn in a complete circle and step. The maximum possible score on the Berg Balance scale is 56, indicating excellent balance. A score less than forty-five may be predictive of multiple falls (The Canadian Physiotherapy Association, 1999). For a more complete review of the test protocol see Appendix C.

Partly due to the absence of a pivoting strategy, turning difficulties in the elderly has been shown to be a strong predicator of falling (Thigpen, Light, Creel, & Flynn, 2000). Pelvic tilt and the changing over from single leg support stance to double leg support stance is another area of concern when considering balance (Winter, Patia, Frank, & Walt, 1990). Postural instability in the elderly is attributable to reduced force

production (Iverson et al., 1990), reduced range of motion in the upper and lower extremities (Maki & McEllroy, 1997; Winter et al., 1990), loss of ankle mobility (Mecagni, Smith, Roberts & O'Sullivan, 2000), and loss of maintenance of posterior and anterior pelvic tilt (Baker, 2000; Winter et al., 1990).

Yet in light of the literature, it appears that Hung Fut's TBS may have the potential to enhance postural balance in the elderly. Because it utilizes one and two foot support stances, full body pivoting and relaxation techniques, the TBS were designed to enhance postural balance and it maybe plausible to assume such enhanced postural balance may lead to a reduced fear of falling, sustained independence and improved quality of life.

Exercise and Falling

Exercise programs that utilize strength training, walking and a balance component are successful in reducing the number of falls in elderly persons (Campbell, Robertson, et al., 1997; Carter, Khan, McKay, Petit, Waterman, Heinonen et al., 2002; Hill, 2002; Herbert, Maher, Chris, Moseley, & Sherrington, 2001; Piotrowski-Brown 1999). In particular, Tai Chi has shown positive reductions in fall rates (Campbell, Robertson, et al., 1997; Hill, 2002; Piotrowski-Brown 1999). Piotrowski-Brown notes that fear of falling is an important issue and Tai Chi shows promise in dealing with this problem, but requires further research. It may be that the "spiritual aspect" integral to the eastern philosophy of Tai Chi provides an enhanced sense of well-being and balance. This component may be reflected in the psychological and spiritual being domains of the QOL model.

Reviewing the literature, Hill (2002) concludes that the most effective interventions for reduction of falls are those that combine an exercise component and a reduction in environmental risk factors. Campbell et al. (1997) investigated the effects of a randomized control trial of a strength and walking exercise program and found that to be successful over the long-term, programs need to be simple, easy to implement,

affordable and effective. Carter, Kahn, McKay, Petit, Waterman, Heinonen, et al. (2002) conducted a randomized control trial utilizing a balance, strength and agility program (Osteofit), specifically designed by the University of British Columbia and prescribed by doctors to elderly women (65-75 years of age) living with osteoporosis. Carter et al. found that participants experienced improvements in dynamic balance and strength. Moreover, because the Osteofit programs were offered in community centres they presented a simple and inexpensive strategy that physicians can prescribe for their patients.

King, Pruitt, Phillips, Oka, Rodenberg and Haskell (2000) reported improvement in the QOL outcome of bodily pain as a result of participation in an exercise regimen of stretching and flexibility exercises in a community-based sample of older adults. This study utilized a strength training group and stretching and flexibility group who participated in a twelve-month program. The strength-training group did not report the improvement in the QOL outcome of reduced bodily pain that was reported by the stretch and flex group. King et al. caution that there is little information on the effects of stretching and flexibility training, relative to other forms of exercise on perceived well-being outcomes, or the importance of bodily pain levels to overall QOL. An additional finding of this study was that participation of all subjects was greater with their home versus class-based exercises.

In a survey study of activities and fear of falling in the elderly, a link between attributes of QOL and Tai Chi was found in relation to the reduction of falls (Li, Fisher, Hammer, & McAuley, 2003). In the study by Wolf, Barnhart, Ellison and Coogler (1997), the effects of computerized balance training and Tai Chi where observed and compared to a control group utilizing a platform balance measure. Findings showed there was little change in stability amongst the Tai Chi and control groups, however, subjects in the Tai Chi group were less afraid of falling compared to subjects from other groups with similar covariates. Follow up visits showed a significant reduction of falls among

those subjects from the Tai Chi group. The researchers concluded that Tai Chi may gain its success, in part, from promoting confidence without reducing sway, rather than providing an actual reduction in sway based measures. (Sway is defined as changes in the centre of mass through a series of force outputs as measured by a force transducer embedded in a platform.)

McAuley, Mihalko and Rosengren (1997) studied fear of falling in the elderly and argued that fear of falling is a more extensive problem than falling itself. Further, fear of falling is significantly associated with depressed mood and restrictions in mobility and social activity (McAuley et al., 1997; Piotrowski-Brown, 1999). Iverson et al (1990), in their research on balance as it relates to hip flexor, extensor and abductor force production, found that highly active participants had higher balance scores and greater muscular torque. The researchers suggest that self protective immobility is debilitating and fear of falling is multiply determined by cognitive, behavioural and physiological factors. While exercises that include a balance component reduce falling, when skills are limited, belief in personal efficacy can allow one to accomplish objectives that do not appear physically possible (McAuley et al., 1997).

Clearly, falling in the elderly is a serious problem (Tinetti, 2003). Data suggest that Tai Chi can reduce the rate of falling and the fear of falling (Wolf et al, 1997). There are also numerous health benefits associated with Tai Chi training, which are associated with improved balance and postural stability: reduced stress, improved mood state, reduced hypertension, reduced levels of chronic pain, increased flexibility, and increased cardiovascular endurance, especially in the elderly and sedentary (Hartman, Manos, Winter, Hartman, Li, & Smith, 2000; Ives & Sosnoff, 2000; Kuei-Min Chen, & Snyder, 1999; Wolf, Barnhart, Ellison, & Coogler, (1997); Wolf, Barnhart, Kutner, McNeely, Coogler, Xu, et al., 1996; Wolfson, Whipple, Derby, Judge, King, Amerman, et al., 1996). It is thought that reduced stress, improved mood state, reduced hypertension and reduced chronic pain may alleviate fear of falling (Wolf et al., 1997). Hung Fut Kung Fu

has similar training methods to Tai Chi, yet far less is known about its influence. The TBS may be able to provide improvements in balance and postural stability to help reduce falling, and fear of falling. If the ten stances are found to have similar effects as Tai Chi it will solidify the assumption that this type of somatic training may reduce the fear of falling and subsequently the fall rate. Moreover, the potential for such a minimal intervention strategy to enhance QOL and independence for the elderly in a cost efficient manner may inform the work of geriatric practitioners. Finally, this research could introduce a method of balance and pivot training that could assist a wide variety of individuals and may serve as a primary tool for prevention of falls in younger populations.

Three key features foretell strong mental function in later years, regular physical activity, self-efficacy and a strong social support system (Rowe and Kahn, 1998). It has been shown that physical activity has a positive effect on the physical body, but as Rowe and Kahn argue there is a mental component that needs to be considered when setting out to make meaningful and lasting change. Following the examination of life long learning will be a review of the current research on the effects of social support systems.

Life Long Learning

The literature shows that seniors facing hard and demanding circumstances, which are perceived as requiring personal change have a readiness to learn (Caserta, Lund, & Rice, 1999). The article by Caserta et al. (1999) presents the Pathfinders program, a theoretically and research based self-care and health education program for recently widowed persons aged fifty and older, and also includes some outcome evaluations from their demonstration program and subsequent post-intervention assessments. They suggest that life transitions, like bereavement, are motivational factors for lifelong learning. As such, acquisition of new knowledge and/or skills to survive life transitions is required.

The idea of the healthy aging mind is further explained in the text Successful

Aging written by Rowe and Kahn (1998). These authors suggest that age related loss of mental function is exaggerated. They report that among those aged seventy-four to eighty-one less than 50% will show any level of mental decline in their ensuing seven years of life. These authors assert that the persistent belief, held by most individuals, that the elderly can no longer enhance or develop new mental capacities leads to a cycle of inactivity and decay. In fact, according to Rowe and Kahn, research indicates seniors do learn new things and learn them well. It is revealed by these authors that the scope and pace of learning is restricted in the elderly, but they demonstrate a robust and enduring ability to synthesis new connections, acquire new information, and as such develop new skills.

Rowe and Kahn (1998) report that due to reductions in visual and auditory acuity, reaction time, and short-term memory, learning - which requires perceptual speed, physical coordination and muscular strength - becomes more arduous and eventually unattainable at some point in the aging process. Because Hung Fut Kung Fu's Chi starter warm-up, and the TBS, requires perceptual speed, physical coordination and muscular strength to perform, these exercises may pose an impediment to the learning process for elderly participants. However, Tai Chi, a style of Kung Fu similar to Hung Fut, has shown senior populations can and do learn to perform the complex physical movements (Li, Fisher, Hammer, & McAuley, 2003; Wolf, Barnhart, Ellison, & Coogler 1997).

Literature on learning as an adult suggests teaching with multi-methods and providing a non-threatening and assistive environment is important. A study involving ninety college seniors aged twenty-three and older measured a variety of outcomes related to the incidental acquisition of information from reading (West & Stanovich, 1991). The findings confront the belief that the acquisition of information is exclusively achieved through the efficiency of neurological mechanisms responsible for storage and encoding. The researchers propose that a significant factor explaining differences in knowledge acquisition between individuals is the utilization of a variety of presentation

methods. Caserta et al. (1999) also indicate that adult learners analyze and retain novel inputs better when presented with visual and auditory stimuli and include visual aids in their Pathfinder Educational Presentations. In addition, Rowe and Kahn (1999) state that the essential requirements for learning in old age include working at your own pace, practicing new skills and avoiding embarrassment.

Social Support System

The literature shows that mental and physical health, cognitive function, willingness to participate in learning new activities, and QOL - factors pertinent to this study - can be enhanced through a strong social support system. This review of the relevant research in the area will begin with a definition of social support and continue with discussion of the factors positively affected by strong social support systems.

A definition of social support is presented by Rowe & Kahn (1998): " information leading one to believe that s/he is cared for, loved, esteemed, and a member of a network of mutual obligations" (p. 157). In addition Young, Russel, and Powers (2004), in their study surveying 9445 women aged 73-78 years participating in the Australian Longitudinal Study on Women's Health, use the following description of the effects of a strong social network, "Older adults who are embedded in active social networks tend to have better physical and mental health than older adults who are less involved with other people" (p. 2627). Further, "social networks may include family members, friends, social or religious groups and neighbours "(p. 2627). Rowe and Kahn suggest that individuals who experience social support are better able to cope with stressors in their lives. The resultant health benefits for individuals demonstrating a reduction in their reaction to stress includes lower risk of arthritis, tuberculosis, depression, and alcoholism, as well, they require less pain medication after surgery, recover more quickly, and show greater adherence to rehabilitation and exercise regimens.

Additional support for the assertion that health benefits are associated with social support was found in a study which performed a cross sectional survey of 3600 non-

institutionalized Spanish elderly persons 60 years and older (Lopez Garcia, Banegas, Graciani Perez-Regadera, Herruzo Cabrera, & Rodriquez-artalejo, 2005). The study examined the relationship between a social network and QOL in comparison to the effects of osteoarthritis on QOL. The findings indicate that a reduced social network resulted in increased body pain and reduced general and mental health. The authors conclude that a weak social network is as negatively associated with QOL as osteoarthritis. Additional, health benefits reported are decreased mortality and morbidity (Lopez Garcia et al., 2005; Rowe & Kahn, 1998; Young, Russel, & Powers 2004). Lopez Garcia et al. also report that decreases in mortality result from reductions in cardiovascular diseases, accidents, and suicides, while reduced morbidity is evident in immunologic, neuroendocrine and cardiovascular function. These findings relating to social support systems suggests that if the TBS intervention is perceived by participants as providing social support it may improve participants' health, help to guard against specific areas of morbidity, and influence feelings of QOL.

Current literature reveals there are other important factors affecting QOL. Perceived cognitive function has been proposed as a determinant in health related quality of life (HRQL) (Kiessling & Henricksson, 2004). In their research, Kiessling and Henricksson administered questionnaires to 253 patients with coronary artery disease to assess which factors affected HRQL. Four factors identified as affecting the patients' HRQL were perceived cognitive, physical, social, and emotional functions. It was concluded that perceived cognitive function was the major determinant of HRQL in coronary artery diseased patients. Other research supports the assertion that there is a positive correlation between social support and cognitive function. In a study which conducted 4,993 face-to-face interviews with elderly city dwellers (> 64 years) living in Taiwan, it was found that marriage and perceived positive support from friends exhibited a positive and significant association with cognitive function (Yeh & Liu, 2003).

Although not connected to the concept of perceived cognitive function Hellstrom,

Andersson, and Hallberg (2004) describe and compare factors that can predict QOL amongst seniors aged 75 years and older who receive help from formal and/or informal helpers. The study reviewed 8500 postal questionnaires sent to a randomly selected and age stratified sample. Questionnaire findings show that it was the amount of help with activities of daily living that impacted QOL negatively and the density of the social network that impacted QOL positively. These findings suggest care must be taken when offering support or assistance. Rowe and Kahn (1998) report on a study that reviewed the type of assistance offered elderly nursing home residents performing a simple task. One group was given a great deal of encouragement when they were having difficulties, but no help performing the task, the second group had the task performed for them each time they showed they were experiencing difficulty and the third group was given neither encouragement, or assistance. On subsequent tests those who had been encouraged improved, those who had been assisted worsened and those receiving no intervention remained the same. As a result Rowe and Kahn conclude that social support can improve the performance of certain mental tasks, but to achieve those improvements the kind of support must be appropriate to the situation and to the needs of the individual. The key then is to be encouraging, not assistive, when fulfilling an assigned and appropriate supportive role.

As reported in the literature exercise implementation and adherence are also positively affected by strong social support systems. A random survey of 8881 community dwelling people 65+ years living in New South Wales examined factors associated with physical activity at a population level. Their findings identified that among other variables support from family members, friends, or exercise support staff is a significant factor in physical activity participation (Lim & Taylor, 2005). In support of these findings is the study by Giles-Corti and Donovan (2002), which surveyed 1803 healthy workers and homemakers aged 18-59 years living in metropolitan Perth Australia. The researchers' intentions were to examine the relative influence of

individual, social environmental, and physical environmental determinants of recreational physical activity. Like Lim and Taylor, Giles-Corti and Donovan conclude that public programs designed to encourage physical activity should create social support by encouraging regular physical activity with exercise partners. The study discussed previously in this literature review by Damush and Damush (1999) concludes that improvements in QOL were related to peer group activity outside the home, which provided a sense of belonging, something meaningful to do and a social network, all elements found within this study.

Research Questions

The gaps in the literature, as well as the uniqueness of the intervention, suggest the following research questions to address:

1. What are the effects of a TBS training regimen with a senior female population on their:
    a) postural stability;
    b) incidences of slips, trips and falls; and,
    c) quality of life?
2. What are participants' experiences with the group TBS training program and its influence, if any, on their QOL?

Regarding the first research question, the following hypotheses were proposed: Seniors' participation in an eight week Hung Fut Kung Fu exercise program will result in:

1. Enhanced postural balance.
2. A reduction in slips, trips and falls.
3. Increased quality of life within the domains of
    a) Physical, Psychological, and Spiritual Being,
    b) Social Belonging, and
    c) Practical and Leisure Becoming.

Addressing the second research question, it was proposed that as a result of participating in the program, participants would report enhanced quality of life related to aspects of their physical, social and psychological wellbeing.

CHAPTER THREE

Research Methods

This chapter includes a discussion of the research design, sampling strategy, and recruitment and the study time line. The chapter also describes the data collection instruments, as well as data analysis procedures. The chapter closes with a presentation of the intervention training protocols.

Research Design

This was a multi method, quasi pre and post intervention design. Two quantitative measures (of quality of life and postural balance) were taken before and after an eight-week intervention, and an additional quantitative measure of slips, trips, and falls before and during the intervention. A post intervention personal interview was conducted with each participant. Finally, the researcher's field notes were documented throughout the duration of the study.

Sampling

The intervention for this research study took place at Goward House seniors' recreation facility for a period of eight weeks. The facility is a non-profit organization serving the social, cultural, physical and recreational needs of seniors closely situated to the University of Victoria in municipality of Saanich. All of the participants were recruited from the Goward house facility where I have been instructing other forms of fitness and conditioning classes for seniors for the past few years. The location was chosen to create a circumstance that did not add undue complications to the lives of the participants, and which represented a typical venue for senior recreational programming. The TBS intervention and pre and post-intervention data collection took place at the recreation facility.

This study had five research participants, all female and between the ages of sixty-nine and eighty-three years. Qualitative research generally focuses intently on small samples that are selected purposefully for their information-rich cases, which yield large

amounts of information pertinent to the purpose of the research (Patton, 1990). The strategy utilized here to purposefully select information-rich cases was an intense sample used to describe a specific sub-group in depth or to elucidate the phenomenon of interest (Patton, 1990) - quality of life in elderly women at risk of falling. Hung Fut has participants of both sexes and all ages and elderly women have traditionally been a group with very low enrolment. The intent of using intense sampling was to bring together senior women who are at an increased risk of falling, and evaluate the effects of the TBS intervention.

The five participants met the following selection criteria:

1. Female. A higher incidence of falls is evident among females than males (Arnadottir & Mercer, 2000; Henderson, Helmick, Sattin, Stevens, DeVito, Wingo, et al, 1997; Minister of Public Works and Government Services Canada 2001).

2. Sixty-five years of age and older, as the initial increase in mortality rates due to falls occurs in this age range. For example, in British Columbia from 1987-1998 it was reported that mortality rates due to falls in women raised from 1.58 for women 45-64 to 7.76 for women 65-74 to 29.1 for women 75-79 and finally 168.75 for women 80+ per 100,000 individuals (BC Injury Research And Prevention Unit, 2001). If the TBS training regimen is effective in the age range 65 + it may serve a preventative role by reducing the alarming fall mortality rates recorded in later years.

3. Capable of maintaining an independent life and having no major musculoskeletal disease conditions.

4. Capable of reading, writing and speaking English.

5. Physician's approval to participate in the study.

Recruitment

Following securing ethical approval (Appendix D) and consent from the recreation facility (Appendix E), posters describing the study (Appendix F) were distributed to the facility two weeks prior to the start of the study. A sign up sheet

accompanied each poster. In addition, an instructor of the facility's chair-based activity class briefly explained the study to participants and directed them to the posters for further information. Individuals who expressed an interest in the study by signing up were telephoned to confirm their understanding of the study, answer any questions and ensure they met the selection criteria. Finally, participants completed an informed consent form (Appendix G).

Data Collection

The data for this study came from a variety of sources, which included a pencil and paper QOL questionnaire, researcher's field notes, Berg Balance Test (BBT), self reporting tracking calendars for slips, trips and falls and a taped personal interview recorded one month after the final BBT. Participants chose their own pseudonym to protect their identity. Below is the chronological order in which the data collection tools were used:

1. Using a bingo blotter, slips, trips and falls calendars were filled out one month before the eight-week intervention (Appendix H).
2. Pre QOL Profile Seniors short version (QOLPSV) and BBT scores were collected one week prior to the eight week TBS program.
3. Researcher's field notes were taken to monitor and assess the intervention and implementation process e.g., how well individual participants progress through the eight week training section of the study. The field notes began with my first personal interaction with the first participant and were ongoing through to the completion of the study. Field notes were recorded after each session with participants. I am a trained and qualified Hung Fut instructor with over five years of experience in teaching Kung Fu students.
4. Participants' recorded their incidence of slips, trips, and falls on a slips, trips, and falls calendar.
5. Post QOLPSV and BBT scores were collected one week following the program.

6. A follow up interview was conducted approximately one month after the final post-test BBT each lasting one hour. The interview provided an opportunity to review and discuss the collected data, expand and enrich details, and enable dialogue between the researcher and participants about aspects of the study not captured through the other data collection methods. Two of the tapes were incomplete due to technical difficulties; however, field notes taken during the interviews were used to fill in the missing and/or inaudible portions of the audio recordings. Questions asked of the participant during these interviews were dependent in part on responses to the questionnaire. A sample of generalized questions and some prompting questions can be viewed in Appendix I.

Table 1

Study Time Line

	Dec/03	Jan/04	Feb/04	Mar/04	Apr/04	May/04	Jun/04	Nov/05
Obtain ethical approval	*							
Recruit participants		*						
1st. BBT				*				
1st. QOL Questionnaire				*				
TBS Program				*				
Calendars			*	*	*	*	*	
Field Notes		*	*	*	*	*	*	
2nd. BBT							*	
2nd QOL Questionnaire							*	
Interviews							*	
Initial data analysis				*				
Continue data analysis				*	*	*	*	*
Write-up								*

Validity and Reliability

In an effort to control for threats to validity, separate approaches were used for the qualitative data and for the quantitative data. A potential threat to validity reflected the fact that I was teaching all the training sessions and analyzing the data. Keeping field notes, which included my feelings, attitudes and reactions to the study, was designed to guard against threats to interpretive validity (Guba & Lincoln, 1989). Gathering data from several forms of procedures (questionnaires, calendars, BBT, field notes and interview) triangulated the data, which helped confirm its interpretation and contributed to the study's validity (Baumgartner & Strong, 1998). Member checks during personal

interviews also contributed to establishing the validity (trustworthiness) of the collected qualitative data.

The QOLPSV has been correlated to four validation measures, including The Life Satisfaction Scale (LSS), the Memorial University of Newfoundland Scale of Happiness (MUNSCH), The Social Health Battery (SHB) and Activity Items (NCA). The correlations were favorable and are presented in Appendix A. Correlations of QOLPSV short and brief versions with the full QOLPSV were strong and can be viewed in Appendix A. Raphael et al. (1998) concluded that the short and brief versions have somewhat lower reliability than the full version, but the effects are minor, and do not affect the validity of the instrument.

BBT reliability and validity have been reported as follows (The Canadian Physiotherapy Association, 1999):

Reliability:

- Internal consistency; Individual items ranged from 0.72 to 0.94. Correlations ranged from 0.35 to 0.94.
- Inter-rater reliability, ranges from 0.71 to 0.99 for the individual items.

Validity:

- Construct; Correlations between the Barthel were 0.80 to 0.94 and 0.62 to 0.94 for the Fugel Meyer.
- Concurrent; For the BBT lab measures of postural sway, balance and mobility the correlations were –0.55 for sway, 0.91 for the Tinnetti balance subscale. 0.67 for the Barthel mobility subscale and –0.76 for the Timed Up and Go Test.
- Predictive; A BBT score of <45 was predictive of multiple falls.

The BBT was set up and administered by the researcher and this was felt to add to test re-test validity. Test protocol was identical: All participants were requested to wear comfortable walking shoes with a heel height no greater then two centimeters and the test was performed on a linoleum floor. The test was held on the same day of the week, at the

same time of day (Tuesday morning), and participants were informed to follow the same daily routine prior to each testing session.

Data Analysis

Quantitative data

Given the small and purposive nature of the sample, a Pearson Correlation Coefficient (r) was performed on the quantitative data (pre and post slips trips and falls calendars, BBT, and QOL questionnaires) to explore relationships between postural balance, QOL and the TBS. The descriptive analysis of questionnaire data was limited to comparing the mean and the mode of the two questionnaires. The QOL questionnaires did allow for triangulation of the data to enhance the transferability of the study's findings.

Qualitative Data

Each interview was transcribed verbatim. A summary of the transcription was forwarded to each participant. There were no concerns regarding the content of the summary and no additional interviews were arranged. A thematic analysis of the data collected through field notes and interviews was performed. Using an editing analysis approach (Crabtree & Miller, 1992), open coding of the interview data was done by hand on hard copies of each transcript. Open coding procedures, using QOL domains, facilitated the analytical process by enabling the researcher to make sense of the data and interpret the meaning of facts while acknowledging the theoretical framework guiding the inquiry (Patton, 1990)

As patterns and themes began to emerge across transcripts of the interviews, and relationships between categories became apparent, each one was revisited using the inductive analytic strategies of axial coding, memoing, clustering and factoring (Miles & Huberman, 1994). Utilizing a constant comparison method of interpretation (Henderson, 1991) allowed me to revisit and locate a conceptually relevant literature (successful aging) to make sense of the patterns and themes captured in the categories. To move the

aging) to make sense of the patterns and themes captured in the categories. To move the data beyond a classification of themes, I reframed the data in terms of existing theory, to provide a perspective in which the utility and implications of the study's findings could be generated.

Training protocols

I have been a student of Hung Fut Kung Fu for thirteen years and as part of my training I have been teaching for the past eight years. I received my training through affiliation with Sifu Wong Sheung's Hung Fut Kung Fu School (1620 1/2 Government St. Victoria BC Canada) from Sifu Martin Hittos and attained the rank of Sifu (teacher) in 2005. In this study, the ten stances were taught in the same manner as they are in regular Kung Fu classes. They were taught from foot position to postural alignment to pivoting and in sequential order from one to ten Appendix J. The chi starter warm up is a series of ten arm and hand movements designed to warm the body and improve shoulder and neck flexibility and is done in conjunction with basic hand movement number 82 and the whirling wind exercise (Appendix K). In addition to attending the training sessions participants were asked to practice ten minutes per day, or as much as they felt comfortable with.

Hung Fut Kung Fu teaching utilizes both visual and auditory methods, providing handouts, literal and visual explanations of the Hung Fut Kung Fu exercises, and plenty of in-class time to practice at participants' own pace. These attributes contribute to an appropriate learning environment in keeping with Caserta et al. (1999) and Rowe and Kahn's (1999) requirements.

Table 2

Number and Content of the Sixteen Training Sessions

Session Number	Content		
First session	Chi starter warm-up		
Second session	"		Learn first stance
Third session	"	Review previous stances	Learn second stance
Fourth session	"	"	Learn third stance
Fifth session	"	"	Learn fourth stance
Sixth session	"	"	Learn fifth stance
Seventh session	"	"	Learn sixth stance
Eighth session	"	"	Learn seventh stance
Ninth session	"	"	Learn eighth stance
Tenth session	"	"	Learn ninth stance
	Chi starter warm-up	Review previous stances	
Eleventh session	"	"	Learn tenth stance
Twelfth – sixteenth session	"	"	

CHAPTER FOUR

Findings

This study has generated data from both quantitative and qualitative measures relating to three hypotheses and one proposition. These data will be presented in the following order; participants' profiles, review of quantitative data and relationship to the hypotheses, and interview findings.

Quantitative Findings

Participants' Profiles

The data presented in these findings are collected from five "life experienced" female participants whose demographic characteristics are presented in Table 3. Initially there were six participants, but one dropped out after the eighth session due to personal reasons; none of the data from this participant were used in this study. One participant (Beth) missed one class due to swelling in the knee, and another (Maeve) missed two sessions due to a previously booked appointment and a family gathering.

The average age of participants was 76.6 years. Each had some post secondary education and was employed at some point during their adulthood. All of the participants were able to live at home without assistance and performed some form of exercise on a regular basis. Heidi perceived the fitness level of the study group in the following manner,

> Well, I feel that our group because we've been with our fitness instructor so long, we were part-way there with the balance and things because she incorporates a lot of these things [Into her fitness classes]. I feel our group is a level or two higher than the man on the street to begin with.

The fitness instructor that Heidi referred to has two decades of experience in offering a wide variety of physical fitness activities. Each week she instructs two one-hour chair based fitness classes designed for senior populations. The facility where this

study was conducted and where participants regularly attend classes is a privately run, non-profit, seniors' recreational facility.

Table 3

Participants' Profiles and an Overview of their Perceptions of QOL, Practice Times and Attendance.

Name	Age	Marital Status	Children	Education	Work History	Perception of QOL Effectiveness	Practice after 30/days
Heidi	83	Widowed	3	1/yr College	Secretarial	E	Y/u
Maeve	78	Widowed	2	BA/Uvic	Radio	I	N
Liz	78	Single	0	BA/U/Sask	Med Lab Tech	I	Y/U&L
Beth	75	Married	2	BA/Uvic	Secretarial	I	Y/U&L
Mao	69	Married	1	B.Ed/UK	Latin Teacher	E	Y/U

Participant withdrawals = one
Absenteeism= .04% or 3 participation hours (5 participants X 16 participation hours = 80 participation hours)

E = effective (QOL questionnaire allowed participants to adequately express themselves)
I = ineffective (QOL questionnaire did not allow participants to adequately express themselves)
Y = Yes
N = No
U = upper body exercises
L = lower body exercises

Quantitative Measures

The quantitative measures used were pre and post Berg Balance tests (BBT), four months of self reported Slips Trips and Falls Calendars (STFC), and pre and post Quality of life questionnaires (QOL). Please refer to Table 4 for a profile of the raw data collected from the BBT, STFC and QOL.

Table 4

Profile of Results from BBT, STFC and QOL

Name	Pre-BBT	Post-BBT	Pre- QOL	Post- QOL	Pre-STFC	Post-STFC
Heidi	54	55	.91	.93	1T, 1S	1S
Beth	56	56	.66	1.21	3S	0
Mao	56	56	.70	.81	1F, 1T, 1S	0
Liz	56	56	.84	1.07	3S	0
Maeve	54	55	.73	.54	0	2S

Note. BBT = Berg Balance Test; QOL = Quality of Life Questionnaire; STFC = Slips, Trips and Falls Calendars; F = falls; T = trips; S = slips

The results from the Berg Balance Test indicate that there may be a ceiling effect as the maximum score on the BBT is 56. Participants' pre-intervention scores achieved or were near this maximum score. The perceived fitness levels of the participants may partially explain why such high scores were achieved on the BBT. Moreover, the two participants capable of improving, Heidi and Maeve, did increase their score by one.

Overall, the observable changes in pre and post BBT and QOL are minimal, yet positive (Figures 1 and 2).

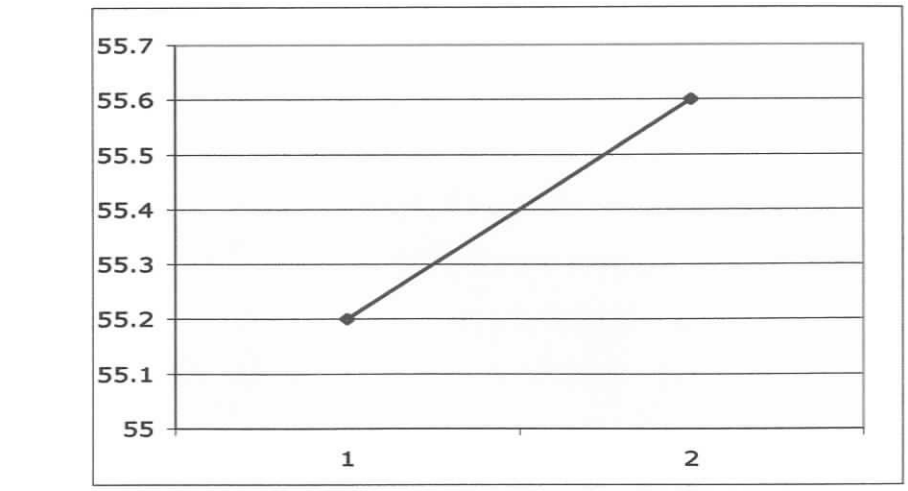

Figure 1. Mean improvements in group BBT scores

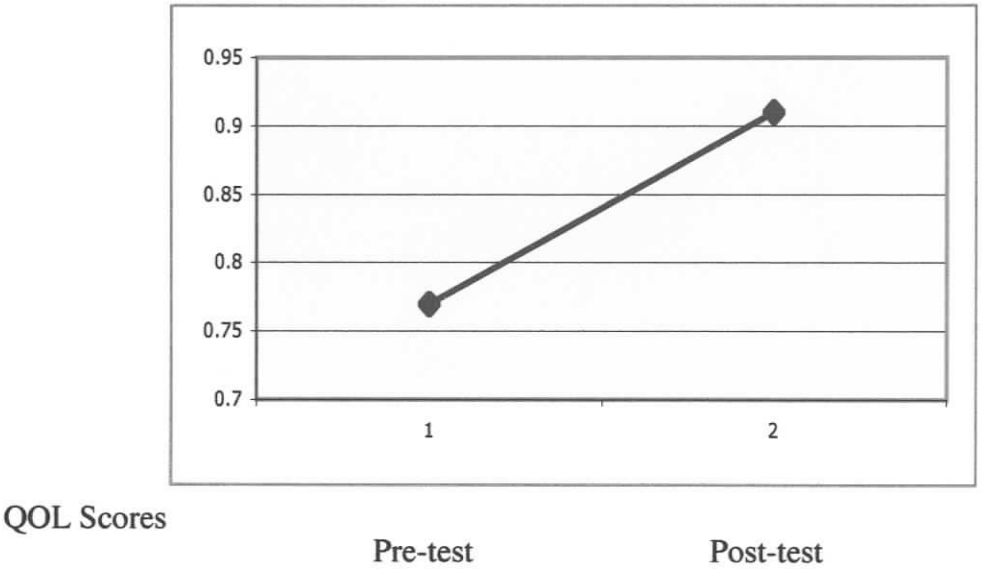

Figure 2. Mean improvements in group QOL scores

Figure 3 illustrates there was an initial drop in slips trips and falls after the second month of the STFC, which corresponds with the end of the first month of the intervention. After the end of the third month of the STFC, and the end of the intervention there was a slight increase in the fall rate. At the final STFC, the fall rate

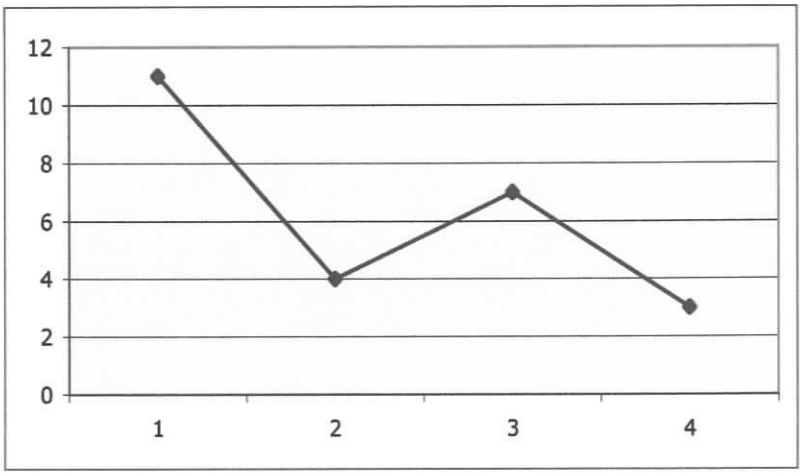

Figure 3. Group scores for the first, second, third and fourth STFC

There was a drop from eleven incidences of slips, trips or falls after the first STFC to only three incidences of slips, trips or falls after the fourth STFC (Figure 3). As indicated in Table 5, the r-values for the STFC are approaching 1 for both r and r^2 and may suggest a strong relationship between the Kung Fu intervention and balance.

The quantitative findings in this study indicate differences between all pre-test and post-test measures with the direction of the change being consistent with what was hypothesized. The small and non-randomly selected sample restricts generalizability; nevertheless a test for statistical significance was performed. Pearson r and Pearson r^2 were performed on the BBT, STFC and QOL (Table 5).

Table 5
Pearson r and Pearson r^2 Correlations

Measure	Pre-test		Post-test		Pearson r	Pearson r^2
	Mx	SDx	My	SDy		
BBT	55.2	1.095	55.6	.547	.20	.04
QOL	.768	.10397	.912	.263	-.18	.03
STFC	2/2	1.304	.6	.895	-.98	.96

Note: BBT = Berg Balance Test; QOL = Quality of Life Questionnaire; STFC = Slips, Trips and Falls Calendars

QOL Scores

It was proposed that there would be improvement in six of the QOL sub-domains following the intervention and post-test QOL results indicate that at least three out of five participants showed improvement in three of the six sub-domains (Table 6).

Table 6

Changes in Participants' QOL Scores Within Domains

	Being			Belonging	Becoming	
Name	Physical Pre/Post	Psychological Pre/Post	Spiritual Pre/Post	Social Pre/Post	Practical Pre/Post	Leisure Pre/Post
Heidi	**.77/1.22**	**-.66/-.49**	.44/.44	2.1/1.82	1.08/.49	1.55/1.27
Maeve	1.83/.77	1.16/.61	**-.94/-.11**	.44/.38	**-.20/.66**	.11/-.38
Liz	1.16/.83	**.66/1.22**	**.44/.66**	**.99/1.49**	.66/.66	.55/.44
Mao	**.44/.83**	**.17/.55**	.20/0.0	1.05/.27	**.17/.61**	**-1.1/.49**
Beth	1.10/1.10	1.1/1.1	**.86/1.17**	2.26/1,66	**.79/1.0**	**1,33/2,55**

Note: Bolded numbers = Increased quality of life within the sub-domain

The QOL instrument has fifty-four sub-domain items (or questions). For a more global understanding of the changes in quality of life, and not just the domains hypothesized to change, Table 7 presents those items in which at least three of the five participants showed an increase or decrease in quality of life.

Table 7

Sub-Domain Item Numbers Where at Least Three of Five Participants Showed an Increase or Decrease in Quality of Life.

	Being (2-12)						Belonging (20-36)					Becoming (40-46)	
Name	2	3	4	12	20	22	26	27	32	35	36	40	46
Heidi			-2.6	1.33			**2.66**	1.0				1.33	1.0
			- 6.6	1,66			**1.66**	1.66				1.66	1.33
Maeve		**2.66**	**1.33**			1.66			1,33	1,66		.66	-3.3
		1.66	**0.0**			3.33			1.66	3.33		1.0	-2.6
Liz	1.0	**0.0**	**1.33**	0.0		1.33		1.33	1.66		0.0		
	1.33	**-2.66**	**0.0**	1.0		3.33		3.33	3.33		1.33		
Mao	0.0			1.33	1.33		**0.0**	1.33	1.66	1.33	1.0		0.0
	1.66			1.66	1.66		**-2.6**	1.66	2.66	1.66	3.33		1.66
Beth	1.33	**2.66**	**1.0**	1.66	2,66	2.0	**3.33**		-2.66	0.0	-1.33	0.0	
	1.66	**1,66**	**0.0**	3.33	3.33	3.33	**1.33**		0.0	1.33	1.33	1.33	

Note: Top row indicates participant's pre-test score; bottom row indicates participant's post-test score; bolded numbers indicate a decreased quality of life score on a specific item. Please refer to appendix B to read the content of all 54 sub-domain items

The majority of participants (4/5) showed an increase in their quality of life within the Being Domain, primarily Psychological Being item twelve. The Spiritual Being sub-domain, which was hypothesized to increase, is identified in Table 6 as being a sub-domain, which showed improvement. The raw data reveal there was at least one participant showing improvement in each of the Spiritual Being sub-domain items. More

interestingly, the Spiritual Being sub-domain was the only sub-domain to show no decrease in QOL by any participant under any of the six sub-domain items. Increases to the Spiritual Being sub domain appear to be the result of small numbers of participants showing improvements in all domain items within the sub-domain, in combination with no reductions among items, as opposed to large increases in a small number of items or a single item within the sub-domain. Therefore, the increases observed for the Spiritual Being sub-domain in Table 6 are not recognized in Table 7 as it identifies individual sub-domain items where at least three participants showed improvement. As a result, none of the Spiritual Being sub-domain item numbers (thirteen through eighteen) appear in Table 7. Unexpectedly, the Social Belonging sub-domain (item 26) hypothesized to positively increase following the intervention did not show measurable changes. Rather, the Community Belonging sub-domain (represented in Table 7 by sub-domain items 32, 35 and 36), not predicted to change, in fact demonstrated greater improvements than all other sub-domains.

Items 2, 3 and 4 are from the Physical Being sub-domain. Item 2 is exercising and keeping fit, which increased for three participants. Item 3 captures balanced nutrition and eating right, and 4 reflects having enough energy "to do the things I want". Interestingly, for two of the participants whose score for item 2 improved, their scores decreased for items 3 and 4. Item 12 is from the Psychological Being sub-domain, and refers to having a positive attitude towards life. It is this sub-domain in which the majority of improvements were found for the Being Domain.

The majority of group improvements in quality of life were in the Belonging Domain, which is represented by items 20 through 36. The Physical Belonging sub-domain is represented by item 20 (living in a safe place) and item 22 (having my own personal things). Improvements in the Community Belonging sub-domain were measured by item 32 (being able to live in affordable housing), item 35 (having enough money to live comfortably) and item 36 (having transportation). The Social Belonging

sub-domain item 27 (people nearby who speak my language) improved for three of the participants. Item 27 was puzzling because all of the participants were fluent in reading and writing English and lived and interacted where only English was spoken. This finding will be addressed in the discussion section. Item 26 (having friends) is from the Social Belonging sub-domain and the decrease in quality of life in this item, along with minimal increases in the remaining four items of this sub-domain, contradicts what was proposed in this study. These contradictions were explored during the interviews and will be discussed in the following section.

Items 40 and 46 are from the Practical and Leisure Becoming sub-domains respectively. This study proposed there would be increased quality of life within these two sub-domains and for three out of five of these participants this increase was achieved. Item 40 refers to going to appointments (doctor, dentist etc.) and item 46 refers to having outdoor activities, for which scores increased for three out of the five participants.

In summary, the TBS regimen produced moderate increases in balance and QOL for these senior women participants. Not all the expected changes in QOL resulted, however, as previously discussed. These discrepancies are explored with the interview data. There were significant decreases in the number of slips, trips and falls during and following the TBS intervention.

Qualitative Findings

Interview data reveal research participants' experiences with the program and their views on changes observed in their QOL scores as reported in Table 1. Further, two themes related to their explanations for these changes centered on the concepts of Knowledge and Socialization, were identified in the interview data and are discussed below. All five participants expressed learning something new as a reason for changes in QOL, or that learning something new was important to QOL. This will be discussed in Theme one (Knowledge). Theme two (Socialization) identifies the influence the social

aspect of the intervention had on enhancing QOL.

Participants' Perceptions on Changes in QOL Scores

Data in Table 1 reveal that two of the five participants felt the QOL questionnaire adequately allowed them to express their feelings about their quality of life while three of five felt the QOL questionnaire was inadequate in this regard. Heidi and Moa found the questionnaire effective and both showed lesser degrees of change in their QOL scores than Beth, Liz and Maeve, who found the QOL questionnaire to be ineffective. Despite research participants' views on the effectiveness or ineffectiveness of the QOL questionnaire, it seems that QOL quantitative measures captured participants' QOL fairly accurately, as the changes in pre and post scores are reflected in interview data. Most were able to relate specific examples of why the scores changed as will be discussed below. During the interview, participants were asked questions about any sub-domain item that showed a considerable change in either direction. Overall, participants' responses substantiated QOL quantitative measures and illuminated instances where the QOL instrument was unable to accurately record participants' perceptions.

Heidi's QOL scores changed in a positive direction, however her degree of change was the least substantial of the five participants. Heidi felt the questionnaire "...had me thinking about things I wouldn't have thought about myself. I had to stop and think about some of those questions." There were few sub-domain items where Heidi showed a large change, evidenced by the QOL measures, but she was able to offer reasons for the changes that were discernable. Commenting on decreases in her QOL scores Heidi explained how seasonal changes could be overwhelming "because in the spring everything suddenly needs doing - the sunshine is here, the windows are all dirty, the weeds are popping up. I don't know - everything." Increases in Heidi's QOL scores were reflective of the fact she was walking her dog more, her daughter had moved back to Victoria and would be able to be of assistance, and that she enjoyed learning; all of these reasons (excluding learning) were not connected to her participation in the TBS

program.

Moa also showed a minimal positive change in her QOL score and her impression of the QOL questionnaire was that "it covered most things I think". She stated that she felt the questionnaire was straightforward and that, "a number [to record on the likert scale] popped into my head quite quickly". Liz reported that she "found it difficult to answer some of them. I couldn't really think what did this mean to me. Some of them were quite straightforward. I found some of them difficult to answer." An apparent discrepancy aside, Moa was able to articulate reasons for negative QOL results as being related to her husband's progressive illness and to construction workers in and around the house during renovations; again, explanations not tied to the TBS intervention. When asked about a strong increase in the physical being sub-domain she commented, "exercise really is a booster I think". Moa commented that she appreciated the social and educational aspects of participating in the exercises as well.

For Liz, improvement in the being sub-domain items exercising and keeping fit and having a positive attitude toward life, were in agreement with statements made by Liz during the interview concerning her perceptions of the increases in her QOL.

> I do enjoy trying to get fit. I've never been a sports type. I've always wanted to be more physically active so when I joined [The recreation centre] exercise I really enjoyed that. The more I do of it, the more I like.

Due to difficulties with vision Liz reported difficulty with completing the questionnaire. She stated,

> As you know I had difficulty reading this. I have difficulty reading and I am very, very slow. My time for interpreting it was cut in half of what the other people would have because I had to do it much quicker then I would have liked.

When asked if more time would have made a difference, Liz responded, "I don't

think so." She suggested the questionnaire was too subjective and personal perceptions of QOL are inconsistent and capable of change, despite acknowledging, "I don't think my answers should have changed, I think it was one-day difference – what happened with that day or the news I heard, or something like that, just sort of put me down. The other day I was feeling more up." She mentioned it was, "hard to decide just what the level of my answer was. Am I really happy about this or am I not so happy. I found the shading was difficult." In combination, poor vision and questions perceived as difficult to understand suggest limitations in the instrument to accurately capture QOL for some seniors.

Data show Beth recorded the greatest degree of change in QOL scores among research participants. Beth mentioned she had an illness during the time she completed the pre intervention QOL questionnaire, and attributed the large overall increase in QOL recorded from the post intervention QOL questionnaire to feeling better. "I mean I do feel so much better. You don't realize until you stop feeling not well, how nice it is to feel well again and not be tired all the time." At the completion of the interview when asked if she had anything further to add Beth commented,

> I think if you taught anything, if you taught karate or kick boxing, anything like that which you taught us would increase our feelings of well-being - as long as we didn't cripple ourselves, because any physical thing you do you feel better. It's just you feel you're tired, but we know quite well when we get up and go for a walk or you get up and do something you start feeling better. If your depressed get up and do something.

The QOL questionnaire was able to identify increases in Beth's responses to the Being, Belonging and Becoming domains. Improvement in the being sub-domain items exercising and keeping fit and having a positive attitude toward life, complement the statements made by Beth concerning the positive effects of feeling better physically.

Beth doubted that the QOL questionnaire would elicit a true or consistent result, "I don't think I really care about that 'becoming' [domain] because questions are so subjective, I think. So what is very applicable to somebody else really doesn't matter to me and I'm probably not consistently answering either." In spite of the fact the QOL questionnaire seemed to capture most of what Beth had mentioned as being relevant to her increases in her pre to post QOL scores, there is a contrary example. The sub-domain Leisure Becoming, which refers to having activities to do and socializing with friends and family, showed a decrease pre to post QOL. Beth's response to this decrease was one of surprise, "I wonder why I went down… I mean I'm always out with somebody. Having hobbies - I have gardening…I don't understand that. Must have had a bad temper when I did it. Or had a bad game of bridge or something. I can't see why I would have gone down." This is another example of a possible limitation to the QOL instrument as her questionnaire scores were opposite to what was gleaned during the interview.

Maeve was the only participant to show a drop in pre to post QOL questionnaire scores. She admitted to having problems responding to the questionnaire items, "I found them really confusing. Can't get the distinction between the two – not just between the first and the last one – but between the two subjects on each." Maeve also felt she was not prepared to spend the time to do a complete job,

> I felt that to do a real honest job, I needed to take longer. I didn't feel there was the time to do that. Which may not have been the fault of the questionnaires. I did find in that particular period of time, I had perhaps taken on too much here at [the recreation centre]. So even if I had taken the questionnaires home, I probably would not have spent more time on them.

When told that her QOL score had dropped Maeve responded, "Yes, there is a

reason for that." She then commented why she felt there had been a drop in her QOL scores,

> Well I am seriously considering moving to the mainland and in the time difference here it has been very much on my mind trying to come to a decision. I've really been giving some thought as to what I have in Victoria that I want to stay here for the rest of my life. Whereas, on the mainland, I have a very devoted family and so that's the difference there. I'm quite sure that is what it is.

A review of Maeve's domain scores showed she had a drop in the Being and Becoming domains, but an increase in the Belonging domain, which supports her interview data. Maeve had initially reflected that she was confused by the questions and felt rushed when answering questions, but despite these shortcomings the questionnaire was able to capture her reality. Maeve's overall QOL scores fell, but her feelings of control over her life and the opportunities available to her increased: "That's all part and parcel of this. [My] control went up, it's because I realize that I have control and I have to make my own decisions about this possible move. So it's all to do with assessing what I have here versus what I would have there." Again the questionnaire was able to capture this reality in spite of feelings Maeve expressed about the ambiguity of the questions and limited time to complete the questionnaire.

In summary, research participants reported a sense of uncertainty in the paper and pencil assessment of their quality of life. Yet, when queried during interviews about the discrepancies between pre and post QOL scores, participants were able to explain the scored differences, reflecting the sensitivity of the QOL tool to their broader life circumstances. This suggests that the instrument was a fair gauge of these participants' QOL.

Theme 1: Knowledge Contributed to QOL

Following the intervention participants reported learning new things (i.e.,

information and exercises) enhanced their QOL. In addition, participants felt the intervention increased their knowledge of basic anatomy, physiology, strength, balance and flexibility and they relish learning this technical information. Participants also revealed that increased knowledge led to an increased awareness of the risks of falling, despite a lack of a consensus on whether their physical balance improved.

Learning Something New Enhanced QOL

None of the participants had experienced Hung Fut Kung Fu, and as such it was a new and novel experience. Participants stated that they "enjoy learning something new" it was "good to do" and that it "can't help but improve the quality of life…"

Moa had shown an increase in QOL Physical Being sub-domain item 4 (Having energy to do the things I want). When asked why she felt there was an increase in this sub-domain she responded, "from learning something new… although I must say I really did enjoy that very much, learning something new. I really like it if it involves the body – I think it is really good to do that."

Maeve's QOL score on Growth Becoming sub-domain item 5 (Learning about new things) decreased. When asked about the decrease she gave the following response,

> I'm surprised at that because that is one of my big interests. So, maybe I didn't take enough time [to complete the questionnaire]. I mean I really believe seniors should keep having challenges – whether it is learning Spanish [or] whatever. No, I haven't really stopped wanting to learn about new things.

Beth reflected that Kung Fu made her "feel better", and on the importance of taking on new challenges to enhancing Quality of Life,

> …Kung Fu certainly has increased my feelings of comfort in my shoulders. Your exercises that we did the other day are opening up really…it felt so good. Everybody said that. Those things will help you feel better so I think – I won't say that Kung Fu- I won't say it

is just because of the exercises, but I think that overall because we are doing something new we're concentrating – you are trying to get your body to do something, so you are in a different space so that can't help but improve the quality of life, can it?

Novel stimuli seems to be appreciated by this elderly population of research participants particularly those with a physical component. However, it was demonstrated through interview responses that participants in this study enjoyed the acquisition of many forms of relevant knowledge.

Increased knowledge and enjoyment of learning

Relevant and technical information about the purpose of each exercise, and its relationship to personal health and the prevention of falls was part of the ongoing dialogue during the intervention training sessions. The dialogue included discussions on anatomy and physiology. For example, there were discussions about the bones and how they move as a lever system with joints acting as fulcrums, and the agonist antagonist actions of the muscles acting to generate force and control. In addition, there were discussions on the effects of progressive resistance. Progressive resistance is a training principle that states appropriate increased stimulation of a physiological system results in improvements to the system. The concepts of strength, balance and flexibility were frequently mentioned. Participants were initially informed, and frequently reminded that increased leg strength, and in turn-increased power to body-weight ratio allows for the raising and lowering of torsos more securely. As well, there were discussions about the importance of developing pivoting strategies to stabilize the body through out a turn. Finally, participants were informed of the benefits of increasing flexibility, with a possible outcome being movement through full ranges of motion. Participants in this study found the sharing of this knowledge to be helpful and enjoyable:

"Oh yes, I enjoyed the group and I enjoyed your instruction very much. I enjoyed your discussions of various things" (Liz). Liz also expressed feelings of

empowerment about the knowledge she had learned.

> It's hard to put this in words. How you explained this particular thing could help you. For example, putting your hands back on your shoulders, how that could relieve strain on your neck and that stiffness. Things like that and you gave a lot of different examples of how. I found that very helpful.

During the interview, one-month post intervention, Heidi mentioned, " You got a big hand in class today [all the participants in this study regularly attended a chair-based activity class, which is operated out of the seniors' recreation complex where this study's intervention was performed] when our class instructor asked how we'd done with you." Heidi offered an explanation why everyone seemed to have such a positive experience and the explanation centered on the acquisition of knowledge, "I think that – the way that you explained where our muscles are and how they work – that was a big thing with everybody."

Beth commented how much she enjoyed the intervention suggesting that the learning environment played a role in the level of enjoyment experienced in the learning process, "I loved it, yes. We all loved it because we like you." Beth expands on this by stating, "It's very difficult to disassociate a task from who is teaching it."

The acquisition of knowledge was enhanced for those who found joy in learning. The benefits for these research participants went beyond simply possessing the knowledge to having an increased sense of awareness of their actions and their interactions with the physical world. When participants were asked to express their feelings concerning their ability to balance and falling, they indicated mixed feelings on the question of balance, but were in agreement that they were "more conscious" and "more aware" of falling.

Enhanced awareness of falling

Participants' responses to the question relating to improvements in balance

ranged from believing balance had improved to perceiving it had declined: "My main thing is I found anything to do with my legs is much more difficult, but I really tried and I think the balance is improving" (Beth). "I don't know whether my balance improved" (Moa). For Maeve, "… I seem to be having slight losses of balance more then I did when I started the program". Despite a lack of consensus concerning improvements in postural balance every one of the participants felt a heightened awareness regarding the risks of falling.

All the participants in this study stated being "more aware" or "more conscious" of falling since having completed the intervention. Many examples were given regarding specific areas of consciousness concerning falling. Participants mentioned being aware of the physical world, being aware of performing physical activities safely, and being aware of the need for ergonomic aids. Further, participants noted more awareness of the side effects of drugs, the ramifications of disease and the anxiety that accompanies falling.

Liz commented on the likelihood of falling, "I think I am just as likely to fall as I was before, but I am more aware" and how this awareness translated into actions taken in her daily life, "I am more careful looking where I'm stepping, or how I'm stepping I think." Maeve explained how she was conscious there were inherent dangers involved when performing activities, "I was over at my son's in Surrey this past weekend painting house trim, up and down the ladder and sometimes up to just about the top of it and I was conscious of being very careful." Like Maeve, Heidi was aware of the inherent dangers of an activity and made this statement, "The bathtub one is a biggie. I have trouble getting out. I worry about falling on the tap, or something like that." She explained, " I'm conscious about it. I recently got a bar, but I don't have it installed yet." Awareness of the concerns surrounding interaction with the physical world accounted for only part of the increased awareness of falling reported by participants. Participants also reported awareness of unseen dangers such as the effects of medications, disease

and anxiety.

Heidi commented on the side effects of needed medications "Those darn pills have their own side effects." Heidi also expressed comments about anxiety in regards to taking the medication, "I keep wishing I didn't have to take this blood pressure medication." As with medications, disease can pose problems that are at the surface not identifiable. Commenting on the relationship between disease conditions and falling, Moa mentioned her cousin, who has osteoporosis, and expressed her concerns about the dangers of falling for those individuals living with osteoporosis.

> It can be a silent killer, you know. I was involved [with] the osteoporosis [centre] for a while and when people come to the meetings they look so frail. It's a big thing for people. If they do fall they are going to break something.

Even a slip can create anxiety amongst individuals who are relatively confident in their abilities to balance. As Moa mentioned while answering a question about her feelings toward falling, "I am more aware that it is a possibility. I'm not worried too much about falling myself although when I do slip it kind of…it shakes me up. "

Becoming more knowledgeable about basic anatomy, physiology, exercise concepts and Kung Fu exercises designed to be pertinent to their lives, was a common theme in the interview data. This theme helps to explain the increased scores in the Physical Being domain, Psychological Being domain and Practical Becoming domain previously discussed in the quantitative findings section of this chapter.

Theme 2: Socialization Contributes to QOL

The socialization aspect of the intervention further benefited participants. Participants' comments suggested that the socialization aspect of the intervention offered an opportunity to meet new people, created a supportive environment, and offered

incentive for engaging in community activities.

Meeting new people

When asked what she enjoyed about participating in the intervention, in addition to the physical benefits reaped, Liz stated "the people". It was reported by one participant that group activities were a way to meet friends and enjoy friendships while still maintaining a distinct private life, "I like being on my own and then I like being with people" (Moa). Moa had experienced an increase in all the Becoming sub-domains, which relate to "things you do to take care of yourself". When Moa was asked to explain the increase she commented, "well coming to your classes made a difference and meeting people there and making new friends with Liz, whom I hadn't met, they're like a little family." The sixteen one-hour sessions offered participants enough time to develop meaningful relationships as evidenced by Mao's last comment about her feelings for the study group, "we certainly did bond".

A supportive environment

After becoming a widow Heidi had to adjust to a new life living alone and made this comment about how she had come to live her life,

> [The recreation centre] has become such a big part of my life. I just don't know what I would do – you know with all the social things.

Participants further commented on the role participation in activities played in offering a supportive environment. When asked about increased scores in one of the Leisure Becoming sub-domain items (getting out with others), Moa responded, "Well, we have a very friendly church. People there are very supportive." Moa further commented on her appreciation for group support when asked about the drop in one of the Social Belonging sub-domain items (having friends),

> I like to join groups. I like to join [the recreation centre] and I like to do yoga downtown… I like meeting people like that. I guess I still do. But being a Gemini I can switch so quickly from one to another – I like being

on my own then I like being with friends. Maybe you caught me when I wanted to be alone.

Moa offered another perspective about her feelings why there was a decline in the score of the Social Belonging sub-domain item (having friends), "I would certainly like to have more [friends]. I guess because my husband and I are so tight together, we do everything together, I don't get out."

Liz commented that she found the supportive environment of a group necessary when she decided to develop an active life-style, "I've never been one to exercise regularly. I had to have a class to come to." The support Liz received from the group empowered her and she stated "but having done this for months now, I am going to continue. I think I will continue regularly at home. But I've never done anything like that on my own." This comment suggests group involvement could have the potential to result in self-directed exercise adherence.

Incentive for getting involved

Beth commented that she felt, "any exercise you do is beneficial", while being with others was motivating "you see normally I walk an hour with my friends". Liz also found herself in need of incentive. Wanting to exercise, but feeling unable to start exercising by herself Liz was at first encouraged by group involvement,

That's what I was saying about having never exercised until I joined the exercise group. Now I wouldn't miss the exercise group for anything. It's partly that I didn't have the incentive to do things. I always do work better if I am in a group.

Subsequent to the Kung Fu sessions, where participants were encouraged to practice the steps at home, Liz found that she could exercise at home alone. One month following the end of the sessions Liz reported exercising at home on a regular basis, but she acknowledged the pleasurable aspects of group interaction, which she finds motivational. "I enjoy it here more doing it in a group than I do at home". However, not

all participants reported needing incentive. Maeve regularly performs a morning exercise regimen and for her participation in group activities was not necessarily a motivating influence, "well I guess whether you do it on your own or in a class depends on your own self-discipline. Would I take a class? It would depend entirely on what else is going on."

The socialization benefits reported by participants helps to explain the increases observed in the Community Belonging sub-domain as presented in the quantitative findings section of this chapter. What remains unexplained is the fall in the Social Belonging sub-domain scores, even as the interview data highlighted the contribution of socialization to QOL. This discrepancy represents an important line of further inquiry.

Summary

The Kung Fu sessions were a low cost, low-"tech" intervention designed to increase physical balance and strength. Despite its simplicity, the results include improved objective measures of balance and falling, and improved self-report measures in QOL scores across all domains, but particularly for the Belonging domain.

Interview data suggest that some of these improvements in QOL resulted from a more knowledgeable group of research participants who appreciated the social experience of "meeting new people" and "learning new things". Even at this later stage of life, enhancing one's control over life circumstances – through provision of information and mastering physical exercises – can improve QOL and may reduce risk of falling in a population vulnerable to falls.

The blend of quantitative and qualitative data collection strategies provided for a more comprehensive understanding of the participants' experience with the TBS intervention and their QOL. Four participants commented on their life circumstances as positively and negatively influencing their QOL that were unrelated to the TBS sessions. For example, for Heidi it was the return her daughter and the responsibility of dog walking that contributed to an enhanced QOL. Beth's recovery from a long-term illness

enabled her to be more physically and socially active. A significant life decision for Maeve regarding relocation was revealed in the interviews as underlying her drop in QOL scores. Finally, for Mao a nominal increase in QOL scores masked the distressing conditions of an ill spouse and repairs to her living space. These results underscore the peril of relying solely on a single data collection tool, particularly with this senior population who found the interview experience a better way to discuss their QOL than the paper and pencil questionnaire.

CHAPTER FIVE

Discussion

Introduction

Improvements to participants' balance parallel other studies citing the importance of physical activities to fall prevention in aging populations. Central themes from the findings of this case study regarding the knowledge generating and socialization aspects of a Kung Fu intervention are evident in the literature of successful aging. This chapter will discuss how the findings support and further our understanding of quality of life, increased balance and strength and successful aging.

The results revealed in this study are consistent with those found in related research, which are improvements in QOL, increases in balance and reductions in the fall rate following participation in an activity involving strength and balance exercises. Slight improvements in QOL resulting from participation in a short duration exercise intervention have been reported by (Damush & Damush, 1999). King et al. (2000) also noticed improvements in QOL outcomes from physical exercise interventions, however participants benefited more from home versus class-based exercises. Wolf et. al. (1997) found their Tai Chi intervention positively affected participants' QOL, and concluded that Tai Chi may gain its success, in part, from promoting confidence without reducing sway. These findings support those from this study where a significant drop in slips, trips and falls is accompanied with only a minor corresponding measurable increase in balance.

The findings, as reported in the previous chapter of this study, compare with those of Tai Chi researchers who report minor to considerable improvements in balance from participation in a Tai Chi intervention (Chen & Snyder, 1999; Choi, Moon, & Song, 2004; Li, Harmer, Fisher, & McAuley, 2004; Thornton, Skyes, & Tang, 2004; Wolf, Barnhart, Kutner, McNeely, Coogler, & Xu 1996; Wolf et al., 1997; Wolfson, Whipple, Derby, Judge, King, & Amerman, 1996). The significant improvements in balance found

elsewhere (e.g., Chen & Snyder, 1999; Choi, Moon, & Song, 2004; Li, Harmer, Fisher, & McAuley, 2004; Thornton, Skyes, & Tang, 2004, & Wolfson et al., 1996) were not found in this study. However, the balance test used in this study, the Berg Balance Test (BBT), had a categorical scale with a restricted range of performance, and may have failed to detect meaningful changes in balance. A more complete discussion on this possible ceiling effect is forthcoming.

Further, this study supports previous research suggesting that strength training and balance exercises are successful in reducing the number of falls in elderly persons (Campbell, Robertson, et al., 1997; Carter, et al., 2002; Hill, 2002; Herbert, Maher, Chris, Moseley, & Sherrington, 2001; Piotrowski-Brown, 1999).

Participants' interview responses and their actions as recorded through field notes show they had a readiness to learn brought about by a desire to learn new things and to be more well prepared for the life transitions presented by aging. This is in agreement with research presented in the literature review (Caserta et al., 1999). In addition further agreement with the research was observed as participants demonstrated the aptitude to learn complex physical skills, the capacity to commit the skills to memory and the ability to perform the skills later on their own (Larkin et al., 1999; Rowe & Kahn, 1998). Findings in this study also agree with previous research (Caserta et al., 1999; Rowe & Kahn, 1998; West & Stanovich, 1991) reporting that seniors learn better with multiple levels of sensory input and require learning at their own pace with lots of practice. As a result, interview data suggest a first theme relating to knowledge acquisition.

The second theme to be identified in the qualitative data relating to socialization mirrors findings by Hellstrom, Anderson and Halberg (2004) where an increased social network was found to positively influence QOL. Further, comparisons can be made with research from Damush and Damush (1999) who found that improvements in QOL were related to peer group activity outside the home that provided a sense of belonging,

something meaningful to do and a social network. Opportunities to meet new people, and involvement with a supportive environment, are reasons given by participants' in this study as incentive for engaging in community activities suggesting that the socialization aspect of the intervention played a role in the measurable increases in QOL.

High socioeconomic status affects physical activity levels

The participants in this study all had post-secondary education (Table 1 p. 24). In addition, four of the five participants in this study showed an increase in the Community Belonging sub-domain item # 35 (having enough money to live comfortably) pre to post test. The following research suggests those individuals who have high levels of education and sufficient amounts of money increase the degree of control they have over their life circumstances, and their capacity to make lifestyle choices for themselves, including physical activity.

Kolt, Driver and Giles (2004) identified gender, age, occupation and education level as factors influencing reasons for participating in physical activities. In relation to the transferability of this study, age, gender, and education are relevant. Further research has found that respondents with college and higher levels of education were one and one third times more likely to be frequent walkers than those who had lower education (Friis, Nomura Ma, & Swan, 2003). The study concludes that individuals with higher SES (measured by education and income) are more likely to engage in healthier lifestyles.

Beyond high levels of education, and some level of financial stability, participants in this study also demonstrated that they have a strong sense of community. Participants indicated an improvement in the Physical Belonging sub-domain item #20 (living in a safe place), the Community Belonging sub-domain item # 32 (being able to live in affordable housing), item #35 (having enough money to live comfortably), item #36 (having transportation), and Social Belonging sub-domain item #27 (people nearby who speak my language) (Table 5 p. 34). Research suggests that a better sense of neighbourhood is associated with better physical and mental health, lower stress, better

social support and being physically active (Young, Russell, & Powers, 2004).

This review of some of the relevant research regarding the effects of education and high SES on making healthy lifestyle choices helps explain the relatively high initial fitness level of this study's participants, and their ability to initiate an exercise regimen. This could also help to explain the low drop out rate and the near perfect attendance of participants in this study (Table 1 p. 24). Finally, this may explain why so many of the participants were still practicing one month after the completion of the intervention (Table 1 p. 24).

Self report slips, trips and falls calendars record fall reductions

Research that has contrasted self-report and performance-based measures of physical fitness found both have merit once consideration is given to factors such as goal assessment (Alexander, et. al., 2000). These researchers also proposed, due to the complexity of physical functions, that physical function measurement warrants the use of multiple methods, both self-report and performance based. Given the inability of the BBT to record whether or not improvements in balance occurred in 60% of this study's participants, results from the self-report slips, trips and falls calendars added insight into the effects of the TBS intervention on postural stability. Many research studies utilize self-report measures to gather falls information (Lawlor, Patel, & Ebrahim, 2003; Li et. al., 2004; Luukinen, Koski, Laippala, & Kivela, 1997; Shumway-Cook et. al., 2000; van Bemmel, Vandenbroucke, Westendorp, & Gussekloo, 2005; Vellas et. al., 1997). The singular distinction between this study and those mentioned above is its inclusion of slips and trips into the self-report calendar. In this study, the self-report measure showed there was an overall decrease in slips, trips and falls (Table 4 p. 31), a transitory spike in the number of slips, trips and falls (Fig. 3 p.33) and statistically significant Pearson r and r squared correlations (Table 5 p. 34).

It has been established that the participants in this study were physically active and possessed adequate balance at base line (Table 3 p.30), so it is not surprising that there was only one fall recorded throughout the sixteen weeks of the reporting period.

The fall was reported in the third week of the first self-report calendar, one week prior to the start of the intervention. Slips and trips accounted for the majority of the decrease in reported balance challenges pre to post STFC. This could suggest that the addition of slips and trips, to self-report falls measures, might increase the clinical sensitivity for those attempting to effectively identify individuals at risk of falling. As with the insufficient clinical sensitivity of the BBT, a review of falls only through self-report calendars, would not have been sensitive enough to identify a significant change in baseline measures for this group of physically able life experienced persons. What relationship the reduction of slips and trips has to fall reduction lacks a clear definition, and more attempts should be made to understand these phenomena.

Pijnappels, Bobbert and van Dieen (2004) report that among elderly populations tripping is one of the main causes of falling and the mechanisms underlying recovery from a trip can elicit insight into balance control. If a trip is the precursor to a fall for the purpose of this study, a slip is the precursor to a trip. Defined by the World Health Organization and the Kellogg International Work Group on the Prevention of Falls, "A fall is an event which results in a person coming to rest inadvertently on the ground or other lower level and other than as a consequence of a violent blow; loss of consciousness or sudden onset of paralysis" (Vellas, et. al., 1997, p. 736). The ability to control balance recovery is the purpose for the inclusion of slips and trips measure, and in this study formed the basis of the definitions offered to participants. A slip was defined as a transitory loss of balance, with no real stumble, or fall; a trip was defined as a loss of balance resulting in an obvious stumble, but not a fall to the ground; and, a fall was defined as a loss of balance where it is not possible to avoid making contact with the ground. In their research into tripping recovery, Pijnappels, Bobbert and van Dieen (2004) found the inability to recover from a trip was due in part to weaknesses in the muscle groups responsible for push off and trunk control. Correspondingly, research has shown that Tai Chi improves the mechanisms controlling forward momentum, and

improves coordination during gait initiation, which suggests improved postural control (Haas, Gregor, Waddell, Oliver, Smith, Flemming et al., 2004). More research is required to determine if slips could be an earlier result, than are trips, of muscle weakness in these areas and, therefore, an earlier detection device for those interested in identifying persons at risk for frailty and falls.

Further, findings in this study showed an initial drop in the number of slips, trips and falls from the fist self report period to the second (Fig. 3 p. 33). The second report period corresponded to the end of the fist month of TBS classes. At the end of the third report period, and the end of the TBS classes, there was a spike in the number of slips trips and falls before dropping to its lowest level at the end of the fourth report period, one month after the completion of TBS classes. Data collected from interviews did not yield a reasonable explanation and nothing from field notes suggested a cause for the spike. Through a personal correspondence Dr. Elaine Gallagher, an expert in the field of falls prevention among the elderly stated,

> It is hard to say what might cause a blip at three months. It would be good to follow people for a year or more as monthly aberrations are common, but true patterns can be seen only over time. And so much depends on whether people keep up with the program after (October 4, 2005).

Table 3 (p.30), shows there was a substantial number (4/5) participants who were still practicing one-month post intervention. This may account for the final STFC recording the lowest number of slips, trips, and falls. Maeve, the one participant who was not practicing (Table 3 p 30) accounted for two of the three slips recorded on the final STFC. The remaining slip recorded was by Heidi (Table 3 p. 30). Moreover, Heidi and Maeve were the two participants that did not score a maximum 56 on the pre-intervention BBT (Table 4 p. 31) and may have been expected to record higher numbers of balance challenges. This is in spite of the fact that Maeve and Heidi recorded fewer balance

challenges than the other participants on the pre-BBT, and Maeve actually realized an increase in incidences from pre to post BBT. Perhaps as suggested by Dr. Gallagher only an extended follow up could determine if the spike represents an aberration, or a true pattern. As a result, beyond being noteworthy there are no data available that can elucidate either the cause or meaning of the transitory spike.

However, statistical analysis of the STFC data revealed Pearson r, and r squared correlations were approaching 1 (Table 5 p. 34). This suggests a strong relationship exists between the TBS intervention and the reduction in the number of reported slips, trips and falls. As stated in the literature review, exercise programs that utilize strength training and a balance component are successful in reducing the number of falls in elderly persons (Campbell et al., 1997; Hill, 2002; Carter et al., 2002; Herbert, Maher, Chris, Mosely, & Sherrington, 2001; Lim & Taylor, 2004; Lord, Ward, Williams, & Sturdwick, 1995; Ourania, Yvonni, Christos, & Ioannis, 2005; Piotrowski-Brown, 1999; Vincent, Braith, Feldman, et. al., 2002). In particular Tai Chi has shown positive reductions in fall rates (Chen & Snyder, 1999; Choi, Moon, & Song, 2004; Hill, 2002; Li, Harmer, Fisher, & McAuley, 2004; Piotrowski-Brown 1999; Thornton, Skyes, & Tang, 2004; Wolfson et al., 1996). This study was designed as an exploratory device intended to determine if the TBS offered an appropriate and health promoting form of physical activity for senior populations. There are not sufficient measures in this study to determine a causal effect for the significant Pearson correlations relating to pre to post STFC, suggesting a need for further study to determine what aspects of the TBS intervention may be affecting change.

QOL Scores

As shown in Table 6 (p. 35), in three of the six sub-domains hypothesized to show improvements post intervention, there was improvement; in another sub-domain, scores remained neutral, while in the remaining two sub-domains scores decreased (Table 6 p. 35). For reasons discussed in the literature review, it was expected there would be improvements in all six proposed sub-domains. Below I review the individual sub-

domain item scores in an attempt to determine the reasons why improvements did not occur within all proposed sub-domains.

The sub-domain scores for Physical Being remained neutral wherein two participants showed increased scores, two more showed decreased scores and the remaining participant showed no change in score. A review of sub-domain items (Table 7 p. 36) illustrates that item 2 (Exercising and keeping fit) improved, which is favourable recognition of the intervention. However, items 3 (Good nutrition and eating the right foods) and 4 (Having enough energy to do the things I want) exhibited decreased scores. This may indicate with increased exercise and fitness the demands for nutritional foods and a desire to perform more also rise. This is, however, the extent to which this measure can illuminate the failure of this research to record a positive score for the Physical being sub-domain. Data from interviews can shed more light on this finding.

Heidi and Moa showed improvement in the Physical being sub-domain (Table 6 p. 35), and Heidi attributed the increase in large part to walking her dog. Moa believed this about her involvement with the TBS, "Exercise really is a booster." Despite not showing improved scores Liz noted about her involvement, " I just feel fitter… I think it means I'm less likely to have health problems." Maeve's reflection about the exercise sessions was, "… I did find it beneficial" and Beth said, "Kung Fu certainly has increased my feeling of comfort… I felt that was so good. Everybody said that." The interview data show that the intervention was considered by most participants to have physical benefits, which were noticeable and made a difference. Nonetheless, the effect was not strong enough to have an impact on the Physical Being aspect of participants' QOL as measured by the questionnaire.

The sub-domain Practical Becoming (the daily things I do) showed improvement in overall score for three participants, while the sub-domain Leisure Becoming did not. Yet a review of the items in (Table 7 p. 36) within these sub-domains indicates there is equally one item in each of these sub-domains (40,46) that showed improvement for at

least 3/5 participants. The result is that little, if any, explanation for the drop in QOL scores for Leisure Becoming can be observed with this measure. This discrepancy in scores reveals the sensitivity of the QOL measure and the importance of reviewing sub-domain as well as overall domain scores.

A more informative explanation was found within data gathered in interviews. The sub-domain item showing improvement for the Leisure Becoming sub-domain (Having outdoor activities) could perhaps be reflective of the participants viewing the intervention as on outside of the home activity, which they enjoyed. As Heidi's interview suggests, " … we really seemed to like each other and we all got along so well it was such a fun thing". Liz also felt the intervention experience was very enjoyable and when asked if she had anything she would like to add after completion of the formal interview questions she stated, "Well I've enjoyed it very much... the physical part of it … the more I do of it the more I like it". Beth also commented on her feelings about participation in class times. " I loved it yes…we enjoyed it". More specifically, when Beth was asked why she felt there had been a drop in her Leisure Becoming score she replied, " I wonder why I went down". She went on to explain that she has hobbies, many friends and much family support. Maeve responded to her drop in leisure becoming by saying, " This, to me is a very confusing heading. Leisure Becoming." As reported in the findings chapter, Maeve found the questionnaire to be somewhat confusing because of a perceived lack of time due to elevated levels of personal responsibility in her life, and a need to make a decision about relocating. Moa was the one participant to show a reasonable increase in her Leisure Becoming scores and attributes the increase to a supportive church group and her ongoing interactions with the senior's recreation facility she is affiliated with.

These statements for the most part contradict the rejection of Leisure Becoming (The things I do for fun and enjoyment) as a propositional statement. The majority of participants in this study found the intervention to be fun and enjoyable and the failure of

the QOL questionnaire to capture this reality may have to do with a degree of ambiguity surrounding the presentation of the concept of Leisure Becoming, as suggested by Maeve's perceived confusion when responding to the Leisure Becoming sub-domain items. However, the items are designed to elicit a response representative of the individual's whole life. This was the case with Moa who attributed her increased score in Leisure Becoming to her interactions with her church and her overall involvement with the seniors' recreation facility. However, it was not the case with Beth who feels she has considerable support and activities in her life, yet still registered a decrease in Leisure Becoming scores.

Scores for the sub-domain Social Belonging (The people around me) as measured by the QOL questionnaire and interpreted in (Table 6 p. 35) is in direct conflict with the interview data. As reported in the findings chapter under the section heading, Theme 2: Socialization Contributes to QOL, participants' comments suggest that the socialization aspect of the intervention offered an opportunity to meet new people, create a supportive environment, and gave incentive for engaging in community activities. Table 7 (p. 36) shows there was a decrease in item 26 (Having friends) and a conflicting increase in item 27 (Having people close by who speak my language), which was interpreted by a number of the participants as meaning having someone close by to relate to someone with shared experiences and views of the world. Heidi offered a possible explanation for this apparent conflict, when asked why her score in item 26 had decreased she said, "Well, as you get older your friends drop off." And Moa mentioned her husband's declining health as one factor affecting her interaction with friends. In addition, three of the six items in the Social Belonging sub-domain relate to family, which would have a potential to influence results unrelated to the intervention. Once again, despite interview data suggesting a strong link between the socialization aspect of this intervention and increases in QOL, the effect of this intervention was not strong enough to record a positive result through the QOL questionnaire.

Increased Consciousness and Awareness of Falling

Interview data presented in the sub-section Enhanced Awareness of Falling within the Knowledge Contributes to QOL theme in the findings chapter, showed that participants had an increased awareness of falling and enhanced consciousness of their physical movements as a result of participating in the intervention. Although there were no measures to identify changes in falls related to self-efficacy in this study, participants' statements suggest they emerged from the intervention with more knowledge and balancing skills from which to increase falls related self-efficacy.

Fear of falling has been identified in the literature review as being a serious health risk, due in part to reductions in mobility arising from increased self-imposed inactivity. Consequently, self-imposed immobility contributes to a decline in the muscular strength and ambulatory capacity leading to reductions in performing important activities of daily living and QOL, while increasing the likelihood of institutionalization (Gagnon, Flint, Naglie, & Devins, 2005; Li, Fisher, Harmer, McAuley, & Wilson, 2003; Zijlstra, Haastregt, Eijk, & Kempen, 2005). Further, these researchers report that only 10 to 15% of falls result in serious injury, which suggests there are factors other than physical injury contributing to fear of falling, and the subsequent loss of mobility. Some of these factors include being eighty years of age or older, having visual impairment, lacking emotional support, or exhibiting unsteadiness (balance performance) (Lach, 2005). Feelings of depression and anxiety (Gagnon, et al., 2005) and reduced self-efficacy related to falls (Li, et al., 2005) are also factors related to falling. The discussion in the literature review chapter demonstrates Tai Chi can improve balance performance, and reduce anxiety and depression. In addition, Tai Chi has been found to have a positive effect on improving falls related self-efficacy (Li et al., 2005).

The atypical group of participants in this study may have been efficacious before starting the TBS intervention. They were all financially stable, had post secondary education, were involved with a community recreation facility, went to regular exercise

classes and all but Maeve were eager to be involved in the study (Table 1 p. 28). About becoming a participant in the study Maeve stated, " … I was very reluctant simply because I didn't have a lot of extra time. Liz pressured me and pressured me so you could get your numbers." In spite of this, further comments by Maeve about her daily routine suggest she has healthy levels of self-efficacy, "… I have always done a set of exercises and I will start to include the upper body [Hung Fut Chi Starter] exercises…"

With no measures for self-efficacy this study cannot inform the body of knowledge on improvements in self-efficacy due to participation in a TBS intervention, or accurately assess participants' levels of self-efficacy at baseline. However, participant comments of increased "awareness" and "consciousness" about falling demonstrate they gained an increased understanding of the importance of avoiding falls. This suggests a promising avenue for research into the effects of a TBS intervention on self-efficacy

QOL Knowledge Theme

Knowledge of risks and benefits creates a precondition for change. If people are to make positive lifestyle changes they require knowledge on how lifestyle habits affect their health. However, self-efficacy is the foundation of human motivation and action. Factors such as knowledge acquisition offer direction and incentive yet are rooted in the focal belief that an individual has the power to produce desired changes through their actions (Bandura, 2004).

According to Bandura (2004) there are six determinants to facilitate change (1) knowledge, (2) perceived self-efficacy, (3) outcome expectations, (4) goals, (5) perceived facilitators and (6) impediments. As well Bandura suggests that individuals are unlikely to initiate changes in their lives if they cannot perceive its risks and benefits. As presented in the personal biographies section of the findings chapter, this study's participants had been attending regular exercise classes for some time, which suggests they possessed knowledge about healthy lifestyle habits, had outcome expectations, established goals, and as discussed in the previous section they appeared to exhibit

efficacious behaviours. Therefore, they may have possessed at baseline reasons to take on the challenge of learning a new skill set. Further, the study's intervention was delivered in the recreational facility participants frequented, offered at no charge and requiring no specialized equipment or clothing thus removing barriers and facilitating their involvement. The knowledge theme findings suggest this may be a reasonable conclusion.

Participants' statements indicate that learning something new increased their feelings of QOL (enjoyment), and that they enjoyed the physical aspects of the intervention because it made them feel better. Furthermore, their statements suggest they felt enjoyment from a wide range of participant based experiences including the group, the instruction, and increased levels of technical knowledge (all of which may represent perceived facilitators), and feelings of heightened awareness (perhaps representative of an improved understanding of impediments). This sense of heightened awareness was expressed by participants as being more aware, or conscious, of physical movements and of how physical movements were performed, more attentive to environmental hazards and what environmental hazards might be, as well as, how to modify their actions to minimize risk without curtailing their involvement in physical activity. Accordingly, this demonstrates congruency with the proposition made by Caserta et al. (1999) that learning can be motivated by an environment that offers problem solving and is oriented to the present.

Findings offer support for the multi methods teaching environment proposed in the literature review. Field notes revealed that participants enjoyed the modeling of the techniques, the handouts, and even requested to see blackboard explanations of techniques or of physiological, or biomechanical information. In the section Theme 1: Knowledge Acquisition of the Findings chapter, statements taken from personal interviews also shows participants' appreciation of the learning environment. Further, the fact 4/5 participants were practicing alone at home one-month post-intervention (Table 3

p. 30) indicates that participants' demonstrated a retention effect. This is not unusual and it has been reported that elderly can and do learn and are able to remember what they have learned (Rowe & Kahn, 1998).

As well, Caserta et al. (1999) state that multi methods teaching strategies utilizing visual and auditory stimuli augment the facilitation of processing, remembering and retrieving new material. Further support for skill acquisition and retrieval, among the elderly, arises from research by Rodrigue, Kennedy and Raz (2005). In their research, adults were trained in a mirror-tracing task for three days at baseline and again five years later. It was found that speed and accuracy were partially retained after five years and that although older adults required more training to reach their peak performance levels they still retained the ability to relearn the skill. There appears to be sufficient evidence to suggest that the teaching method used in this intervention was adequate enough to elicit a positive learning outcome and that the ability of participants to demonstrate retention through practicing alone at home supports the assertions that seniors can process, remember, and retrieve new information.

In summary, the transferability of the findings from this research regarding knowledge acquisition must consider the atypical nature of these participants (Table 3 p. 30) and their aforementioned pre-existing knowledge and motivational levels. Finally, the study cannot make any claims relating to how long the retention effect from a Hung Fut TBS intervention might last.

QOL socialization theme

Participants' interview responses show that the participants felt the intervention provided an opportunity to meet new people, that it was a supportive environment and offered incentives to exercise. These responses are in agreement with the research presented in the literature review, and initially the discussion will centre on how these responses relate to the body of knowledge on social support.

Enjoyment was a term reported in the findings section to explain participants'

reactions to meeting new people and making friends. It was also reported that the group setting offered a sense of belonging for participants. This gives perspective to the assertion made by Kiessling and Henricksson (2004) that four factors affect QOL, cognitive, physical, social, and emotional functions. In this study it has been shown in previous discussion that cognitive and physical factors affected participants' QOL. Participants' statements support the idea that appropriate social interaction affects a positive emotional response. There were no tests to show participants realized increased emotional function, and although interview statements show participants perceived a positive emotional reaction they did not comment on aspects of their emotional functioning.

Additionally, participants' interview statements suggest they felt the intervention offered a supportive environment. Rowe and Kahn (1998) presented research defining the need to be encouraging as opposed to assistive when offering support; particularly with senior populations. The TBS are typically taught in an encouraging manner, as the instructor cannot perform the exercise for the student. As well, the movements are complicated and generally require that the instructor offer positive reinforcement for processing, remembering and retrieving information. The instructor, in the remembering and retrieval phases of performance, can demonstrate assistive behaviours as s/he can perform the movements first and the student can then mimic the action. Participants reported practicing at home alone, up to one month post-intervention. The combination of participants feeling the intervention provided a supportive environment and their subsequent ability to perform the exercises alone may suggest a working balance was struck between encouragement and assistance within the class environment.

Further, there is congruency between the literature and participants' statements in regards to the importance of support for becoming involved in physical activities. Research indicates that among other variables support from family members, friends, or exercise support staff is a significant factor in physical activity participation (Lim &

Taylor, 2005). Giles-Corti and Donovan (2002) concur and conclude that public programs designed to encourage physical activity should create social support by encouraging regular physical activity with exercise partners. Damush and Damush (1999) state that improvements in QOL can be related to peer group activity outside the home, which provide a sense of belonging, something meaningful to do and a social network. The socialization theme findings show that participants enjoyed exercising with friends and seek out friends to exercise with; they enjoyed the group aspect of the intervention, and felt the group atmosphere within the intervention offered incentive to begin the exercise program and to continue to exercise. As with Tai Chi, Hung Fut group teaching appears to offer an environment in which elderly participants can find incentive, support, and enjoyment.

Despite socialization emerging as a theme from the interview data, the expected increase in the Social Belonging sub-domain was not recorded by the QOL questionnaire. Reviewing first the individual sub-domain items it is revealed that 3/6 items were related to family; items 25, 29, and 30. Raw data reveal a greater number of participants showed decreases in items 25 and 30 than increases. For item 29 one participant showed a decrease in scores while only two participants showed an increased score. Finally, there was a drop in sub-domain item 26, having friends.

The qualitative findings indicate participants felt a positive aspect of the intervention was making friends, yet 3/5 participants registered reductions in their QOL scores for this sub-domain. (A discussion of possible reasons for this outcome has been presented in the QOL Scores section of this chapter.) Sub-domain item number 28 (meeting in social/cultural/interest/faith groups) remained unchanged, which contradicts field note recordings and interview statements made by participants who reported enjoying their church groups, their interactions with recreation facilities, and other group activities such as bridge, and Spanish. Item 27 (having people close by who speak my language) was the only item to show an increase and as discussed earlier in this chapter

was attributed by participants to having people of like minds near by to talk to. This disjunctive between the quantitative and qualitative data represent a limitation of the study. In addition, due to the fact, as stated in the literature review and reiterated in participants' interview data, that mortality and morbidity affect seniors, their spouses, and friends at a higher rate than other populations, it may have not been reasonable to predict rising QOL scores for factors involving friendship.

Successful Aging

Successful aging is an ongoing process that utilizes opportunities to enhance and maintain physical, social, and mental health, as well as, independence and QOL while facilitating congruent transitions through the course of ones life (Peel, McCLure, & Bartlett, 2005). Key factors Identified in the literature as affecting successful aging are smoking, physical activity, body weight, alcohol consumption, and diet. (Green, & Ottoson, 1999; Jeste, 2005; Peel, et al., 2005). Because the TBS is a low cost low-tech intervention, it has the potential to be inclusive for those of low SES.

Although presented in the findings section this statement given by Beth, when asked if she had anything to add at the conclusion of the interview, helps illuminate the effect of the intervention on QOL,

> I think if you taught anything…like that which you taught us it would increase our feelings of well-being – as long as we didn't cripple ourselves, because any physical thing you do you feel better.

As stated above, Beth felt the intervention had a positive effect; she also offered further insight into her perspective of exercise and the elderly,

> It's just you feel your tired, and can't do anything. But we know quite well that when we get up and go for a walk, or you get up and do something, you start feeling better. If you're depressed get up and do something. Don't just sit there.

Beth alludes to the fact that she had incorporated a healthy understanding of the

need to exercise prior to her participating in the intervention, and the level to which this intervention can claim an affect is limited. However, comments made by Liz suggest the intervention may have had a strong effect on her attitude toward physical activity and attainment of a successful aging lifestyle. Liz mentioned enjoyment was an outcome of participating in the intervention. When asked what she enjoyed Liz said, " Just the physical part of it…I've never been a sports type. The more I do the more I like." Further, Liz commented on what she liked, "I just feel fitter." The following is an explanation of what being fitter means to Liz,

> I feel I suppose, more control. I think it means I'm less likely to have health problems. I can manage my own life longer as the years go on, the fitter I am…I think that the fitter I am in this respect, the more physically and mentally able I'll be to carry on over the years. I see people my age very much like me, but have just sort of given up on everything and they're not nearly as active. Also, I'm very fortunate that I have good physical health too. I have no joint problems like so many of my friends. That makes a difference too. But I feel the more I do of this, the less I'll have of that.

This explanation implies Liz views exercise as an opportunity to enhance and maintain physical, social, and mental health, sustain independence, increase QOL and help facilitate transitions over the course of life. The definition of successful aging offered by Peel, et al., (2005), in the first paragraph of this sub-section, suggests Liz has found, in exercise, a means to achieve a successful aging lifestyle.

The aspect of control mentioned by Liz is also interesting. Perhaps unwittingly, but insightful nonetheless, in referring to control Liz is speaking to a well accepted definition of health promotion – the process of increasing control over improving one's health (WHO, 1986), suggesting that the TBS provided Liz with a means to promote her own health.

It was noted in the previous sub-section (Increased consciousness and awareness of falling) that Liz pressured Maeve to involve herself in the research study - to ensure there were enough participants. Additionally, field notes document that Liz was the participant most attentive to TBS instruction in class, and she indicated a greater adherence to practice in the one-month post intervention interview (Table 3 p. 30). Therefore, the effect this intervention had on Liz's positive outlook on exercise, and the outcomes derived from exercise, has to be viewed in light of the fact that she was very eager to participate, energetically and enthusiastically performed in class exercises, and practiced at home. Finally, Liz's enjoyment with exercise began with her participation in the fitness classes mentioned in the preamble to (Table 3 p. 30) and as the following statement illustrates the fitness classes were motivational to her,

> The first exercise I ever did was at the [seniors recreation facility], except in school, of course, and then you had to...When I joined the [seniors' recreation facility] exercise [class] I really enjoyed that.

Despite her predisposition toward exercise, and her enthusiasm for participating in this research study, Liz's participation in the TBS intervention, and her subsequent practice of the TBS, appear to have been beneficial in helping her achieve a successful aging lifestyle. This, in association with observed increases in QOL by 4/5 participants, significant reductions in slips, trips, and falls, and the identification through interview data analysis of knowledge acquisition and socialization themes, may indicate the effectiveness and appropriateness of TBS as a form of exercise for seniors hoping to age successfully. As Seeman et al. (2004) note, low SES represents an enduring and largely intractable barrier to successful aging. Because the TBS acquisition and performance require very little equipment and space it has the potential to be affordable and accessible to all.

CHAPTER SIX

Implications for Practice and Future Research

This chapter will discuss the study's results in terms of implications for practice and further research. The TBS program in this study delivered sixteen instructional hours, over eight weeks, which proved to be sufficient time for participants to gain enough mastery of the skills to enable them to practice the Chi starter warm-up and the TBS alone at home one month post intervention. As well, participation in the intervention provided participants with slight improvements in QOL and postural balance, and significant decreases in slips, trips and falls. Finally, participants' post intervention interviews indicated they enjoyed the social aspects of the group interaction and the acquisition of knowledge, which they viewed as pertaining to their lives and having meaning. Because of the exploratory and case study design, the findings provide a glimpse into the benefits of the TBS program on QOL and balance, and equally informative, methodological improvements for building on the knowledge base.

Implications for Practice

Given the enormous QOL, health and economic burden that falls have on seniors and our health care system, locating a preventative measures is critical (Campbell, 2002; Leigh, Hubert, & Romano, (2005). This study's findings have demonstrated the positive influence of a TBS intervention on QOL and balance of an - admittedly very small and atypical - senior population. Its simplicity to deliver as a low cost, low-tech health-promoting program and adopt as a health promoting practice, holds promise in the search for a preventative measure or "programs [that] are a good investment in the health of people into very old age" (Campbell, 2002, p. 1006).

Multi-factorial approaches to reducing fall rates, have shown success (Public Health Agency of Canada, 2005; Tinetti, Baker, McAvay, Claus, Garrett, Gottschalk et al., 1994), including assessing seniors' living conditions, reducing hazards through comprehensive education, monitoring of medications, skills training, installing tub

handles, removing in-home hazards and exercise. Additionally, earlier research demonstrating that the majority of falls occur outdoors (Gallagher and & Brunt, 1994; Reinsch, McRae, Oachenbruck, & Tobias, 1992), argues for an effective, and inexpensive, activity that can be learned indoors with skills transferable to the outdoor environment.

Other initiatives, such as the STEPS program (Gallagher & Scott, 1997), have been successful in altering the built environment by increasing municipal engineers' awareness of the impact of structural design on pedestrian safety. Indeed, one community engineer reported making civic changes as a direct result of participation in the program. Tinneti and colleagues (1994) applied a multi factorial approach where they conducted in-home assessments of physical, behavioural, and environmental risk factors for falling. Despite the need for and the success of these types of interventions the cost in time, labour, and money for implementation is prohibitive (Minister Of Public Works and Government Services Canada, 2001). A TBS intervention, which may offer increased QOL, postural stability, and a reduction in falls could be implemented for considerably less amounts of these resources.

A review of the Best Practices for reducing falls among seniors (Public Health Agency of Canada, 2005) recommends exercise. The report outlines comprehensive fall prevention strategies for seniors that are multidisciplinary, multi factorial, health and environmental approaches, which include a combination of assessments and interventions; exercise being one of the suggested interventions. Further, the report states that exercise improves balance, mobility and reaction time, increases bone mineral density in post-menopausal women and people age 70 and over, reduces risk of falls by 15% and decreases the number of falls by 22%. The Best Practices guide also echoes evidence presented in the literature review, that exercise regimens emphasizing strength and balance components, in particular Tai Chi, are most effective in reducing falls and falls related injury. Similarly, research showed 10-12 weeks of gentle exercise focusing

on strength, endurance and flexibility also demonstrated a reduction in falls. Other research showed a combined strength and endurance program three times per week for six months had nearly twice the effect on fall reduction as strength or endurance training alone. Finally, the report concludes that while researchers believe in the benefits of exercise there is inconclusive evidence for recommending specific falls prevention exercises.

The nature of the TBS intervention mirrors the Osteofit programs for persons living with osteorporosis where a twice-weekly 40-minute program of supervised exercise delivered in a community setting achieved improvements in strength and balance through resistance training and tandem walking and single-leg standing (Carter, Khan, McKay, Petit, Waterman, Heinonen et al., 2002). Although the improvements were minimal in the Osteofit trial, as in this study, it has been suggested that small gains in strength and balance are most effective in preventing falls when the elderly person is at that critical threshold where daily activities, such as turning while holding a cup of tea, catching a toe on uneven pavement or carrying groceries up the stairs when tired, are sufficient to cause a fall (Campbell, 2002, p. 1006).

Interestingly, in their evaluation of an exercise program Robertson, Campbell, Gardner and Devlin (2002) found increased strength and balance among all participants, yet the reduction of falls occurred only for those aged 80 and over. Clearly, the participants in this study represent the stage described above and argue for early and sustained interventions. In addition to reaping the physical health benefits from exercise interventions, Campbell comments on the social interactions, peer reinforcement and encouragement, as well as its efficiency of instructor to participant resources that make community and group-oriented approaches advantageous. As well, training participants in a group setting and encouraging continued practice at home seems a model for maximizing the social aspects and physical outcomes (Campbell, 2002; Robertson et al., 2002; Tinetti et al., 1994. The low resource requirements and portability of the TBS

(outlined below), as well as the participatory nature of the activity, suggest that it would be an ideal addition to the provision of community-based care for seniors. As such, a TBS program offered in retirement homes, seniors' centers and long term care institutions, may empower and engage senior citizens in a highly sustainable manner.

Projects like the STEPS program (Gallagher Scott, 1997), had success in altering the built environment by increasing awareness of municipal engineers responsible for public safety and one community engineer reported making civic changes as a direct result of participation in the program. Tinneti and colleagues (1994) applied a multi factorial approach where they conducted in-home assessments of physical, behavioural, and environmental risk factors for falling. Despite the need for and the success of these types of interventions the cost in time, labour, and money for implementation is prohibitive (Minister Of Public Works and Government services Canada, 2001). A TBS intervention, which may offer increased QOL, postural stability, and a reduction in falls could be implemented for considerably less amounts of these resources.

Low cost and low tech

The Chi starter warm up in Hung Fut Kung Fu can be done seated as depicted in picture 1 below, or standing, depending on the fitness level and preference of the cliental. The TBS must be done standing as shown in picture 2. However, whether in a chair warming up, or performing the TBS standing, only an area six feet by six feet is required for each participant. It is preferable to have a hard smooth surface, for ease of movement, but it is not essential as the TBS can be done on any reasonably flat surface, and depending on the fitness level of the individual can be performed on grass, gravel, dirt, or sand. Versatility is a strong positive benefit with this form of exercise, as it can be accomplished on almost any reasonably flat surface six feet by six feet. In addition, no special equipment is required, chairs are optional, and regular street clothes and shoes can be worn as illustrated in picture 3.

Illustration 1. Seated Chi starter warm up

Illustration 2. Performing the ten basic stances

Illustration 3. No special equipment or clothing

The cost of the activity is dependent on whether the individual would prefer to exercise alone, or in a group setting. Training alone can be done at home, so the only cost incurred is in taking the sixteen lessons it takes to learn to perform the exercises. Training with an instructor would mean having to pay an ongoing instruction fee. At seniors' recreation facilities these costs are often supplemented and are minimal. For example, the cost of this eight-week sixteen-session intervention would have been $ 690.00. The cost break down is as follows, forty dollars per hour for the instructor and twenty-five dollars per month for the facility (the facility used in this study was a seniors recreational facility). In addition, a maximum of ten participants could be accommodated in this manner, resulting in a one time per person cost of $69.00, for the sixteen-session two-month course of instruction, These costs are relatively small when compared to those associated with caring for seniors who have fallen and are relying on health care professionals and/or family resources to carry out their daily activities

Future Research

There are a number of limitations of this study, which need to be addressed in future investigations. In terms of methodology, this study is restricted by its small and atypical population, an insufficiently sensitive balance measure (the BBT ceiling effect), two incomplete audio recordings, and an inexperienced interviewer. Conducting a similar intervention with diverse senior populations (e,g., in recreation centres, retirement homes, and long-term care institutions) will further our understanding of the utility and efficacy of the TBS as a health promoting and fall preventing activity.

With regard to the ceiling effect, Wolfson et al. (1996) note " ...there is no consensus regarding which ... measures of balance validity reflect its complexity and multidimensionality" (p. 498). Due to the complex and multidimensional nature of the concept of balance there are a number of tests used to measure components of balance including the Tinetti Performance-orientated mobility assessment (POMA), ten meter walk (TMW), Katz activities of daily living, functional reach test (FRT), Sharpened

Romberg test (SR) one leg stance test (OLST), timed "up and go" test (TUG), biomechanics force platform (BFP), and accelerometry. All of these tests have been used in some capacity for research intended to find ways and means to identify frailty and those at risk of falling (Alexander, Guire, Thelen, Ashton-Miller, Schultz, Grunawalt, & Giordani, 2000; Cho & Kamen, 1998; Lundin –Olssin, Nyberg & Gustafson, 1998; Shumway-Cook et al., 2000; Thapa, Gideon, Fought, Kormicki & Ray, 1994; Thigpen et al., 2000; Vellas et al., 1997; Weiner, Duncan, Chandler, & Studenski, 1992). It is important when considering assessment tools to understand the distinction between multidimensional and single factor assessments (Rogers, Rogers, Takeshima, & Islam, 2003). As explained by Rogers et. al. (2003) multidimensional tests (composite ratings of performance) assess a wide array of physical characteristics and then give a compendium score using a categorical scale. Conversely, single factor tests (performance measures) are utilized when there is a need to focus on only one, or a few function(s). It is suggested that this type of test has greater sensitivity to clinically significant changes in performance. These researchers advise where the primary purpose of testing is to determine improvements in balance, and not frailty, or risk of falls performance measures should be used.

FRT, SR, OLST, TUG, BFP and accelerometry are examples of performance measures used throughout the literature (Arnadottir & Mercer, 2000; Era et al., 1997; Iverson et al., 1990; Mecagni et al., 2000). The primary reason for choosing these tests to measure components of balance is they have an open-ended measuring scale (the tests are timed and there is no pre-set time limit unless imposed by the researcher). As a result, regardless of the participant's level of physical conditioning, these tests can accommodate the measuring of any level of change in baseline measures the participant may experience through engagement in the intervention. Accordingly, a possible recommendation of this study is that researchers should choose a test with an open ended scoring system if the primary purpose of the test is to determine changes in balance

measures, especially if physically fit participants are to be involved in the research.

In addition, it may be useful to conduct future investigations with other measurement tools. In particular a single factor balance test, which as suggested in the discussion by Rogers et al. (2003) has greater sensitivity to clinically significant changes in performance. While the QOL measure used in this study was able to reflect aspects of participants' experiences in the intervention, it was through the interviews that the concepts of socialization and learning emerged as particularly salient. Thus, instruments to capture self-efficacy, social support and learning that emerged in this study rather than a global QOL would provide more in-depth understanding of these variables and their relationship to the TBS intervention. Therefore, future research and/or evaluation of falls prevention programs should utilize multi-methods so as to capture the multiple dimensions of seniors' QOL. It may be that, using a health-related quality of life measure as discussed in the literature review by Spiro and Bosse (2000) and Thomas (2001) may be a more accurate gauge of an intervention's impact.

The findings in this study indicate that the TBS have similar effects on QOL, balance and falling as does Tai Chi. Research into the effects of Tai Chi demonstrate that Tai Chi can improve blood pressure (Thornton et al., 2004), increases physical functioning and QOL in people suffering from osteoporosis (Hartman et al., 2000; Kotz, Deleger, Cohen, & Kamigaki 2004) and can improve gait initiation and gait coordination, which has implications for a recent study on the effects of walking. Liegh et al. (2005) found that walking predicts lower costs for hospitalization and diagnostic testing and those that walked farther had significant subsequent cost savings. Future research into Hung Fut Kung Fu's TBS may reveal it has the same beneficial effects as Tai Chi on blood pressure, osteoporosis and walking. A case-control longitudinal study, tracking health indicators (blood pressure, bone density, balance, etc.), health status, and health care utilization costs, in addition to a measure of quality of life, would provide data more persuasive to policy-makers and useful to health care providers.

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Table of Contents

Appendix A

Internal Consistency Scores (∝) for QOL Scores for the Three Instrument Versions.

QOL Domain	Instrument Version Full	Short	Brief
Being	.97	.94	.91
Physical	.93	.88	.87
Psychological	.95	.90	.79
Spiritual	.92	.83	.77
Belonging	.97	.94	.88
Physical	.93	.88	.73
Social	.92	.85	.80
Community	.93	.86	.75
Becoming	.98	.95	.81
Practical	.95	.86	.84
Leisure	.94	.87	.79
Growth	.95	.91	.81
Total scale	.98	.95	.92

Correlations of QOLPSV Short Domain Scores With the Full QOLPSV

QOL Domain	Short
Being	.99
Physical	.97
Psychological	.98
Spiritual	.97
Belonging	.98
Physical	.97
Social	.96
Community	.96
Becoming	.99
Practical	.96
Leisure	.95
Growth	.98
Total Scale	.99

QOL Scores for the Nine Sub-Domains of the Short Version

QOL Domain	Short	
	M	SD
Being Items	1.06	1.15
Physical Being	1.21	1.33
Psychological Being	.93	1.30
Spiritual Being	1.0	1.13
Belonging Items	1.28	1.06
Physical Belonging	1.63	1.13
Social Belonging	1.17	1.08
Community Belonging	1.06	1.27
Becoming Items	.90	1.04
Practical Becoming	1.04	1.13
Leisure Becoming	.85	1.11
Growth Becoming	.80	1.17
Total Scale	1.04	1.00

Appendix B

The 54 Sub-Domain Items in the Quality of Life Profile: Short Version

Being Domain

Physical: My body and my health

How important/satisfying to me is?

1. Being physically able to get around my house/neibourhood.
2. Exercising and keeping fit.
3. Good nutrition and eating the right foods.
4. Having enough energy to do the things I want to do.
5. Maintaining my personal hygiene.
6. My overall physical health.

Psychological: My thoughts and feelings.

How important/satisfying to me is?

7. Making my own decisions.
8. Being able to remember things.
9. Being free of worry, stress, and sadness.
10. Coping with what life brings.
11. Feeling good about myself.
12. Having a positive attitude towards life.

Spiritual: My beliefs and values.

How important/satisfying to me is?

13. Being caring towards others.
14. Feeling peaceful within myself.
15. Feeling that my life is accomplishing something.
16. Having hope.
17. Having religious beliefs.
18. Having things to look forward to.

Belonging Domain

Physical: Where I live and spend my time.

How important/satisfying to me is?

19. Being able to make my own household decisions
20. Living in a safe place
21. Having a space for privacy.
22. Having my own personal things.
23. Living in a comfortable place.
24. Living near my family and friends.

Social: The people around me.

How important/satisfying to me is?

25. Being able to count on family members for help.
26. Having friends.
27. Having people close by who speak the same language.
28. Meeting in social/cultural/interest/faith groups.
29. Not being a burden to people in my family.
30. Spending time with adult members of my family

Community: My access to community resources.

How important/satisfying to me is?

31. Being able to get medical services.
32. Being able to live in affordable housing.
33. Feeling government is understanding of my needs.
34. Going to places in my neighbourhood (stores etc.).
35. Having money to live comfortably.
36. Having transportation that allows me to get where I want to be.

Becoming Domain

Practical: The daily things I do.

How important/satisfying to me is?

37. The caring I do for a spouse or other adult.
38. Doing work around my home (gardening etc.).
39. Doing things to tack care of myself.
40. Going to appointments (doctor, dentist etc.).
41. Looking after grandchildren or other children.
42. Shopping for myself or others.

Leisure: The things I do for enjoyment.

How important/satisfying to me is?

43. Getting out with others (shopping, lunch, etc.).
44. Having hobbies (knitting, painting, etc.).
45. Having indoor activities (reading etc.).
46. Having outdoor activities (walks, cycling, etc.).
47. Visiting and socializing with friends or neighbours.
48. Visiting and socializing with people in my family.

Growth: The things I do to improve and change.

How important/satisfying to me is?

49. Adjusting to changes in my personal life.
50. Creating new challenges/projects in my life.
51. Improving or keeping up with my memory skills.
52. Improving or keeping up my physical health.
53. Learning about new things.
54. Solving my own problems.

Appendix C

Berg balance test

Fourteen-item balance test | On each item score 0-4 | Score

1. Sit to stand
2. Standing unsupported
3. Sitting unsupported
4. Standing to sitting
5. Transfers
6. Standing eyes closed
7. Standing feet together
8. Reaching forward with outstretched arm
9. Pick up object on floor
10. Turn to look over shoulder
11. Turn 360 degrees
12. Step touch stool
13. Standing unsupported one foot in front
14. Standing on one leg

Total: /56

Score
0 = unable to perform
1 = a lot of difficulty
2 = some difficulty
3 = slight difficulty
4 = can perform independently

Indications of score relating to walking aids
49.6 - no walking aids
48.3 - care outdoors
45.3 - care indoors
33.1 – walking frame

Indications of score

An individual with a score of greater than 45/56 is likely to be safe in independent ambulation, whereas a score of less than 45/56 indicates a need for further assessment, the need for an assistive device, supervision, and is associated with a high risk of falling

University of Victoria

Appendix D

University of Victoria - Human Research Ethics Committee

Certificate of Approval

Principal Investigator	Department/School	Supervisor
Douglas Panton Graduate Student	PHED	Joan Wharf-Higgins

Co-Investigator(s):

Dr. Elain Gallagher, Committee Member, UVic School of Nursing
Dr. Lara Lauzon, Committee Member, UVic School of Physical Education

Title: The Effects of Hun[illegible] Kung Fu's Ten Basic Stances on Postural Balance and Quality of Life in Elde[illegible] Women

Project No.	Approval Date	Start Date	End Date
524-03	24-Dec-03	24-Dec-03	23-Dec-04

Certification

This is to certify that the University of Victoria Ethics Review Committee on Research and other Activities Involving Human Subjects has examined the research proposal and concludes that, in all respects, the proposed research meets appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Subjects.

J. Howard Brunt
Associate Vice-President, Research

This Certificate of Approval is valid for the above term provided there is no change in the procedures. Extensions/minor amendments may be granted upon receipt of "Request for Continuing Review or Amendment of an Approved Project" form.

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524-03 Panton, Douglas

Appendix E

The Goward House Society
2495 Arbutus Road
Victoria, B.C.
V8N 1V9

Phone 477-4401
Fax 477-6317

November 5, 2003

Doug Panton
Research Proposal

Dear Doug:

The Goward House Society has given permission to Doug Panton to do his research proposal, "The effects of Hung Fut Gung Fu's ten basic stances on postural stability and the quality of life in elderly Women" at the senior centre.

Yours truly,

Marilyn Davis,
Coordinator

Appendix F

VOLUNTEERS REQUIRED
FOR UNIVERSITY OF VICTORIA RESEARCH STUDY

Investigator: Douglas W. H. Panton (Qualified Hung Fut Kung Fu Instructor)

Title: THE EFFECTS OF HUNG FUT KUNG FU'S TEN BASIC STANCES ON POSTURAL STABILITY AND QUALITY OF LIFE IN ELDERLY WOMEN.

Purpose: The purpose of this research is to explore Hung fut Kung Fu's ten basic stances (a mild form of training for balance, flexibility and strength) and determine if it is an appropriate and health promoting form of physical activity for senior populations.

Selection Criteria: Female (The first twelve qualified volunteers will be chosen)

Over 65 years of age
Can read, write and speak English
Can live an independent life with no major musculoskeletal disease conditions. Examples of major musculoskeletal disease would be severe arthritis, muscular sclerosis, or extreme acute joint pain.
* Must receive a physician's approval.

Study time line: January 2004 –April 2004

Volunteer Participant requirements:	**Approximate completion time.**
Two balance measures (Measuring movements of daily activities)	2 hours
Two questionnaires (Asking for opinions on the quality of your life)	3 hours
Four self report monitoring calendars (Monitoring slips, trips & falls)	2 hours
Sixteen exercise classes (Low intensity Kung Fu exercises)	16 hours
Twenty-four practice times (Done at your discretion)	4 hours
One personal interview (Your opinions about the program and it's impact)	1 hour

Total Time Required = 28 hours.

Location: Goward House Seniors Activity Center.

Contact Information: For more information about participating in this study, or to volunteer, please contact: Douglas Panton, Phone:(250) 519-0454; Email: lampton@telus.net

Appendix G

THE EFFECTS OF HUNG FUT GUNG FU'S TEN BASIC STANCES ON POSTURAL BALANCE AND THE QUALITY OF LIFE IN ELDERLY WOMEN.

You are being invited to participate in a study entitled The Effects of Hung Fut Kung Fu's Ten Basic Stances on the Quality of Life in Elderly Women that is being conducted by Douglas Panton. Douglas Panton is a graduate student in the department of physical education at the University of Victoria and you may contact him if you have any further questions by telephoning, or emailing the following numbers: Douglas Panton (Home) (250) 519-0454 (Cell) (250) 888-5835 Email Lampton@telus.net

As a graduate student, I am required to conduct research as part of the requirements for a Masters of Arts in Kinesiology. It is being conducted under the supervision of Dr. Joan Wharf-Higgins (Work) (250) 721-8377 Email jwharfhi@uvic.ca.

There are three purposes for this research project: (1) to test the ten basic stances (TBS) as a method of training for postural balance and pivoting; (2) to determine if the TBS is an appropriate and health promoting exercise for seniors; (3) to determine if training in the TBS results in improved quality of life and postural balance for elderly participants.

Falling among the elderly represents a significant health concern in terms of injury and death. It is assumed this study may assist the elderly in reducing the number of slips, trips and falls and enable the maintenance of an independent life. As well, the TBS, which requires a minimum of cost, time and space to perform may enhance quality of life. The simplicity of the TBS could give caregivers for senior populations an attractive care giving strategy. Finally, this research could introduce a method of balance and pivot training that could assist a wide variety of individuals and may serve as a primary tool for prevention of falls in younger populations.

You are being asked to participate in this study because you are female, over sixty-five years of age, an age and gender population thought to be at a greater risk of experiencing falls. You are also being asked to participate because you are capable of maintaining an independent life, have no major musculoskeletal disease conditions and are capable of reading, writing and speaking English. As a participant you may, or may not have experience with physical activity. You will need your physician's approval to engage in the study.

If you agree to voluntarily participate in this research your participation will include, a pencil and paper quality of life questionnaire, Berg Balance Test (BBT), self reporting tracking calendars for slips, trips and falls and a taped personal interview one month after the final BBT. Below is the sequence in which data will be collected:

1. Using a bingo blotter, slips, trips and falls calendars will be filled out one month before the eight-week intervention.

2. Complete the quality of life questionnaire and Berg Balance test one week prior to the eight week TBS program.

3. You will be asked to track your incidence of slips trips and falls in a calendar during the sixty days of the program.

4. One week following the eight-week session, you will complete a second quality of life questionnaire and Berg Balance test.

5. A follow up interview will be conducted approximately one month after the final questionnaire and balance test. The interview will provide an opportunity to review and discuss the collected data, expand or enrich on details if necessary and encourage dialogue between you and myself about positive and negative aspects of the TBS sessions not captured through the other data collection methods.

6. Over sixteen weeks participants will spend approximately 28 hours performing the following tasks:

Two balance measures (Measuring movements of daily activities). = 2 hours
Two questionnaires (Asking for opinions on the quality of life). = 3 hours
Four self report monitoring calendars (Monitoring slips, trips & falls). = 2 hours
Sixteen exercise classes (Low intensity Kung Fu exercises). = 16 hours
Twenty-four practice times (Done at participants' discretion). = 4 hours
One personal interview (Your opinions about the program and it's impact). = 1 hour

Total participation required = 28 hours.

Participation in this study may cause some inconveniences to you, primarily the time required to complete the questionnaires, interview, BBT, calendars and participate in the TBS sessions.

There are some potential risks to you by participating in this research and they include physical risks and emotional risks. The physical risk is that sore muscles and sore joints often accompany the start of a new activity. The emotional risk may relate to feeling that you are not able to keep up with the activities, or perform as well as others. To prevent or to deal with these risks the following steps will be taken. The physical risks will be minimized by proper attention to warm-up, correct teaching techniques and cool-down. I am a trained and certified instructor, with over eight years of experience teaching TBS, and I am able to provide appropriate warm-up, cool-down and stretching activities to minimize the effects of beginning the practice of TBS. Maintaining a small class size, allowing enough time for all to learn and offering greater attention to those who are experiencing difficulty help reduce the emotional risks. At the bottom of this consent form is my telephone number, and you are welcome to phone me at any time to ask questions or discuss your progress.

Your participation in this research must be completely voluntary. If you decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study your data will be destroyed and not used in any way.

The potential benefits of participation in this research include reducing the number of slips, trips and falls and enabling the maintenance of an independent life. As

well, the potential for such a simple exercise to enhance quality of life and independence for the elderly in a cost efficient manner may help to educate caregivers for senior populations. Finally, this research could introduce a method of postural balance and pivot training that could assist a wide variety of individuals and may serve as a primary tool for prevention of falls in younger populations.

To ensure your consent to participate in this research, I will ask for your consent before you complete the second quality of life questionnaire, Berg Balance test, self-reporting calendar and interview.

In terms of protecting your anonymity only the investigator will know, or be exposed to the names, or personal information of any of the participants. You will be assigned a code name and/or number, so that all information collected from the bingo blotter calendars, questionnaires, balance test and interview will not reveal your true identify. Your name will not be used in the final thesis report, or in other means of sharing the findings. You will be given the opportunity to review the interview transcript, and change anything that you feel identifies yourself. Your confidentiality and the confidentiality of the data will be protected in a metal lock box, kept in my office at home and nothing will be stored on the hard drive, or desktop of my computer. The audio-tape of the interview will be erased following transcription. Three years after completion of the study all data will be destroyed.

It is anticipated that the results of this study will be shared with others in the following ways: completion of my Masters thesis, its subsequent defense and publication, presentations at scholarly meetings and publication in a journal.

In addition to being able to contact the researcher (and if applicable the supervisor) at the above phone numbers, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President. Research at the University of Victoria (250) 472-4362

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Name of Participant	Signature	Date

A copy of this consent form will be left with you, and the researcher will take a copy.

Slips, Trips and Falls Calendar For December 2003

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	
21	22	23	24	25	26	
28	29	30	31			
A slip is a transitory loss of balance, with no real stumble, or fall.	**A trip is a loss of balance resulting in an obvious stumble, but not a fall to the ground.**	**A fall is a loss of balance where it is not possible to avoid making contact with the ground.**				

Appendix I

Interview Schedule

Generalized Questions:

1. **Did the three domains of "Being", "Belonging", and "Becoming", and the nine sub-domains presented in the questionnaire, allow you to adequately express your feelings about your quality of life? Why or why not? Is there an element or aspect of your quality of life that is not reflected or captured in the questionnaire? If so, can you describe it for me?**

2. **One month after the completion of the study how would you express your feelings toward the idea of falling? Have these feelings changed from one month ago?**

3. **One month after the study are you still performing the TBS?**

Examples of Prompting Questions to capture in-depth data relating to each participants' pre- and post questionnaire responses:

1. **There was a sharp increase in your score for the sub-domain "leisure becoming" after participating in the Hung Fut King Fu sessions - can you think why the scores increased?**

2. **Despite being involved in a group activity your score for the sub-domain of "social belonging" went down following our sessions; would you have any thoughts on why this might be?**

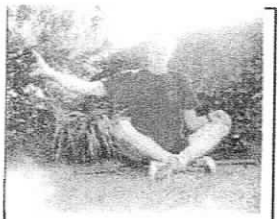
Appendix J

CRANE WING TO TIGER CLAW – BASIC NUMBER 82

Starting Position

Block Crane Wing Hand

Stab Serpent Hand



Extend Tiger Hand

- Basic # 82 warms up and stretches the wrist, elbow and shoulder.
- Whirling wind warms up and stretches the shoulder and the trunk.

WHIRLING WIND

Starting position

Raise right Hand Lower left

Pivot the trunk Head forward

Side view full pivot.

Lower right and raise left hand. Then rotate *in the opposite direction..*

Pivot trunk head forward

Finished position.

QI STARTER: Warms and stretches neck, shoulders, arms hands and fingers

Starting position

Serpent hand position
Blocking low

Tiger hand position
Blocking high

Tiger hand position tearing

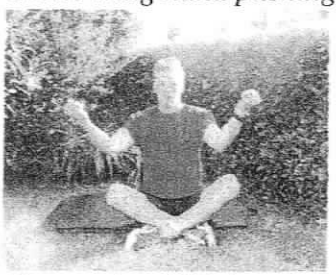
Tiger hand position pulling

Side view of previous picture

Crane wing hand pushing

crane wing hand collapsed

Tiger hand extended



Dragon hand hitting up
to the chin.

Dragon hand circles and
strikes the heart.

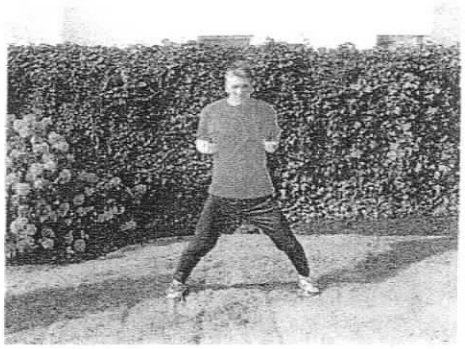
Dragon and circles and
Backfist the lung.

Back to starting and ready.
to go again.

Repeat cycle as many times
As you like.

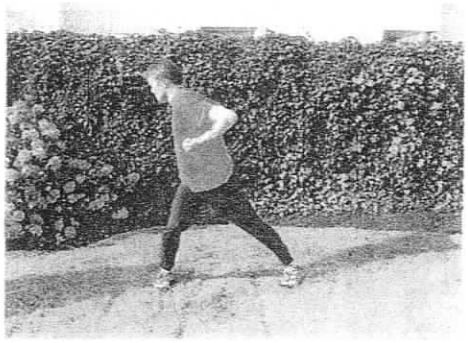
Appendix K

Ten Basic Stances 1-3



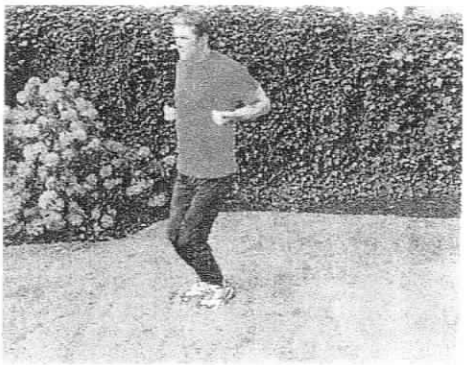
No. 1; Front View

No. 1; Side view

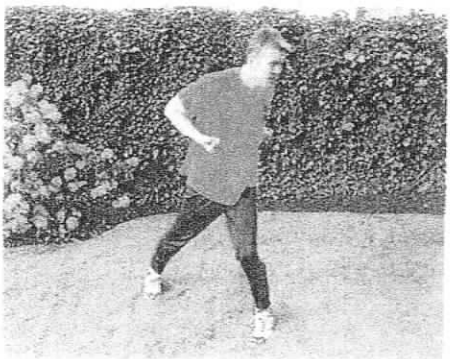


No. 2; Front View

No. 2; Side View

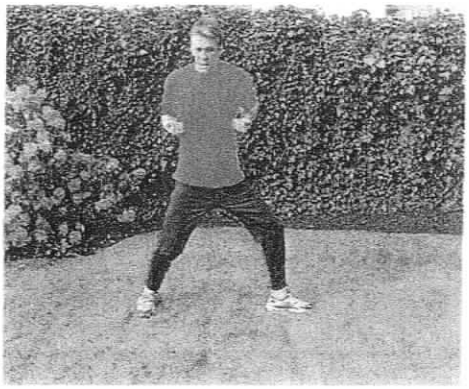


No. 3a; Feet together from #1

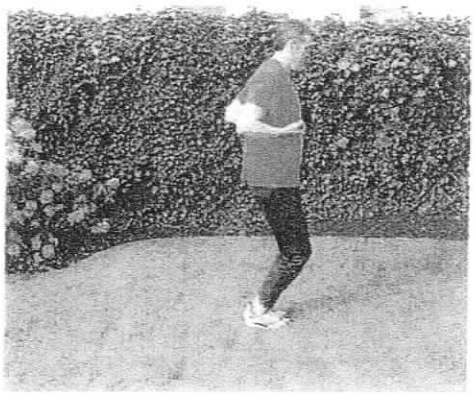


No. 3b; Forward into # 2 at 45-degree angle

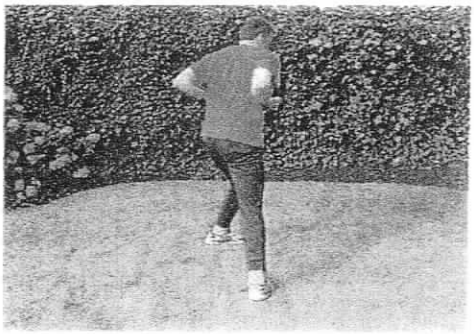
Ten Basic Stances 4 & 5



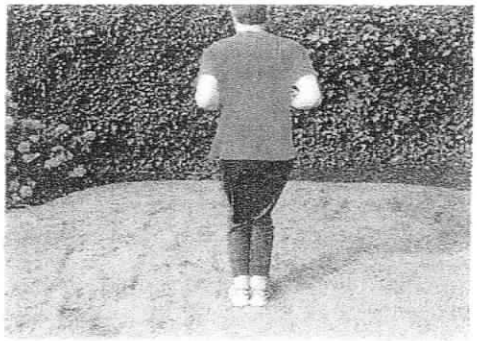
No. 4a; 90-degree pivot from #1



No. 4b; Feet together move to a # 1

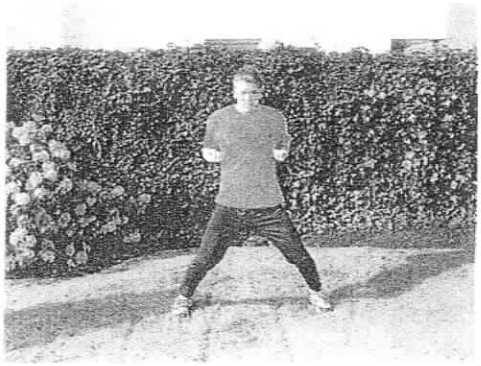


No. 4c; Heal back pivot from #1



No. 4d; Feet together move to a #1

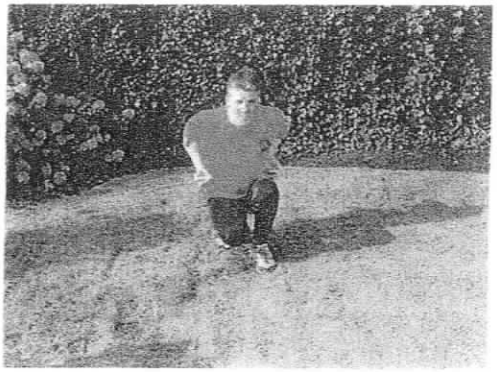
No. 5a; Cross-over from #1



No. 5b; Step out to a #1

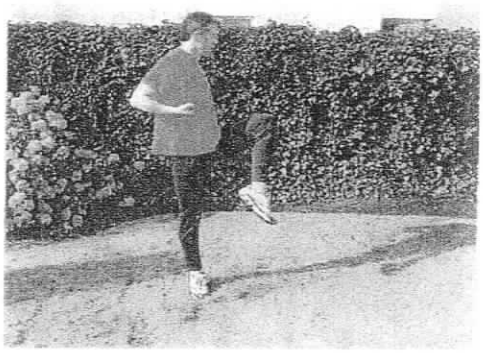
Ten Basic Stances 6-10

No. 6; Weight 90% back foot 10% front foot from #1



No. 7; To kneeling position from #1

No. 8; 45-degree turn from #1



No. 9; Knee up from #1

No. 10a; Cross over #5

No.10b; Pivot lead foot bring feet together move to #1