DOES TAI CHI PROMOTE PERCEPTIONS OF WELL-BEING AND RECOVERY AMONG STROKE SURVIVORS?

by

Melinda Ann Zeimantz

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As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by Melinda Ann Zeimantz entitled “Does Tai Chi Promote Perceptions of Well-Being and Recovery Among Stroke Survivors?” and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

_________________________________________________________________________ Date: ____________
Ruth E. Taylor-Piliae, PhD, RN, FAHA

_________________________________________________________________________ Date: ____________
Anne G. Rosenfeld, PhD, RN, FAHA, FAAN

_________________________________________________________________________ Date: ____________
Lori M. Martin-Plank, PhD, FNP-BC, NP-C, GNP-BC, FAANP, FNAP

Final approval and acceptance of this DNP Project is contingent upon the candidate’s submission of the final copies of the DNP Project to the Graduate College.

I hereby certify that I have read this DNP Project prepared under my direction and recommend that it be accepted as fulfilling the DNP Project requirement.

_________________________________________________________________________ Date: ____________
DNP Project Director: Ruth E. Taylor-Piliae, PhD, RN, FAHA
STATEMENT BY AUTHOR

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SIGNED: Melinda Ann Zeimantz
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DEDICATION

To my daughter, Brittney Rose, who has been with me through times of struggle and abundance.

She is the best thing that ever happened in my life and my most prized accomplishment.

May you always follow your dreams and thrive. Mom
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ABSTRACT

Introduction: Stroke, a leading cause of disability requires formal and informal rehabilitation so that stroke survivors can regain as much of their physical and mental abilities and return to living an active and independent life. Tai Chi is a well-established beneficial form of exercise that if practiced regularly can promote health and prevent chronic disease. Investigating the benefits of Tai Chi from stroke survivors’ perspectives is important for healthcare providers to understand.

Purpose/Objective: Using the Story-Recovery Model, stories from community-dwelling stroke survivors were examined to identify their feelings about participating in a Tai Chi exercise intervention and to examine their perceptions about how their participation influenced their post-stroke recovery.

Design: Descriptive qualitative study, using inductive content analysis

Methods: Stories from 17 community-dwelling stroke survivors, who were on average 71 years old (range 54 to 87 years old); mainly men (65%, n=11) were examined. Stories were on average 132 words long (range=17 to 364 words). A priori theoretical codes (and sub-codes) were: 1.) Feelings (confidence, enjoy, hopeful, helpful, other), and 2.) Perceptions of Impact (physical abilities, mental/cognitive abilities, challenges, other).

Results: The most common feelings these stroke survivors had about participating in a Tai Chi exercise intervention were helpful (n=15) and enjoyable (n=7). Some stories related improved confidence (n=4) and only one story mentioned hope. When examining their perceptions of how Tai Chi influenced their post-stroke recovery, improvements in physical abilities were: balance (n=10), walking (n= 4) and fewer falls (n=3) were reported; while improvements in mental and
cognitive abilities were common (n=12). Other unexpected perceptions of Tai Chi included: moving forward (n=8) and friendship (n=4).

**Conclusions:** This qualitative study supports results from other quantitative studies that Tai Chi can positively impact perceptions of their physical and mental abilities, as well as, decrease falls in stroke survivors. This study lays the groundwork for future studies to look at combining storytelling and Tai Chi to aid in the recovery process for stroke survivors in a variety of settings including community centers, nursing homes, and assisted living facilities.
CHAPTER 1: INTRODUCTION

A stroke or cerebrovascular accident is caused by a lack of oxygen to the brain and affects more than 795,000 people a year in the United States (Mozaffarian et al., 2016). Mozaffarian and colleagues (2016), project that by 2030, over 40% of Americans will have some form of cardiovascular disease, with stroke being a leading cause of long-term disability. Following a stroke, many people do not receive the necessary rehabilitation to help them live independently and return to their homes (Mozaffarian et al, 2016). In addition, women suffer more residual disabilities than men, which may impact their ability to perform activities of daily living (ADL) after a stroke.

While many studies have been completed on the physical complications stroke survivors experience, there is an absence of studies that attempt to evaluate the psychosocial and recovery processes a patient undergoes after suffering from a stroke. Furthermore, there are few studies using storytelling to promote exercise and healing in community-dwelling older adults who have suffered a stroke. Sharing their unique stories, perspectives, and psychosocial processes can potentially decrease stroke survivor’s depression, isolation, and recovery time. Additionally, Tai Chi may increase adherence to exercise, helping stroke survivors recover faster and lower healthcare costs associated with strokes. Tai Chi may also give insight into nursing interventions that will increase adherence to regular physical activity among stroke survivors. The purpose of this Doctor of Nursing Practice (DNP) project is to examine stories told by community-dwelling older adults who have suffered a stroke and recently participated in an exercise study. This research aims to answer two questions: 1. How does a stroke survivor begin to heal both physically and mentally?; and 2. Does post-stroke physical activity continue to show benefits
after formal rehabilitation is complete? For abbreviations and definition of terms used please refer to Table 1.

**TABLE 1. Abbreviations/Terms and Definitions**

<table>
<thead>
<tr>
<th>Abbreviations/Terms</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>African American</td>
</tr>
<tr>
<td>AHA</td>
<td>American Heart Association</td>
</tr>
<tr>
<td>ADL’s</td>
<td>Activities of Daily living</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>COG</td>
<td>Center of Gravity</td>
</tr>
<tr>
<td>DBP</td>
<td>Diastolic blood pressure</td>
</tr>
<tr>
<td>DGI</td>
<td>Dynamic gait index</td>
</tr>
<tr>
<td>FRT</td>
<td>Functional reach test</td>
</tr>
<tr>
<td>GHQ</td>
<td>General Health Questionnaire</td>
</tr>
<tr>
<td>HbA1C</td>
<td>Determines the average blood sugar level in the past 2-3 months</td>
</tr>
<tr>
<td>HPV</td>
<td>Human Papilloma Virus</td>
</tr>
<tr>
<td>ND</td>
<td>No Data</td>
</tr>
<tr>
<td>NR</td>
<td>Numeric Risk</td>
</tr>
<tr>
<td>PSQI</td>
<td>Pittsburgh Sleep Quality Index</td>
</tr>
<tr>
<td>RCT</td>
<td>Random Control Trial</td>
</tr>
<tr>
<td>RIW</td>
<td>Reciprocal interaction worldview</td>
</tr>
<tr>
<td>SAW</td>
<td>Simultaneous Action Worldview</td>
</tr>
<tr>
<td>SF-36</td>
<td>36-item Short Form Health Survey</td>
</tr>
<tr>
<td>SPPB</td>
<td>Short Physical Performance Battery</td>
</tr>
<tr>
<td>SS</td>
<td>SilverSneakers®</td>
</tr>
<tr>
<td>Story</td>
<td>An account, either true or false, intended to interest, entertain, or educate the listener or audience.</td>
</tr>
<tr>
<td>Story Bank</td>
<td>Collect and manage personal stories from a particular audience that educate, guide, or form policies.</td>
</tr>
<tr>
<td>Storytelling</td>
<td>The art of retelling an event to inform or entertain.</td>
</tr>
<tr>
<td>TAU</td>
<td>Treatment as Usual</td>
</tr>
<tr>
<td>TC</td>
<td>Tai Chi</td>
</tr>
<tr>
<td>TUG</td>
<td>Timed up and go test</td>
</tr>
<tr>
<td>UC</td>
<td>Usual Care</td>
</tr>
<tr>
<td>UT</td>
<td>Unitary Transformative Paradigm</td>
</tr>
<tr>
<td>10MWT</td>
<td>How fast someone can walk 10 meters.</td>
</tr>
</tbody>
</table>
Significance

In the United States (U.S.), someone suffers a stroke about every 40 seconds (Mozaffarian et al., 2016), with almost 795,000 people suffering a stroke every year (Mozaffarian et al., 2016). Over 600,000 are persons experiencing their first stroke ((Mozaffarian et al., 2016).). However, the risk for recurrent stroke is high, with one in four people having more than one stroke in their lifetime (Mozaffarian et al., 2016).

It is projected that health care costs related to stroke will triple and cost the U.S. healthcare system almost 818 billion dollars a year (Mozaffarian et al., 2016). Additionally, according to the American Heart Association (Mozaffarian et al., 2016), lost productivity related to strokes will cost the U.S. approximately 276 billion dollars in 2030. These costs do not take into account the emotional and social impact that strokes have on the stroke survivor, their families, or society. Stroke, a typically sudden and unexpected event—alters people’s lives by affecting their physical, emotional, and social health (Reed, Harrington, Duggan, & Wood, 2010). Regular physical activity has been shown to promote both physical and mental health in stroke survivors. Therefore, healthcare providers need to look at complementary interventions to prevent and decrease the complications common to stroke survivors.

Exercise to Prevent Stroke and Promote Recovery

Until recently, stroke experts thought the first three months following a stroke was when most, if not all, post stroke recovery was achieved. Physical activity has shown to be an important component in both reducing strokes and improving recovery time from strokes (cite). However, because most rehabilitation programs only provide services in the first few months following a stroke (Mead & Bernhardt, 2011), many stroke survivors have limited options for
continuing regular physical activity to aid in their recovery. Although historically this was not a concern for rehabilitation, new empirical evidence indicates rehabilitation efforts are beneficial to stroke survivors long after the first three months following a stroke (Korner-Bitensky, 2013).

In fact, a lack of regular physical activity can lead to recurrent strokes, incomplete recovery, longer recovery time and depression in stroke survivors (Mead & Bernhardt, 2011). Identifying major hurdles and positive driving forces that promote physical activity in stroke survivors is a central component to stroke rehabilitation. Promoting physical activity among senior stroke survivors is also critical to prevent falls, loss of independence, and disability due to chronic diseases (Mozaffarian et al., 2016). Although it is well documented in the literature that exercise is important to promoting and maintain physical and mental health (Mozaffarian et al., 2016), in the U.S. few people (21%) meet the guidelines for physical activity (Centers for Disease Control and Prevention, [CDC], 2016). The percentage of older adults who participate in regular exercise is even smaller with only 15.9% of Americans 65 years and older meeting the national guidelines for physical activity (CDC, 2016).

**Barriers to Exercise in Stroke Survivors**

Research indicates that regular physical activity benefits stroke survivors (Eng, 2010). However, there are real and perceived barriers to exercise that are unique to stroke survivors. These barriers are diverse and multifactorial. Damusch and colleagues (2007) indicated stroke survivors encounter physical, environmental, and emotional barriers while trying to exercise. Physical impairments from stroke made exercise more challenging. Environmental barriers included transportation issues, lack of knowledge, lack of motivation, or availability of programs in the community for stroke survivors. Feelings of isolation following a stroke were cited as
emotional barriers to exercising following a stroke (Damush, Plue, Bakas, Schmid, & Williams, 2007).

Regular exercise habits play an important role in stroke recovery; however, understanding how to develop and encourage regular exercise participation is not well understood. Boysen and colleagues (Boysen, Marott, Gronbaek, Hassanpour, & Truelsen, 2009) found that healthcare providers who repeatedly advised stroke survivors to exercise did not increase their participation in exercise; this was especially true for women and the elderly. Additionally, there is very little data on which forms of exercise are most beneficial to stroke survivors and there are still gaps in the research on innovative ways to promote regular exercise participation in stroke survivors. Listening to stories of stroke survivors who attempt to engage in a physical exercise routine specifically Tai Chi, may provide further insights into how to aid stroke survivors to engage in regular exercise.

The History and Philosophy of Tai Chi

Tai Chi originated from qigong, a branch of Traditional Chinese Medicine, and has been practiced in China for over 2500 years. There are many forms of Tai Chi but the three most popular are Yang, Wu, and Tai Chi Chih (Weil, 2016). The Wu form has a higher stance compared to the Yang style and is thought to be easier for beginners and improving balance, (Weil, 2016). All forms of Tai Chi involve slow meditative movements that connect mind, breath, and movement to create peace, balance and harmony in all areas of a person’s life (Weil, 2016).

According to the American Tai Chi and Qigong Association (ATCQA) (2016), the Yin and Yang philosophy is a core component of Tai Chi. Yin and Yang are opposing and equal
forces that need to be in balance to maintain health and the slow meditative movements of Tai Chi are thought to help a person stay in balance and promote health. There are three fundamental elements of Tai Chi: (ATCQA, 2016)

1. Movement: Movements are fluid and the person should feel grounded to the earth and maintain proper body alignment throughout the routine.

2. Meditation: A state of calm alertness and inner focus is maintained throughout the movements and routine.

2. Deep breathing: Breathing with the flow of the movements releases toxins and increases oxygen and nutrients to the body improving the overall health of the person.

Regularly practicing Tai Chi has been shown to have many physical and mental health benefits that will be discussed below. (ATCQA, 2016)

**Benefits of Tai Chi**

Three fundamental elements of Tai Chi can improve balance, aid in digestion, improve mood and alertness and help improve lung function (ATCQA, 2016). Tai Chi has been found to be both a suitable and enjoyable form of exercise for older adults, regardless of prior exercise experience or aerobic capacity (Lan et al., 2013). Tai Chi, a form of martial arts, improves balance, strength, gait speed, and mental focus (Taylor-Piliae et al, 2014). Studying the benefits of Tai Chi in stroke survivors is a relatively new phenomenon; however, a recent study conducted by Taylor-Piliae and colleagues (2014) found that stroke survivors who participated in Tai Chi had fewer falls, compared to those in usual care, which is generally twelve weeks of rehabilitation. Other benefits of Tai Chi include increased cardiovascular health, strength, camaraderie, and a sense of community (Kim et al., 2015). Tai Chi is also easy to execute in
community settings, is safe, and relatively inexpensive compared to formal rehabilitation (Mead & Bernhardt, 2011). Using Tai Chi along with storytelling may increase adherence to regular exercise, which is critical to post-stroke recovery. The following section will define story and then discuss Story Theory (Smith and Liehr, 1999) and the Story-Recovery Model (Zeimantz, 2016).

**Defining Story**

According to Leihr and Smith (2008), a story incorporates narration of an event as remembered and infuses unique personal perspectives that shape the meaning and guide choices in the moment. Storytelling is usually from a very personal perspective, and has the unique ability to engage an audience (Moreau, 2014), while also allowing the storyteller to create meaning out of events. Stories have the ability to captivate an audience and make them believe they are experiencing the story firsthand (Moreau, 2014). By captivating their audience, stories can help motivate the storyteller to change or make sense of their current or past circumstances so that they can heal (Chen, 2011). Moreau (2014) states that there are three reasons a story can be transformative. First, the story shifts us to another place or time. He surmises that the more people are submerged in a story or event, the more apt they are to take on the beliefs and actions of the story. Because the mind does not know the difference between an actual event and a story about an event, this can be powerful in healing or changing a behavior or belief. Second, the story moves both the storyteller and the audience. A powerful story can be a force to guide and direct a person’s behavior such as increasing exercise, healing from a serious health issue like a stroke, and moving forward or past obstacles encountered in life (Moreau, 2014). Third, storytelling allows us to observe a situation and come to our own conclusions. Personal
conclusions resulting from hearing a story have been demonstrated to be more important in creating positive change than being told what to think or feel (Moreau, 2014).

To educate and guide patients, the nursing profession has been informally using storytelling since Florence Nightingale began the nursing profession (Riddle, 2016) in order to motivate others in similar situations. However, stories are often perceived as more powerful when the people who experienced them tell them firsthand (Moreau, 2014). Therefore, this dissertation aims to understand the perceived benefits of storytelling among stroke survivors.

**Theoretical Perspective: Story Theory**

Smith and Liehr’s (1999) Story Theory, provided the theoretical perspective for this DNP project. Story Theory posits that nurses and patients connect through stories in order to make sense of a situation and to alleviate discomfort (Smith and Liehr, 1999). According to this theory, stories are evolving processes that build as storytellers integrate stories into their lives. By telling their story and identifying themes, patients start to connect and begin to make sense of their story (Liehr & Smith, 2008). Within the Story Theory, Liehr & Smith make three assumptions (2008). First, that people change as they connect with their world in a boundless range of related layers. Second, that people exist in the present and so they incorporate past and future events. Third, as stories evolve and as storytellers interact with other people, storytellers gain insight, significance, and a clearer understanding of their current or past experience (Liehr & Smith, 2008).

According to Liehr and Smith (2007) Story Theory, storytelling is an intentional dialogue between patients and nurses to create a story for healing (Liehr & Smith, 2007). However, this DNP project focused on patient-to-patient and patient-to-self health promoting processes among
stroke survivors. In this DNP project we anticipated that cathartic storytelling does not always need to be between nurses and patients, but could be between stroke survivors. It was proposed that storytelling among stroke survivors may encourage senior community-dwelling stroke survivors to exercise on a regular basis, as storytelling helps promote knowledge, enthusiasm, and connections between people (Moreau, 2014).

**Story-Recovery Model**

Telling one’s story is medicinal, supportive and the benefits attained cannot be matched (Mitty, 2010). The Story Recovery Model (Figure 1) developed for this DNP project was adapted to incorporate the basic tenets of Story Theory (Smith & Liehr, 1999). The Story Recovery Model expanded the Story Theory to include peer-to-peer storytelling and interactions to gain understanding of stroke’s impact and healing processes. Gaining a peer-to-peer connection has the added value of relating, recognizing, and communicating the unique and personal knowledge of how a stroke has impacted the lives of survivors (cite cancer survival group therapy research here—or something like it). This connection is thought to empower peers to form an emotional bond that can serve as a powerful cathartic catalyst for change.
FIGURE 1. Story-Recovery Model

Represented above in the middle box is the storyteller who creates a story or intentional dialogue relating to a health complication. According to Smith and Liehr (2008), intentional dialogue is the “purposeful engagement with another about the events of a health crisis” (p. 209). This dialogue helps both the storyteller and listener become more familiar with themselves and their values and needs. On the left side of the figure, self-reflection is vital to connect the person to the story, environment, and the current or past health complication in order to create ease.

The right side of the figure depicts connecting with others in relation to the story, the environment, and the current or past health crisis. A nurse could facilitate this, but it can also be by someone who is facing similar health challenges or someone who takes an active role in the story, such as a family member. The revolving arrows depict the continual interchange and interaction between all players.
The Story-Recovery Model helped guide this DNP project in order to examine themes in stroke survivors’ stories. The researcher looked for personal connections between stroke survivors when discussing their stories as well as whether Tai Chi impacted stroke survivors’ physical or mental health. The research questions below further defined the specific aims of this study.

**Research Questions**

The purpose of this DNP project was to combine and expand current knowledge and theoretical views in order to answer the following questions: Does Tai Chi promote perceptions of well-being and recovery among stroke survivors?

Aim 1. To identify and examine the stroke survivors’ feelings about participating in a Tai Chi exercise intervention.

Specific Research Questions:

1. Did participating in the Tai Chi exercise intervention influence the stroke survivors’ feeling of confidence?
2. Did stroke survivors enjoy participating in the Tai Chi exercise intervention?
3. Did participating in the Tai Chi exercise intervention foster the feeling of hope among stroke survivors?
4. Did stroke survivors feel that participating in the Tai Chi exercise intervention was helpful?

Aim 2. To identify and examine stroke survivors’ perceptions about how participating in a Tai Chi exercise intervention influenced their post-stroke recovery.

Specific Research Questions:
1. What were the stroke survivors’ views of their perceived physical abilities following the Tai Chi exercise intervention?

2. What were the stroke survivors’ views of their perceived mental/cognitive abilities following the Tai Chi exercise intervention?

3. What challenges did the stroke survivors experience during the Tai Chi exercise intervention?

**Implications for Nursing**

Stroke survivors require multifaceted and complex care in order to regain their independence (Mozaffarian et al., 2016). Because of the high costs associated with recovery following a stroke, new and innovative interventions that aid in the recovery process are needed (cite). Storytelling is one possible solution. Storytelling is inexpensive, requires little training, and is easy to implement throughout the recovery process (cite). Storytelling allows nurses to educate and share information, which can be a catalyst for change in behavior and mood. By introducing storytelling to stroke survivors and their families, nurses could aid in providing an inexpensive tool to help stroke survivors and their families begin the process of healing, and examine role changes that may occur following the stroke. However, even though nurses play a pivotal role in complementary therapies—such as storytelling—the benefits of storytelling in stroke survivors have not been investigated.

**Conclusion**

In the United States, the rising number of strokes and the associated costs remains a burden for healthcare system (Mozaffarian et al., 2016). Storytelling is an inexpensive intervention that may be vital to promoting exercise and healing in people who have suffered a
stroke. One form of exercise that has been indicated as beneficial in the elderly population is Tai Chi (cite). Tai Chi is an easy and relatively inexpensive intervention that can be adapted to a variety of settings and populations. Examining the perceived benefits of Tai Chi and storytelling in stroke survivors could lead to future evidence-based interventions. To the author’s knowledge, storytelling and Tai Chi have not been empirically studied together. Therefore, this DNP project sought to understand the perceived or real benefits that participating in Tai Chi and storytelling has on assisting survivors to regain independence.
CHAPTER 2: REVIEW OF THE LITERATURE

This review will discuss the latest research involving Tai Chi, storytelling, and stroke patients in order to identify topics related to this DNP. Multiple studies support regular exercise participation for preventing various chronic illnesses and improving quality of life (QOL) (cite). New complementary approaches to stroke recovery are needed in order to create cost effective, timely, and non-pharmacological interventions. Healthcare is already using storytelling to educate and improve the health and well-being of diverse communities Leihr and Smith (2008); however, there is very little information on combining storytelling and exercise promotion. To the best of our knowledge, there is no research of the effects of storytelling and Tai Chi on stroke survivors.

**Literature Search**

An electronic search was performed using MEDLINE-PubMed, Embase and OVID CINAHL, through The University of Arizona Health Sciences Library (AHSL), from February 2006 through February 2016. Using keywords, controlled vocabulary function, and a combination of the keywords “Storytelling or Narration,” “Tai Chi, or Exercise,” and “Stroke Survivors,” were used to find relevant full text articles. Additional limits included English language, research conducted among humans, 18 years and older.

**Literature Review**

The search yielded a total of 30 articles for review, of which a total of 16 articles did not meet inclusion criteria and were discarded. Of the remaining 14 articles, five examined Tai Chi among stroke survivors, while the remaining nine articles focused on storytelling to promote health interventions or health education. There were 10 randomized controlled trials (RCT), three
quasi-experimental studies and one observational study. These studies included 2,226 participants, with six of the 14 studies having more than 100 participants and one having 598 participants. Most of the participants were female (65%) and the average age of participants was 72 years old (Tables 2 and 3). Five of the nine-storytelling studies were comprised of only stroke patients who were African-American or Hispanic.

The following review of the results of these studies will start with the Tai Chi research and then move on to discuss the storytelling and health promotion studies. It is important to study how these two interventions can be implemented together to affect low-cost and long-lasting improvement in stroke patients’ mental and physical health.

**Tai Chi and Stroke Survivors**

**Physical Function**

All five studies (Au-Yeung, 2009; Kim, 2014; Taylor-Piliae, 2014, 2012; Wang, 2010) specifically researched balance and Tai Chi; stroke survivors showed significant improvement in balance due to Tai Chi versus more traditional rehabilitation techniques. The Tai Chi groups also showed greater improvement in the timed up and go test, functional reach test, and the dynamic gait test, than the rehabilitation groups (Kim, Kim, & Lee, 2015). While the pilot study performed by Taylor-Piliae and colleagues (2012) did not aim to show statistical significance due to sample size, the change in balance and endurance suggested that Tai Chi was a benefit for stroke survivors. Gait speed, physical function, and strength were improved in the usual care group over the Tai Chi group in that same study (Taylor-Piliae & Coull, 2012).

The 2014 study, performed by Taylor-Piliae and colleagues, found that the Tai Chi group had two-thirds fewer falls than the other two groups, and the SilverSneaker® group had fewer
falls than the usual care group (Taylor-Piliae et al., 2014). Another study by Au-Yeung and colleagues found that as little as six weeks of Tai Chi improved balance and proprioception in stroke survivors. Furthermore, the improvements remained even after the formal training was complete in the Tai Chi group (Au-Yeung, Hui-Chan, & Tang, 2009).

Results on the Timed Up and Go (TUG) test were mixed, with one study finding that Tai Chi improved performance (Kim and Colleagues 2015) and one study finding it did not find see improvement in the TUG test among the Tai Chi participants (Au-Yeung and colleagues 2009). The researchers surmised that this may be due to Tai Chi not stressing speed in either walking or turning and that other studies incorporated different forms of rehabilitation that may have improved their overall speed or aerobic ability. Taylor-Piliae and colleagues (2012; 2014) also found increased endurance and balance and equated that to incorporating the physical activity guidelines for seniors of 150 minutes per week, in their study compared to 60-120 minutes in the other studies using Tai Chi. The different forms of Tai Chi used in the studies might have also impacted the results (Au-Yeung et al., 2009).

Overall, most of the studies found the ability of Tai Chi to improve speed and or endurance. Taylor-Piliae and colleagues (2014) and Kim and colleagues (2015) reported increased aerobic ability in stroke survivors incorporating Tai Chi or other forms of physical activity such as SilverSneakers®. Taylor-Piliae and Coull (2012) also found that Tai Chi is safe, easy to perform, and well tolerated. The overall results of these studies found improvement in balance, decreased falls, and the feasibility of this intervention for stroke survivors.
Quality of Life

Factors that play a role in QOL are physical function, mental function (depression/anxiety), and sleep quality. The four studies that looked at QOL (Kim, 2014; Taylor-Piliae 2014; 2011; Wang 2010) all used standard measures that included the Pittsburgh Sleep Quality Index (PSQI), Center for Epidemiological Studies Depression scale (CES-D), 36-item Short Form Health Survey (SF-36), General Health Questionnaire (GHQ), and Short Physical Performance Battery (SPPB) test. All of these tests are fairly easy to use in a variety of settings and populations, have been used extensively in research, and are validated. The QOL factors will be discussed separately below.

QOL - Physical Function

The ability to physically care for yourself and perform ADL’s independently plays an immense role on one’s quality of life. There were mixed results with the studies that used the SF-36 to evaluate physical health scores. Kim and colleagues, (2014) found improved physical functioning improvement in decreased pain and general health. Taylor-Piliae and Coull (2012) RCT pilot study found a trend in favor of improved physical function, but due to sample size was unable to provide any statistical significance in their study. While Taylor-Piliae and colleagues (2014) found no significant improvement in the SF-36 physical composite scores (PCS); however, all groups in the study reported perceiving an improvement in their PCS scores post-intervention. Wang and colleagues (2010) used a similar measure for general health called the General Health Questionnaire (GHQ) and reported significant time-by-group improvement only in the total score, but not for the somatic score The authors state that both rehabilitation and Tai Chi improve QOL for stroke survivors (Wang et al, 2010). The identified current studies found
that all forms of post-stroke rehabilitation and exercise including Tai Chi improved the physical function of stroke survivors. These four RCT studies clearly suggest that larger and longer studies investigating Tai Chi’s effectiveness in improving physical function QOL scores in stroke survivors is important.

**QOL - Mental Function**

Good mental health is critical to the overall healing from any major health crisis. Depression and anxiety can slow the healing process due to lack of energy, motivation and enjoyment of common activities. Depression has been shown to create real physical ailments or worsen current health issues (American Psychiatric Association [APA], 2013). The three studies that used SF-36 to evaluate mental health (Kim, 2015; Taylor-Piliae, 2014; 2012), again found mixed results in mental health improvements due to Tai Chi. Kim and colleagues (2015) found improvement in energy/fatigue level. They surmised that Tai Chi helped in overall improvement of QOL, but that the social interaction created when performing Tai Chi might have played a role in improved mental health (Kim et al., 2015).

Taylor-Piliae and colleagues (2014) found no improvement in the mental composite scores in the time x group interaction. Again, all groups had significant improvement in perceived mental health after 12 weeks. Taylor-Piliae and Coull (2012) reported a trend toward favoring Tai Chi in mental health composite scores but it was not significant or expected to be significant due to sample size. Wang and colleagues (2010) GHQ score reported a significant improvement in time x group interaction for depressive symptoms, a finding that Tai Chi is more effective than rehabilitation for severe depressive symptoms (p=0.02). The group also found Tai
Chi was more effective in combating anxiety/insomnia than the rehabilitation intervention (p=0.03).

**QOL - Sleep Quality**

The quality of sleep affects both physical and mental health and plays a major role in a person’s quality of life. The three studies that looked at sleep quality (Taylor-Piliae, 2014; 2012; Wang, 2010) used the PSQI test. These studies seem to find that Tai Chi does not improve sleep quality over other types of exercise but further studies need to be done. There was a trending towards improved sleep quality in the Taylor-Piliae and Coull study (2012), but the Taylor-Piliae and colleagues (2014) study did not find improved sleep quality between time main effect or time x group intervention. Wang and colleagues (2010) found improvement in sleep for both groups but only found sleep quality to be significant in the time x group interaction. Daytime dysfunction, sleep disturbance, and sleep efficiency were not significant.

**Tai Chi and Stroke Survivors Conclusion**

According to Taylor-Piliae and colleagues (2014) all forms of exercise improved physical function and QOL. Tai Chi and SilverSneakers® both improved these outcomes, which is no surprise, as most health professionals and medical associations recommend exercise to improve the overall mental and physical health for all Americans. Larger and longer studies need to be conducted in order to see if different variables that were trending towards or away from Tai Chi do become significant. The Tai Chi research found improved balance, decreased falls, and increased QOL. Whether it is Tai Chi, SilverSneakers® or Usual Care, more interventions need to be created that improve the lives of stroke survivors.
Storytelling in Health Promotion

The nursing profession has used formal storytelling for almost 25 years (Crogan et al., 2008). It has helped nurses and patients learn new skills and come to terms with multiple health issues. According to Larkey and colleagues (2007), stories help create social norms and strengthen communities. The following section will further explore the recent research regarding storytelling and health promotion and the important factors involved in utilizing storytelling as an intervention.

Storytelling Health Promotion - Cultural Relevance

Eight of the nine studies in this literature review examined if culture was an important factor in changing behavior or increasing knowledge (Cherrington et al., 2015; Crogan et al., 2008; Frank et al., 2015; Houston et al., 2011; Larkey et al., 2007; Lebron et al., 2014; Wilkin et al., 2015; Williams et al., 2014). These studies did indeed find that cultural relevance played a key role in the success of a health message to change behavior or increase health knowledge. Larkey and colleagues (2007) concluded that in order to reach populations that are far too often not reached by the healthcare community, it is very important to create messages that are culturally pertinent. Frank and colleagues (2015) added that identifying with the storyteller was also important. They concluded that not only does it need to be culturally relevant; it needs to be relevant to the lives of a particular audience (Frank et al., 2015).

Storytelling Health Promotion - Changing Behavior

The research was mixed on whether storytelling was an effective intervention to change behavior. Williams and colleagues (2014) found that storytelling was practical and beneficial in improving exercise adherence, decreasing BMI, and improving foot care, but also found that
there was no statistical decrease in participants HbA1C at the end of the study. Blood pressure was statistically lowered only in participants who had uncontrolled blood pressure, not in participants who had fairly controlled blood pressure on usual care interventions (Houston et al., 2011). Cherrington and colleagues (2015) found participants that viewed storytelling DVDs had greater intention to quit smoking but the intention did not remain statistically significant at two weeks. They also found storytelling needed to be combined with other interventions to be effective.

Exercise was positively associated with storytelling but increasing fruits and vegetables was not effective using only storytelling as an intervention according to Wilkin and colleagues (2015). That same study found that there were racial differences in how AA’s and Hispanics responded to a story and that African Americans were more likely to change their behavior after hearing a story than Hispanics. Larkey and colleagues (2007) found that Latinos had increased intent to improve exercise and eating habits, but not increased health-screening behaviors. While many of the studies did not show statistically significant changes in behavior, many of these studies were trending towards storytelling as an effective intervention in changing behaviors to improve health.

**Storytelling Health Promotion - Quality of Life**

There were three studies that looked at storytelling and improving quality of life (Crogan, et al., 2008; Houser et al., 2014; Phillips et al., 2010). The results of storytelling and quality of life were mixed. Crogan and colleagues (2008) reported stress levels decreased even with increased pain in the storytelling arm of their study, but no other measures were statistically significant. Houser and colleagues’ (2014) randomized controlled study found no difference in
disposition or behavior when using storytelling as an intervention. In their quasi-experimental study, Phillip and colleagues (2010) found increased pleasure and communication skills. Both Houser (2014) and Phillip (2010) agreed that larger studies done over longer periods of time are needed in order to show significant changes or conclusions.

**Storytelling and Stroke Survivors Conclusion**

While there were mixed results in storytelling to promote health and changes in behavior, most of the studies concluded that storytelling interventions trended towards positive health changes (Cherrington, 2015, Houser, 2014, Wilkin, 2015). In the studies that did show positive changes when using storytelling, they reinforced the importance of cultural and situational relevance when creating effective health messages (Frank et al., 2015). Houston and colleagues (2011) caution that interventions for stroke survivors and other people struggling with health issues need to focus on target audiences, desired outcomes, and messages that are engaging in order to be effective. Interventions that improve quality of life and health promotion in stroke survivors need to be specific and relevant.

**Tai Chi, Storytelling and Stroke Survivors Conclusion**

During the review of the literature, there were some emerging themes within the specific studies regarding the health benefits of Tai Chi among stroke survivors and storytelling health benefits. Within the Tai Chi research, improved balance, decreased falls, and increased QOL were important results. Among the storytelling studies, being culturally specific and having health information that was relevant to the audience, were very important. Storytelling decreased stress and changed behaviors in many cases. The research also found that hearing a story from a peer was very important in promoting healthy behavior and introducing interventions.
Investigating storytelling and Tai Chi in stroke survivors as a viable intervention in the future is important in order to examine alternative treatments that may improve outcomes in stroke survivors and improve their QOL. While these interventions have been successful in other health issues, results may not be transferrable to stroke survivors. Further, no research to date combines these two interventions among stroke survivors. This DNP project will combine storytelling and Tai Chi to see if they can empower stroke survivors and improve their overall function and QOL.

As shown in the literature research presented (Table 2 & Table 3), there are no studies looking at the perceptions that stroke survivors have about improvement in their mental and physical health overall, or with exercise and Tai Chi, and how that has impacted their recovery. The intention of this DNP project is to look at perceptions of stroke survivors and the impact those perceptions had on their QOL and physical well-being. The next chapter will discuss the methods used to examine storytelling and Tai Chi in stroke survivors and their perceptions during their recovery.
TABLE 2. Literature Review: Tai Chi and Stroke Survivors

<table>
<thead>
<tr>
<th>First Author, Yr. Location</th>
<th>Study Design</th>
<th>(n)</th>
<th>Study Sample</th>
<th>Intervention</th>
<th>Study Variables/Measur es</th>
<th>Results</th>
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<tbody>
<tr>
<td>Kim, 2014 Korea</td>
<td>RCT</td>
<td>24</td>
<td>22 Inpatient (Rehabilitation center) Stroke Survivors</td>
<td>Tai Chi/ TAU (n) =11 10 Tai Chi movements 60 minutes twice a week for 6 weeks TAU (n) = 11 One on one with a physical Therapist with focus on balance and proprioception improvement</td>
<td>Physical Function: Static Balance (EO/EC sway length and velocity) Dynamic balance: (FRT) &amp; (DGI) Gait ability: (10MWT) (TUG) QOL: SF-36</td>
<td>Tai Chi group had significantly (p&lt;0.05) better static and dynamic balance and gait ability, than Controls. Tai Chi group had no significant change (p&gt;0.05), in overall QOL (physical or mental health), than controls.</td>
</tr>
<tr>
<td>Taylor-Piliae, 2014 USA</td>
<td>RCT</td>
<td>145</td>
<td>Community-dwelling stroke survivors &gt;3 months post stroke.</td>
<td>Yang Style Tai Chi (n) = 53 1-hour class 3 x a week for 12 weeks SilverSneakers® (SS) (n) = 44 1-hour class 3 x a week for 12 weeks Usual Care (UC) = 48 Weekly phone call. Written material and information for community based physical activity appropriate for older adults</td>
<td>Physical Function: Falls SPPB 2 minute step test QOL</td>
<td>The TC had 2/3 fewer falls than SS and UC (p = .06) Post Hoc: significantly fewer falls only in TC vs. UC group (p = .04). SPPB= All groups significant (P &lt; .01). 2-minute step test: Significant group by x time interaction: (p &lt; .01) Post Hoc: TC (p = .02) &amp; SS (p &lt; .01) greater aerobic endurance over time vs. UC (p = .12) QOL: Not significant in physical health for any group (p &gt; .05). Perceived mental health improved all groups (p &lt; .05)</td>
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<td>First Author, Yr. Location</td>
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<tr>
<td>Taylor-Piliae, 2012 USA</td>
<td>RCT pilot study</td>
<td>28</td>
<td>Stroke Survivors ≥ 3 months post stroke TC, n=16, UC, n=12</td>
<td>Yang Style Tai Chi (n) = 13 12 weeks of Tai Chi 1 hour of group practice and 1-3hours of individual practice UC: (n) =12 Received weekly calls and written materials/resources for community based physical activity</td>
<td>Physical Function: SBBP SF-36 CESD PSQI Study safety and feasibility Recruitment rates Intervention adherence Falls or adverse events Study satisfaction Dropout rates</td>
<td>Improvement seen in TC for balance, endurance and QOL Greater improvement in UC for overall physical functioning, gait speed, and strength Feasible study 52% were interested and eligible No falls or adverse effects Adherence rates high (TC = 92%) (UC = 99%) Satisfaction rates were high at 83% Low dropout rates not-related to study. 11% Sample size for significance = 52</td>
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**Study Sample:**
- Female: = 40%
- Average Age = 69 years
- MMSE= 27
- Stroke Type= Ischemic 75%
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<tbody>
<tr>
<td>Wang, 2010 Japan</td>
<td>RCT</td>
<td>34</td>
<td>Stroke survivors: ND on time of stroke to study</td>
<td>Yang Style Tai Chi; (n) =16 Once a week fifty minute sessions</td>
<td>Quality of Life: P300 evoked potential measurements (amplitude and latency)</td>
<td>P300 test: Not significant between the TC and control group.</td>
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<td></td>
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<td></td>
<td>Stroke type = ND</td>
<td>UC: (n) = 13 Nonresistance training (walking) and resistance training</td>
<td>PSQI (Pittsburgh Sleep Quality Index)</td>
<td>PSQI: Improved sleep quality in time by group interactions (p = 0.006)</td>
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<td></td>
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<td>Female: = 46%</td>
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<td>GHQ (General health questionnaire)</td>
<td>GHQ: total score (p = 0.005) anxiety/insomnia (p = 0.034) severe depression (p = 0.020).</td>
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<td></td>
<td></td>
<td></td>
<td>Average Age: 77 years</td>
<td></td>
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<td>Improved sleep quality for both groups but Tai Chi had better sleep quality</td>
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<td></td>
<td></td>
<td></td>
<td>MMSE: 26</td>
<td></td>
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<td>Improved depressive symptoms in TC group</td>
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<td>Most common co-morbid conditions: ND</td>
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TABLE 2. – Continued

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<tbody>
<tr>
<td>Au-Yeung, 2009 Hong Kong</td>
<td>RCT</td>
<td>Stroke survivor &gt;6 months. TC (n=59) Control (n=55) Female: 72.7% Average Age: 64 years MMSE: 28</td>
<td>Tai Chi Sun Style: (short form) (n)= 56 12 weeks training: 1-hour group training and 3 hours of self-practice</td>
<td>Physical Function: Dynamic standing balance Standing Equilibrium Functional mobility (TUG)</td>
<td>Dynamic standing balance: TC showed COG leaning forward, backward, toward the non-affected side week 6 onward (p &lt; .05) Affect side (p &lt; .001) week 12 persisted 6 weeks after training ended (p ≤ .007). Improved reaction time when leaning forward on non-affected side by end of program (p = .014) and follow up (p = .005). Standing equilibrium: TC improvement conditions 4, 5, &amp; 6: week 12 onward (p &lt; .005). Control: conditions 5 &amp; 6 only at follow up (p &lt; .0167) TC group improved visual ratios week 12 (p &lt; .005) TC: Vestibular ratio significantly better week 12 (p = .38). TUG: no improvement within or between groups</td>
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### TABLE 3. Literature Review: Storytelling for Health Promotion and Education

<table>
<thead>
<tr>
<th>First Author, Yr. Location</th>
<th>Study Design</th>
<th>(N)</th>
<th>Study Sample</th>
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<th>Results</th>
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<tbody>
<tr>
<td>Cherrington, 2015 USA</td>
<td>RCT</td>
<td>300</td>
<td>African American smokers with chronic illness in urban hospital (N=300). Female: = 52.3% Average Age: 50 years</td>
<td>Intervention= (stories DVD + routine care) (N=150) Control= (Attention DVD +routine care) (N=150).</td>
<td>Measures: Self-report using a video Transportation Scale Carbon-monoxide testing H1: Intervention group more likely to report intention to quit after viewing storytelling DVD vs. Control group. Who receives attention control DVD? H2: Storytelling DVD group will be more likely to quit smoking 2-week and 6 months post intervention compared to control group. H3: Success of smoking cessation intervention will be changed by self-reported health status in the hospital.</td>
<td>H1: Not supported Initial intention to quit higher in intervention. No difference at 2 weeks H2: Not supported no statistical difference but trended toward intervention group. H3: Not supported Not significant for perceived good health (p= 0.16) Perceived Fair/poor health status: (P= 0.24) Continuous quit: (P= 0.055) not significant trended toward intervention</td>
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TABLE 3. – Continued

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<th>First Author, Yr. Location</th>
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</table>
| Houser, 2014 USA           | RCT pilot study | 26   | Dementia patients in a skilled facility                                        | Intervention: Standard of Care = 2 one hour “Time Slips” sessions weekly for 6 weeks. | 1. Overall mood score, based on verbal, sleep, appearance, and loss of interest scores  
  2. Overall behavior score based on wandering, verbally abusive, physically abusive, hallucinations, resistance to care, sexually inappropriate, and delusion scores.  
  Secondary Outcomes are the individual scores from the 11 components of the mood and behavior scores.  
  Measures: Use of Psychotropic drugs  
  “Caretaker” (mood and behavior tracker)                                                                 | Mood: Sleep No statistical difference: (p = 0.99)  
  Behavior: Physically abusive: No statistical difference (p = 0.29)  
  No statistical difference in use of Psychotropic drugs between or within groups. |
| Houston, 2011 USA          | RCT           | 299  | AA with HTN: Intervention: n=147 Control: n=152                               | Intervention: 3 Interactive storytelling DVD’s delivered at baseline, 3 months and 6 months | BP change between groups at baseline 3, 6, and 9 months                                                                 | Significant reduction only in participants with uncontrolled HTN  
  3 months: SBP (P=0.012)  
  6-9 months SBP (P=0.012)  
  6-9 months DBP (P=0.119) |
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<th>First Author, Yr. Location</th>
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<tr>
<td>Crogan, 2008 USA</td>
<td>RCT pilot project</td>
<td>10</td>
<td>Cancer patients in Remission Female 90% Latinos N=64 Women: 86% Average Age: 47 years</td>
<td>Intervention: Nurse led Storytelling group met 12 x for 1.5 hours over 12 weeks. Control group: No formal storytelling done or encouraged at meetings:</td>
<td>Mood Stress: Index of Clinical Stress Coping: Cantril’s ladder Pain: McGill Pain Questionnaire Self-efficacy: Physical Self-Efficacy Scale QOL: Satisfaction with Life Scale: SF-36 Strategies used in storytelling: how to form tell and retell stories. Caring</td>
<td>Stress was significantly different in intervention group (p&lt;.05) even with increased pain. No other measures significant</td>
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<td>First Author, Yr. Location</td>
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<tr>
<td>Larkey, 2007 USA</td>
<td>Two group RCT Pilot study</td>
<td>64</td>
<td>Latinos N=64 Female: 86% Average Age: 47 years</td>
<td>Intervention: Health Educator provided information on Cancer Risk through storytelling (ST) Control received information through Numerical risk (NR)</td>
<td>H1: Latinos exposed to cancer-risk education via storytelling will (a) verbalize intent to increase exercise and vegetable intake (b) Show greater knowledge and perceived risk for cancer (c) have a decrease in fear than those receiving numeric risk (NR) information. H2: Latinos (≥ 50 years old) exposed to storytelling will more likely to obtain screening and recommend screening to others compared to the NR group Measures: Risk and Fear: (Adapted Breast Cancer Fear Scale) 3 question Likert scale Behavioral intentions Increase in Vegetables Intent to screen</td>
<td>H1: (a) supported ST significant intent to increase vegetable intake (p = .030) ST planned to increase exercise (p=.018) H1: (b) not supported: Fear reduced in both groups but ST had less decrease in fear vs. NR. ST had reduced perceived risk for CA vs. NR H2: not supported: No difference between groups to recommend screening or be screened</td>
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<tr>
<td>Frank, 2015 USA</td>
<td>Quasi-experimental</td>
<td>450</td>
<td>Female: 100% European N=129, Hispanic N=117, African American N=107, Average Age=38 years old Married (60%)</td>
<td>DVD: 11-minute “Tamale Story” health message about HPV and cervical cancer prevention, depicting Mexican-American family preparing for daughters Quinceañera, Phone Survey was done at 2 weeks and 6 months post exposure.</td>
<td>Explore role of narrative involvement in assessment of perceived vulnerability Phone Survey was done at 2 weeks and 6 months post exposure.   H1: Narrative involvement will be positively associated with response efficacy, perceived severity, and perceived risk of contracting HPV at 2 weeks and 6 months. H2: Identifying with specific characters will be linked with participants’ response efficacy, perceived severity and risk to contracting HPV at two weeks and 6 months post intervention. H3: Behavior at six months will be linked to narrative involvement(b) relating to specific character (c) response efficacy, (d) perceived severity and (e) perceived risk to HPV</td>
<td>Results showed relevance (p &lt;0.1) and immersion (p&lt;0.5) positively associated with perceived efficacy of the HPV vaccine. Relevance of story positively associated with perceived severity of getting HPV at posttest (p &lt; .01). The only factor that remained statistically significant at 6 months was relevance of storyline associated with response efficacy (p &lt;.05). Identification with specific character Lupita (has HPV virus) was negatively associated with perceived severity of HPV (p &lt; .05) but positively associated with perceived susceptibility to the virus (p, &lt; .05). The pattern changed at 6 months, with Lupita having a positively associated with response efficacy (p, &lt;05) and perceived susceptibility (p&lt; .02). Identification with Blanca, (mother), negatively associated with perceived severity (p &lt; .03). Not significant at 6 months Identification with Connie (younger sister) was not significant until 6 months and only with perceived severity (p &lt; .05). Narrative factors had no bearing on talking with a provider. Identified with Lupita had a negative association with talking with provider (p &lt;. .05). Identifying with the mother had a positive association (p&lt;. 001) Perceived susceptibility was linked to a more likely talking with a provider about the HPV vaccine (p &lt; .05).</td>
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<td>First Author, Yr. Location</td>
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<tr>
<td>Williams, 2014 USA</td>
<td>Quasi-experimental Pilot study</td>
<td>32</td>
<td>AA diabetics N=25 Woman 80% Average Age 62 years old</td>
<td>Intervention: 8 educational meetings 2 years follow up 6 Videotapes depicting AA Diabetics confronting typical problems Related to DM</td>
<td>Data was collected at baseline, 3 months and 12 months after intervention Measures: HAIC, Lipids, Co-morbidities, current treatment plans Assessing Knowledge using Spoken Knowledge in Low Literacy patients with Diabetes (SkilId) questionnaire Problem solving skills Diabetes Problem Solving Skills (DPSS) General Physical and Mental Health using SF-12</td>
<td>AIC decreased but not statistically significant Post intervention and 3 month A1C 8.0% to 7.6% (P=. 22) at 12 months (7.4) not significant BMI showed a significant decrease at 3 months (P=. .03) decreased further at 12 months not significant. Exercise significantly increased at 3 months (P=. .007) exercise level dropped between 3-12 months still higher than at baseline. Increase in knowledge: 3 months (p = .001) and 12 months (p = .001). Foot care also improved at 3 and 12 months (p=. .001). Mental health: Significant change at 3 months (p = .05) continued to increase at 12 months not significant (P=0.9). Physical health: Trending improvement at 3 months but at 12 months health had significantly declined (p = .06)</td>
</tr>
</tbody>
</table>
### TABLE 3. – Continued

<table>
<thead>
<tr>
<th>First Author, Yr. Location</th>
<th>Study Design</th>
<th>(N)</th>
<th>Study Sample</th>
<th>Intervention</th>
<th>Study Variables/measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phillips, 2010 USA</td>
<td>Quasi-experimental, two group repeated measures design</td>
<td>56</td>
<td>Dementia patients in nine long-term care facilities: Intervention (n=28) Control (n=28) Female: 87% Average age: 80 years</td>
<td>Intervention: Twice weekly 6-week Time slip program. Control: Usual Care</td>
<td>Outcome measures: Cornell Scale for depression in Dementia Neuropsychiatric Inventory Nursing home version QOL-Alzheimer’s disease Observed emotion Rating Scale</td>
<td>Treatment group showed significantly higher pleasure Week3 (p &lt; .001) Week 6 (p &lt; .001) Week 7 (p &lt; .001) and a larger effect of pleasure was found at week 7 (d = .58) Small to moderate treatment effects in week 7 for social communication (d = .49), basic communication (d = .43) Treatment group had lower scores on the CSD-D scale but not clinically significant</td>
</tr>
<tr>
<td>First Author, Yr. Location</td>
<td>Study Design</td>
<td>(N)</td>
<td>Study Sample</td>
<td>Intervention</td>
<td>Study Variables/measures</td>
<td>Results</td>
</tr>
<tr>
<td>---------------------------</td>
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</tr>
<tr>
<td>Wilken, 2015 USA</td>
<td>Observational</td>
<td>598</td>
<td>AA =49% Hispanic =51%</td>
<td>NA</td>
<td>H1: Strength of storytelling network connection will be positively associated with regular exercise and healthy eating.</td>
<td>H1: Storytelling partially supported with exercise. Not fruit and vegetable consumption. (p = .01)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Female: 51% Average age: 40 years old Most common co-morbid conditions: ND</td>
<td></td>
<td>H2: higher interaction with family will be positively related to exercise and healthy eating.</td>
<td>H2 supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>H3: the relationship between STN and levels of exercise and healthy eating will be greater for woman than men ethnicity?</td>
<td>Exercise in Hispanic &amp; AA males influenced only by family (p = .00) (p = .01)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>H3b: Family interaction and levels of exercise and healthy eating will vary by gender.</td>
<td>Women influenced by family (p = .00) and STN (p = .00).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Question1: Do association between STN connection and exercise and healthy eating vary by race/ ethnicity</td>
<td>H3 b: Not supported No relationship between healthy eating and gender (p=.12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Question 1b: Do associations between family interaction and</td>
<td>Family Interaction was significant for exercise but not for healthy eating in Hispanics when entered together, but was significant for both in AA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Level of exercise and healthy eating vary between race/ ethnicity?</td>
<td>No significant race/ethnicity differences with Family interaction (p = .08).</td>
</tr>
</tbody>
</table>
CHAPTER 3: METHOD OF INQUIRY

This DNP project used a qualitative descriptive approach to examine stories obtained from stroke survivors who participated in a Tai Chi exercise intervention. It focused on perceptions of health maintenance and physical and mental recovery in stroke survivors who participated in a Tai Chi exercise intervention. While there is no current research that specifically looks at the perceptions of stroke survivors and their recovery, the research reviewed in chapter two does provide important clues and possible benefits of Tai Chi for people facing challenging health issues that may be transferable to stroke survivors and their recovery.

According to Sandelowski (2000), qualitative descriptive research offers a complete overview of a phenomenon in a familiar language that most people observing or reading would agree upon the meaning or implications unfolding during that event. Researching something new requires starting at a very basic level in order to fully understand the phenomenon of interest. To date, there are no studies examining stroke survivors “stories” and about how Tai Chi exercise made them feel or how participating in Tai Chi impacted their lives. A fundamental understanding of the impact of Tai Chi on stroke survivors is critical to understand the emotions that are common to stroke survivors and if participating in Tai Chi had a positive or negative effect on their lives. Therefore, this DNP project will utilize a qualitative descriptive research approach to examine stories obtained from stroke survivors who participated in a Tai Chi intervention conducted by Dr. Ruth Taylor-Piliae (Taylor-Piliae, 2014).

The following aims and research questions identified for this DNP project are:

Aim 1. To identify and examine the stroke survivors’ feelings about participating in a Tai Chi exercise intervention.
Specific Research Questions:

1. Did participating in the Tai Chi exercise intervention influence the stroke survivors’ feeling of confidence?
2. Did stroke survivors enjoy participating in the Tai Chi exercise intervention?
3. Did participating in the Tai Chi exercise intervention foster the feeling of hope among stroke survivors?
4. Did stroke survivors feel that participating in the Tai Chi exercise intervention was helpful?

Aim 2. To identify and examine stroke survivors’ perceptions about how participating in a Tai Chi exercise intervention influenced their post-stroke recovery.

Specific Research Questions:

1. What impact did the Tai Chi exercise intervention have on stroke survivors’ views of their post stroke recovery?
2. What were the stroke survivors’ views of their perceived physical abilities following the Tai Chi exercise intervention?
3. What were the stroke survivors’ views of their perceived mental/cognitive abilities following the Tai Chi exercise intervention?
4. What challenges did the stroke survivors perceive they had during the Tai Chi exercise intervention?
Research Design

This DNP project looked at stroke survivors’ words and perceptions about the impact participating in a Tai Chi exercise intervention had on their lives. For these reasons, the aims investigated in this DNP project required the use of qualitative research approach and more precisely, the use of descriptive qualitative research.

Qualitative Description Design

According to Sandelowski (2000), qualitative descriptive studies are a complete overview of a phenomenon in an easily understandable description of those events. The descriptive researcher interprets data, words, and events literally in order to provide straightforward interpretation and agreement by other researchers or readers of that data. The truth and the meaning of those truths communicated in a logical and practical way is the ultimate goal of the descriptive researcher (Sandelowski, 2000). Allowing the data to remain pure while describing the meaning accurately in order to give voice to participants’ experiences is a critical component of good qualitative descriptive research.

One of many misconceptions about qualitative descriptive research is that it requires little or no analysis of the data (Sandelowski, 2010). A qualitative descriptive analysis still obligates the researcher to fully investigate the meanings and intentions of the participants. It also requires a coherent and somewhat unbiased description of the events and words that stays true to the participants, while not over interpreting the data. Qualitative descriptive research provides knowledge about the human experience and the template to easily explain an event.
Parent Study Methods

Parent Study Sample

This DNP project employed a descriptive qualitative approach, using data collected between January 2009 and December 2012 from the “Tai Chi for Stroke Survivors Study” (AHA SDG 0930324N and RWJFNFS66527; Taylor-Piliae, PI). The original randomized clinical trial investigated whether 12 weeks of either Tai Chi or SilverSneakers® among community-dwelling stroke survivors, aged 50 and older, was effective in improving physical function, fall rates, or quality of life, compared to usual care. The participants in the original study were screened for safety and eligibility prior to study enrollment, using standardized tests to assess functional disability, overall physical function, and cognitive impairment. Stroke survivors meeting the inclusion criteria that agreed to participate in the study, signed an informed consent. The University of Arizona Institutional Review Board (IRB) reviewed and approved the original study. In the original study, there were a total of 145 stroke survivors (47% women, mean age=70 years, mean time post-stroke=3 years, ischemic stroke=66%, hemiparesis=73%).

Parent Study Data Collection Procedure

Following baseline study assessments, participants were randomly assigned to one of three groups: Tai Chi, SilverSneakers® or Usual Care. This research study was conducted at rehabilitation facilities or community centers that focus on seniors. At the end of the study, all of the participants, their spouses, and study staff were invited to a presentation of the study results. Since the researchers were interested in creating a story bank, they invited all participants at this meeting to share their stories in order to encourage other stroke survivors to participate in exercise programs or future studies. The data used in this DNP project came from a “Tell Us
Your Story” form (Appendix A), which was given to each participant. The instructions on the form were as follows:

“We are developing a Story Bank about how participating in The Tai Chi Exercise for Stroke Survivors Study has changed your life. We would like to use your story to encourage other stroke survivors to participate in future exercise studies or to begin a regular exercise program.”

Each study participant was allowed to write anything they wanted. Participants had the option of writing their own story or having someone write their story for them. Among the 53 participants assigned to the Tai Chi group, a total of 17 stroke survivors provided their stories. This DNP project utilized those 17 stories to identify and examine themes in stroke survivors’ stories, to determine how stroke survivors perceived their life changed, and how their post-stroke recovery was impacted due to participating in the Tai Chi intervention.

**Data Management**

Data was obtained from Dr. Taylor-Piliae, with all identifying information removed prior to data analysis, in order to maintain IRB standards and confidentiality. The 17 stories were given a unique ID and imported into Atlas.ti for Mac® for initial coding. The researcher evaluated the initial data in order to obtain themes or recurring words (i.e., empowered, hopeful, frustrated) for data analysis.

**Data Analysis**

Qualitative content analysis was used to analyze the stories provided by stroke survivors who participated in Tai Chi. Content analysis involves three main steps: preparation, organization and communicating results that provide a structured and empirical means of expressing an experience or event (Elo et al., 2014). According to Polit and Beck (2008), content analysis classifies and blends qualitative information to reveal themes. It involves dividing
information into data sets that share similar ideas and coding those units in order to identify emerging themes.

There are two types of content analysis, the first is inductive and is used when there is no prior research or research that has not been well developed. The second type of content analysis is deductive, and is utilized to test a current theory (Elo et al., 2014). This DNP project used an inductive content analysis approach due to the lack of prior research in the area of Tai Chi, story theory, and stroke survivors. Once the data was imported into Atlas.ti for Mac®, the researcher reviewed and categorized the data from all 17 stories.

Coding is the process of identifying patterns or themes among the data. Theoretical codes provide concrete links that help explain a phenomenon or experience (Polit & Beck, 2008). Data saturation is the process of collecting qualitative data until no new information is gleaned from the data or participants (Polit & Beck 2008). Data saturation was not applicable in this study as this was an analysis of previously collected data, and this researcher was unable to go back to participants to gather additional information on their feelings or perceptions.

The specific steps taken in order to analyze the data for this DNP project to answer the research questions and aims are shown below:

1. Theoretical coding into two main codes, each have three or four sub-codes:

   (1) Aim 1: Feelings
   
   (a) Confidence
   
   (b) Enjoy
   
   (c) Hope
   
   (d) Helpful
(e) Other

(2) Perceptions of impact:

(a) Physical abilities

(b) Mental/cognitive abilities

(c) Challenges

(d) Other

2) Line-by-line open coding of the above to look for the terms participants use.

3) Code for relationships and patterns among and between the codes.

4) Descriptive summary: Requires an overall narrative of the results in a succinct and logical format that is both informative and understandable to the reader or researcher.

**Data Quality and Trustworthiness**

In 1985, Lincoln and Guba (1985) coined the term “trustworthiness” and provided criteria to establish credibility and a framework for evaluating qualitative research. It is similar to the term “rigor” used by quantitative researchers to maintain credibility and a framework when conducting and evaluating quantitative research. Trustworthiness is the accepted standard to evaluate qualitative research. According to Lincoln and Guba’s evaluative criteria, (1985) demonstrating trustworthiness in qualitative research requires establishing the following:

1. Credibility = are the data or persons involved in the research accurately depicted and with as little bias as possible? Has the researcher utilized peer debriefing and triangulation to discover natural bias and defend their hypothesis?
2. Transferability = “Thick description”: Has the researcher presented enough information in order for other researchers or readers to be able to transfer that information and come to the same conclusion in other settings, people or situations?

3. Confirmability = has the researcher used an audit trail, and reflexivity in order to systematically and with as little bias as possible build knowledge?

4. Dependability = has the researcher used external auditing from outside researchers to validate their results? (Robert Wood Johnson Foundation [RWJF], 2008).

During the evaluation of the data, the researcher for this DNP project established and maintained credibility by utilizing the analyst triangulation procedure. Analyst triangulation is the process of more than the person or researchers reviewing the same data in order to observe the data from many perspectives and establish consensus if the data is depicted accurately (RWJF, 2008). During the analysis of the data, the researcher worked with her chairperson to examine the quotes line by line. Together they came to a consensus on what the definitions for the sub-codes were and which quotes best represented the definitions for this project. Transferability and confirmability were maintained by using a journal and audit trail to write down the step-by-step process that was followed during data analysis.

This researcher made every attempt possible to provide enough information so other researchers can easily apply the same technique to duplicate the research and validate the results in other settings and with other people, which is important to establish transferability (Polit and Beck, 2008). The chairperson provided “external auditing”, which is having outside, objective researchers review the data and provide feedback in order to confirm the hypothesis of the
researcher and establish dependability (Elo et al., 2014), which is the fourth criterion necessary
to establish trustworthiness of the data.

**Ethical Considerations**

The University of Arizona IRB committee approved the original study (Taylor-Piliae et al., 2014). All data obtained for this project were de-identified. The researcher for this study received a confirmation letter from the Office of Research and Discovery that human subject review was not required for this DNP project (Appendix B).

**Conclusion**

This chapter described the methods for data collection and analysis used to examine the research questions for this study. This qualitative descriptive study is a first step in exploring: 1) What feelings arose in stroke survivors who participated in a Tai Chi exercise program? and 2) What were the perceptions or impact of stroke survivors who participated in a Tai Chi exercise intervention on their recovery, (i.e., QOL, mental and physical health)? Chapter 4 will present the results and interpretation of the qualitative content analysis around the stories participants provided after completion of the “Tai Chi Exercise for Stroke Survivors Study” (Taylor-Piliae et al., 2014).
CHAPTER 4: ANALYSIS

This chapter presents the results and analysis of the feelings and perceptions stroke survivors had after participating in a Tai Chi study. Qualitative content analysis was the method chosen to interpret their “stories.” As a reminder, the participants were given a “Tell Us Your Story” form, which asked the following of each participant:

“We are developing a Story Bank about how participating in The Tai Chi Exercise for Stroke Survivors Study has changed your life. We would like to use your story to encourage other stroke survivors to participate in future exercise studies or to begin a regular exercise program.”

Participants

A total of 17 stories were available from the stroke survivors who participated in the parent study conducted by Dr. Taylor-Piliae: “Tai Chi Exercise for Stroke Survivors Study” (AHA SDG 0930324N and RWJFNFS66527; Taylor-Piliae, PI). Study participants agreed to share their experience and perceptions about their involvement in the Tai Chi study and how their participation may have impacted their recovery. At the beginning of the parent study, all participants signed an approved University of Arizona institutional review board (IRB) informed consent. Eleven of the 17 (65%) community-dwelling stroke survivors were male and had suffered a stroke at least three months prior to admission into the study. The age of the participants providing stories ranged from 54 to 87 with an average age of 71. The average length of each story being 132 words; the shortest story was 17 words, and the longest was 364 words in length (Table 4).

The participants’ stories were exported into Atlas.ti for Mac® and each given a number from 1-17. Some participants (n = 6) requested that their stories be written for them either due to convenience or due to physical limitations; because of this, some of the quotes in this paper are
in third person. Table 4 reports the demographics of participants and whether the story was written by the participants themselves or was written by a research assistant. Throughout this chapter, the participants will be identified by the number they were given when exporting the documents into Atlas.ti for Mac®. (i.e., P1, P2).

**TABLE 4. Participants Demographics**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Age</th>
<th>Storyteller</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>M</td>
<td>82</td>
<td>Self</td>
</tr>
<tr>
<td>P2</td>
<td>F</td>
<td>72</td>
<td>Self</td>
</tr>
<tr>
<td>P3</td>
<td>M</td>
<td>66</td>
<td>Self</td>
</tr>
<tr>
<td>P4</td>
<td>F</td>
<td>80</td>
<td>Self</td>
</tr>
<tr>
<td>P5</td>
<td>M</td>
<td>79</td>
<td>Self</td>
</tr>
<tr>
<td>P6</td>
<td>F</td>
<td>74</td>
<td>Self</td>
</tr>
<tr>
<td>P7</td>
<td>M</td>
<td>70</td>
<td>Self</td>
</tr>
<tr>
<td>P8</td>
<td>M</td>
<td>67</td>
<td>Self</td>
</tr>
<tr>
<td>P9</td>
<td>M</td>
<td>54</td>
<td>Transcribed</td>
</tr>
<tr>
<td>P10</td>
<td>M</td>
<td>87</td>
<td>Transcribed</td>
</tr>
<tr>
<td>P11</td>
<td>M</td>
<td>55</td>
<td>Self</td>
</tr>
<tr>
<td>P12</td>
<td>F</td>
<td>61</td>
<td>Transcribed</td>
</tr>
<tr>
<td>P13</td>
<td>M</td>
<td>64</td>
<td>Self</td>
</tr>
<tr>
<td>P14</td>
<td>M</td>
<td>82</td>
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<td>P15</td>
<td>F</td>
<td>74</td>
<td>Self</td>
</tr>
<tr>
<td>P16</td>
<td>M</td>
<td>57</td>
<td>Transcribed</td>
</tr>
<tr>
<td>P17</td>
<td>F</td>
<td>75</td>
<td>Transcribed</td>
</tr>
</tbody>
</table>

**Theoretical Coding Process and Defining Sub-Codes**

Each document was read all the way through, without any coding, to get a general sense of the overall content. The codes were created *a priori* and split into two different groups based on the aims of this study.

**Aim 1.** Identify and examine the stroke survivors’ feelings about participating in a Tai Chi exercise intervention.
Aim 2. Identify and examine stroke survivors’ perceptions about how participating in a Tai Chi exercise intervention influenced their post-stroke recovery.

Sub-codes for the two aims were then put into Atlas.ti for Mac® and separated into two categories. The two categories were based on the two aims of feelings and perceptions of impact that the stroke survivors had while participating in the Tai Chi intervention.

Aim 1: Feelings:
   a) Confidence
   b) Enjoy
   c) Hopeful
   d) Helpful
   e) Other

Aim 2: Perceptions of Impact:
   a) Physical abilities
   b) Mental/cognitive abilities
   c) Challenges
   d) Other

The codes listed above were defined *a priori* based on theory in chapter one and the literature review in chapter two, to ensure credibility and transferability. The theoretical codes were defined based on the results of the literature review. For Aim 1, no definition was required for the sub-codes because the researcher was looking only for the actual words: confidence, enjoy, hopeful and helpful, that participants reported due to Tai Chi and their involvement in the study. The researcher first read each story in its entirety twice before placing the documents into
Atlas.ti for Mac®. Once the initial coding was completed, the researcher went through and did open coding of the data to discover other sub-codes that appeared frequently in the documents.

Defining the sub-codes for Aims 2 was more complicated because the perceptions of impact that the participants had regarding their physical/mental abilities and the challenges that they faced during their participation in the Tai Chi intervention were more subjective. Ensuring that some words were not interpreted to mean the same thing or be placed in the same sub-code if they were able to stand-alone. For instance, balance and falls are interrelated but require their own separate discussion. The data was read, reread, and recoded at least five times throughout the coding process due to increased understanding of the data, recognizing the researcher’s biases and at times assumptions, or reading more into the statements from the participants than was appropriate for this type of study. The researcher met with the chairperson almost every week. Once the quotes were created, the chairperson and researcher went through the data and quotes line-by-line, to ensure coding was done properly and that no words or themes were missed. Initially, the researcher reported 108 quotes; through continual review and discussion with the chairperson, a final count of 72 quotes that fit the criteria for the sub-codes remained. The following codes for Aim 1 and Aim 2 are below and the results from the data will be discussed in detail below.

Feelings:

Confidence: confidence

Enjoy: enjoy

Hopeful: hope

Helpful: helpful, beneficial
Other:

Perceptions of impact:

Physical Abilities: balance, walking, strength, endurance, falls, coordination, flexibility

Mental/ Cognitive abilities: emotional well-being, attitude, and cognitive ability

Challenges: Challenges, barriers, environmental problems

Other: Friendship

Other: Moving forward, not giving up, and planning their future

Results

Aim 1

This section presents the results of Aim 1, which identified and examined the stroke survivor’s feelings about participating in a Tai Chi exercise intervention. The words in the stories searched for included: confidence, enjoy, hopeful and helpful. A review of the results pertaining to each of the words or feelings will be discussed separately and then an overview of the overall results of this content analysis for Aim 1 will be presented. The number of times a feeling was reported, along with the number of participants reporting this feeling is presented in parenthesis.

Feeling: confidence (n = 4 times used; n = 2 participants). The word confidence only appeared four times with only two participants using the word confidence in their story. While it only appeared in two participants’ “stories”, these participants reported gaining confidence in their body and their abilities to do things they used to take for granted. P12 used the word confidence in her story three times. The first quote talks about her regained sense of confidence with her body and her abilities to perform normal activities.

“She realized she had started to have more confidence in her body again and more confidence in what she could do.”
The second quote reinforces her confidence using numbers, which was an important part of this participant’s life and gave her the ability to measure her success and validate her newfound confidence.

“It gave her confidence to do things on her own again: As someone who once lived to meet specific sales goals, it made a difference to her to be able to quantify her improvement on the physical measures of the study. But, as she says, “It all started with Tai Chi.”

The second participant who discussed confidence in his story was P13; he used the word when describing his body’s abilities and the resulting return to normal social activities like dating and connecting with old friends.

“He has proven to himself that he can do more than what he or his doctors thought he could, especially regaining confidence to ask women out socially again and starting a vegetable garden—but has accepted that it “just takes longer” to get things done.”

**Feeling: enjoy (n = 7 times used; n = 7 participants).** The word enjoy was used a total of seven times, with seven participants using the word in their story. The main themes that appeared with the word ‘enjoyed’ were the connections the participants had with the group, the activity, and the instructor. P1, reported:

“Enjoyed every bit of the Tai Chi. Great companions and enjoyed physical education.”

P17 commented that he enjoyed Tai Chi because it reinforced the importance of feeling comfortable with himself, the instructor, and social settings

“Being more comfortable in his own skin, being with other people in class, and enjoyed instructor and staff. So more comfortable in social settings and he enjoyed every minute of it.”

P17 also remarked that the skills of the instructor played a big role in her enjoying Tai Chi.

“Really enjoyed learning Tai Chi from the teacher in the study. Thought he was a good instructor.”
These remarks from the participants’ show how important and beneficial Tai Chi was in helping them get out and connect with other stroke survivors, and how Tai Chi and a skilled instructor can assist stroke survivors to participate in exercise and begin to interact again with their peers and within their communities.

**Feeling: hope (n = 1 time used; n = 1 participant).** It was a surprise to the researcher that the word hope/hopeful was only used one time among the 17 stories. P12 who used the word ‘hopeful’ reported:

“The most striking affective change was that after the stroke, the world had seemed to be in ‘sepia tones’ or like ‘a rainy day in Gary, Indiana—all in shades of gray.’ Being in Tai Chi made the world colorful again, infused with a sense of hopefulness.”

**Feeling: helpful (n = 15 times used; n = 11 participants).** The word ‘helpful’ was the most common descriptor found in the stories of stroke survivors. The word beneficial was also used in the category titled helpful while searching the documents for feelings that Tai Chi was helpful to the participants; beneficial was found twice in the stories from stroke survivors.

Helpful was used a total of 15 times by 11 participants who reported that Tai Chi helped them physically, mentally or both. Participants reported that Tai Chi helped them both physically and mentally. Balance or fall prevention was one of the biggest reasons participants cited that Tai Chi had helped them. P17, stated Tai Chi:

“Helped most with falls prevention. Since being in Tai Chi she has really improved and doesn't fall nearly as much as she did. It really has helped. The routine of it gives you a better balance. Really does improve balance and really does prevent falls.”

Many of the participants felt that Tai Chi was helpful both mentally and physically. It helped them come to terms with their disability and move forward. P11, reported

“It helped me realize I'm different now and have learned to live with it. Helped me physically and mentally. What I do every day is different and I live with it.”
Tai Chi exercise increases mental and physical well-being and decreases stress, depression, and anxiety (Wang et al., 2010). P6 verbalized what researchers and many studies have shown, that Tai Chi helped her manage her fears surrounding having another stroke and that mental health is important for recovery.

“My participation helped me to not be afraid, most important for survivors.”

P14 stated that getting out and meeting other people really helped him during the intervention.

“Really did help him - enjoyed getting out and meeting other people.”

Aim 1 Summary and Discussion

The analysis of stories of stroke survivors’ feelings about participating in the Tai Chi study felt that Tai Chi helped with their physical and mental health. Examining the feelings that participants had after participating in a Tai Chi intervention identified enjoy and helpful as the most common feelings:

1. Participants enjoyed Tai Chi and enjoyed the interaction with other stroke survivors and the instructor (n = 8).
2. Stroke survivors felt that Tai Chi helped with balance and falls (n = 11).
3. Stroke survivors felt that Tai Chi helped them mentally with decreasing fear and coming to terms with their new reality (n = 4).

The participants of the study did not use the words ‘confidence’ and ‘hope’ very often when describing their feelings regarding their participation in the Tai Chi study. This was a little surprising because most did feel that their balance, physical, and mental abilities improved during the intervention; and with that improvement it would be expected that their confidence and feelings of hope would increase as their physical and mental abilities improved. There could
be a number of reasons why these stroke survivors did not use the words confidence or hope when describing their feelings surrounding the intervention; for years, these participants had been coping with the emotions that are common after having and recovering from stroke. Another reason for not seeing the words confidence or hopeful could be because the participants expressed those emotions using other words, terms, or actions.

Overall, participants of this intervention had very positive feelings’ regarding Tai Chi. Only one participant was unable to recall any benefits. P10 stated that he enjoyed Tai Chi even though he was unable to specify any physical or mental benefits.

Feelings play a key role in our lives. Recognizing and encouraging specific feelings can help healthcare providers design interventions and tools that help in stroke recovery. The impact of participants’ perceptions also plays a big role in recovery. During the data analysis, no other feelings were discovered.

Aim 2

This section discusses the results of Aim 2; which examined stroke survivors’ perceptions about how participating in a Tai Chi exercise intervention influenced their post-stroke recovery. This section will discuss each sub-code separately and then provide a summary of the overall results for Aim 2. The number of times a perception was reported, along with the number of participants reporting this is presented in parenthesis.

Physical Abilities

Words used to define physical abilities included balance, walking, falls, coordination, flexibility. The sub-codes were chosen a priori based on the literature review in chapter two. As suspected, improved physical abilities were the most discussed topic of the participants. Sixteen
of the participants reported perceived improvement in their physical abilities. There were 20 quotations identified that pertained to perception of their post-stroke recovery and their physical abilities. In the study, improved balance and walking skills were the most reported physical benefits obtained during the intervention. They also reported fewer falls, increased coordination, and improved flexibility during the intervention, but these were less common.

**Balance (n = 10 times used; n = 8 participants).** All three of the participants, listed below, reported improved balance, greater ability to turn quickly, and still maintain their balance after participating in the Tai Chi intervention. P3 reported that stiffness on the affected side was improved along with balance.

“Stiffness on left side and terrible balance after the stroke were definitely improved during the Tai Chi classes.”

P5 reported:

“Tai Chi helped me balance when turning quickly.”

P12 also reported increased balance:

“When she went to Tai Chi, at first she felt clumsy. But after only 2-3 weeks, she noticed she was keeping her balance more easily.”

**Walking (n = 7 times used; n = 4 participants).** The inability to ambulate, dress themselves, and perform normal ADL’s lead to loss of independence, isolation, and increased morbidity and mortality. These participants reported increased ability to walk long distances, increased range of motion of their affected limbs, and increased coordination.

P11 stated:

“It's easier for me to walk, and I walk for half an hour at the mall or in a park. Tai Chi gave me more comfort in walking.”
P1 also remarked on his increased ability to walk after the intervention. Doing Tai Chi helped his walking and balance considerably.

**Falls (n = 3 times used; n = 3 participants).** P17 reported:

“Helped most with falls prevention. Since being in Tai Chi she has really improved and doesn't fall nearly as much as she did. It really has helped. The routine of it gives you a better balance. Really does improve balance and really does prevent falls.”

P14 also reported that he noticed a decrease in falls after participating in the study:

“Tai Chi helped him prevent falls.”

**Coordination (n = 2 times used; n = 1 participant).** The word coordination was used twice by P3 who perceived that Tai Chi was beneficial in his recovery:

“Tai Chi also improved coordination - stepping through a limited space and not stumbling. Upper body coordination increased as well.”

**Flexibility (n = 1 time used; n = 1 participant).** The least reported benefit or word participants used was flexibility. P13 reported:

“Everything he has gotten from Tai Chi has been a “plus: increased flexibility in his hips and shoulders.”

The other words strength and endurance, used to define physical ability, did not show up in any of the stories of these Tai Chi participants.

**Mental/Cognitive Abilities**

**Emotional Well-Being, Attitude, and Cognitive Ability (n = 12 times used; n = 8 participants).**

The words used to define mental and cognitive ability for these participants were: emotional well-being, attitude, and cognitive ability. The literature review in chapter two was used to define and discover perceptions the stroke survivors had regarding their mental and cognitive ability after participating in the Tai Chi intervention. The participants, who remarked
on how Tai Chi benefited them mentally, reported improved attitudes and the ability to remember things more clearly. There were eight participants who made some reference to Tai Chi helping with mental or cognitive abilities.

P3 remarked:

“The Tai Chi helped balance, my mind-set, and my spirits. Had some difficulty remembering the sequence - was a positive challenge to be motivated in working on remembering.”

P9 also alluded to improved concentration and focus and reported that it had helped with relaxation. The meditative component of Tai Chi was very helpful for this participant:

“What Tai Chi did for him was concentration, relaxation and the meditation part of it was most helpful for him. Focusing, breathing and concentration were the most beneficial for him.”

P12 reported improved clarity due to the Tai Chi intervention:

“She noticed improved ‘cognitive reasoning and said she was able to ‘think more clearly.”

P13 also noted improved mental focus:

“Improved mental focus, not so liable to ‘zone out’ anymore, improved memory to follow the Tai Chi movements.”

Challenges

**Challenges, Barriers and Environmental (n = 1 time used; n = 1 participant).**

The definition for challenges for this study includes the words: challenges, barriers, and problems that could be environmental, such as transportation or scheduling conflicts. Only one participant discussed challenges related to their participation in the Tai Chi intervention. The participant discussed transportation issues or other obligations as barriers. P3 reported that both environmental and physical challenges impacted his participation in Tai Chi and the ability to continue Tai Chi on his own:
“If I missed class due to appointment or lack of transportation, it was unavoidable. When I got home, it was hard to practice on own (needs to lose weight to address problems with hips and knees).”

Other

When analyzing the data, two themes emerged that were not a part of the original subcodes for this project. The first theme was the perceived impact on Tai Chi helping members to move forward after their stroke. The second theme was friendships and the value of friendships formed between group members during the Tai Chi intervention.

Moving Forward and Planning for the Future (n = 8 times used; n = 7 participants).

Moving forward, not giving up, and planning their future were the words used to describe, “moving forward” for the purposes of this study. Seven people who participated in the Tai Chi intervention discussed how they felt Tai Chi helped them begin living again and moving forward in their recovery and life. P3 reported volunteering in the community. Tai Chi was directly responsible for his volunteering and getting back out into the world and moving forward:

“Will be volunteering with the senior services - part of getting out in the world and not giving up - which he attributed to involvement in the Tai Chi Study.”

P11 reported coming to terms with his new reality and being able to move beyond his disability and look to the future with excitement:

“I may move back to LA to be with girlfriend. I'm excited about what may come with my health. What I wanted to do with my life -- tell stories --I can still do that and continue to grow.”

P13 discussed his interest in traveling and reconnecting with an old buddy and stated that Tai Chi made it possible for him to move forward:

“He is planning to drive to Oregon this summer to see an old Vietnam buddy, driving via Utah to ‘dig fossils,’ and making a big circle through the Grand Tetons and Yellowstone, to OR again. He thinks Tai Chi has made this possible for him too.”
Another theme that emerged for the stroke survivors was friendship; it played a big role in many of the participants’ perceptions and involvement in this study. The participants reported they enjoyed the connections they made while participating in the “Tai Chi for Stroke Survivor Study”. Some just reported “neat people” and meeting new friends. However, P9 remarked that connecting with another participant allowed him to see himself in that participant and reach out and help the other survivor in his recovery. He reported:

“He was also able to see himself in another participant's process of recovery and was glad he could pay it forward and help his recovery and become friends.”

While P8 was just glad to make new friends:

“Gained a lot of friends.”

**Aim 2 Summary and Discussion**

Some of the perceptions that the stroke survivors discussed, for instance, the impact on their physical and mental abilities after participating in the Tai Chi intervention, were not surprising. In the past, Tai Chi research has been shown to be beneficial for increased mental and physical abilities; this project supports the perceptions of stroke survivors in this study, and that Tai Chi had a positive impact on their physical and mental abilities. These stories suggest that stroke survivors, in many cases, perceived Tai Chi positively impacted their ability to move forward and plan for their future. Moving forward is important for anyone recovering from a major health crisis. Recognizing and understanding your new normal and still looking forward to the future is an important component of a full recovery. The quotations from participants beautifully illustrate their recognition of their limitations, how to work through them, and plan for their future. Other participants reported that they were helping friends, gardening, and
volunteering after participating in Tai Chi. Another theme was the importance of establishing connections and participating in group programs that help stroke survivors stay in their community.

It was surprising to the researcher that there was not more discussion in the stories about the challenges the participants faced during the intervention. Challenges, either physical or environmental, are a well-known problem for stroke survivors. The challenges of getting to the classes, staying involved, and having the ability to perform the Tai Chi movements with their disabilities was rarely discussed. This could mean that either the participants had grown to expect these challenges, or that Tai Chi was easy to perform even with their current disabilities. This is something that would be important to investigate in future studies.

**Summary**

Key results from analyzing the stories of the community-dwelling stroke survivors supported what other studies have found about Tai Chi and stroke survivors. (Au-Yeung, 2009; Kim, 2014; Taylor-Piliae, 2014, 2012; Wang, 2010). Tai Chi helps stroke survivors with both physical and cognitive abilities. Tai Chi was enjoyable and helpful to the stroke survivors. More qualitative research involving one-on-one interviews to delve deeper into the feelings and perceptions of community-dwelling stroke survivors is needed to confirm these results. More studies are needed to answer the questions concerning the challenges the participants faced and why feelings like confidence and hopefulness did not turn out to be a large part of these participants’ stories. Chapter 5 will discuss in more detail the implications of this study and how to proceed in the future in order to provide quality, low cost interventions to community-dwelling stroke survivors.
CHAPTER 5: DISCUSSION

This chapter will: a) present a justification of the methodology; b) discuss the results; c) discuss the strengths of the study; d) discuss the limitations of the study; e) explore the relevance of the study for nursing practice and research; and f) discuss the implications and directions for future research.

Justification of the Methodology

When this DNP project was in its infancy, the original intent of the researcher was to videotape stroke survivors telling their story about how Tai Chi impacted their recovery. In addition, showing those videos to recent stroke survivors to see if viewing another survivor’s experiences or struggles helped them in their recovery. While searching the literature and talking with my advisors, it became clear that a formative study was a necessary first step in the research process. Currently, there is no available research on the feelings and perceptions that Tai Chi has on community-dwelling stroke survivors. It also became clear that it was necessary to first explore how stroke survivors perceived how having a stroke had affected their lives and the feelings that were common among stroke survivors, and if Tai Chi had any positive or negative impact on their recovery. Qualitative content analysis is ideal for getting a basic and complete understanding of a phenomenon. Qualitative content analysis research helps provide a fundamental understanding of the impact of Tai Chi on stroke survivors, which is a critical first step to see if Tai Chi is a viable intervention to aid in stroke recovery.

Comparison with the Literature

In this section, results from the study will first be compared with the results of the literature review discussed in chapter two regarding quality of life, as well as physical and
mental function. Secondly, the aims for this project will be discussed in detail, along with the key elements identified by stroke survivors during their recovery, while participating in the Tai Chi study. Finally, the results will then be discussed in relation to the theoretical perspective of the Story Theory (Smith & Liehr, 1999, 2007, 2008) and the researcher’s Story-Recovery Model (Zeimantz, 2016).

**Improved Quality of Life: Physical Function**

The perceptions of increased balance and decreased falls were the most prominent findings of this study and support the importance of Tai Chi as a tool in stroke recovery and improved QOL. While many quantitative studies discussed in chapter two (Au-Yeung, 2009; Kim, 2014; Taylor-Piliae, 2014, 2012; Wang, 2010) have shown the physical benefits of Tai Chi for stroke survivors, this is the first qualitative study that found that stroke survivors perceived an improvement in their balance, physical function, and decreased falls. Many of the participants in this study told stories of how they were able to perform ADLs easier and begin their life again because they perceived that their physical abilities improved after participating in Tai Chi. Perceptions in many cases are more important in the recovery process than the actual physical improvements obtained through an intervention. If a person does not perceive any benefits, or does not enjoy something, they are less likely to participate in that intervention long-term.

**Improved Quality of Life: Mental Function**

Another major perceived benefit for the participants was improved focus, cognitive reasoning, and improved attitude. This again supports other quantitative studies discussed in chapter two that report Tai Chi improved participants mental abilities and attitudes. This study further suggests that Tai Chi may be a great alternative intervention for people recovering from a
stroke to improve their mental health, either alone or in conjunction with other therapies. This study aligns with results of the literature review that Tai Chi improves mental focus and attitude.

**Discussion of the Aims Results**

This section will discuss the results of aims one and two; and the feelings and perceptions stroke survivors had regarding participation in a Tai Chi intervention. It is important to understand certain feelings and perceptions stroke survivors may have regarding Tai Chi, to establish whether it is a viable tool and would be a beneficial intervention. Recognizing perceptions regarding exercise in stroke survivors may help improve adherence to exercise (Simpaon, Eng, & Tawasky, 2012).

**Aim 1 Finding**

**Did participating in the Tai Chi exercise intervention influence the stroke survivors’ feeling of confidence?**

Tai Chi improved confidence in at least two participants who discussed the important positive impact Tai Chi had in their recovery. However, this was not a big theme for any of the other stroke survivors. In the future, more focused studies on Tai Chi need to be completed to either validate or dispel this finding. According to the Flint Recovery Center (2016), confidence can make the difference between an incomplete recovery and a total recovery, as confident people are more tenacious and committed to following their rehabilitation plans. The stroke association also reports that picturing yourself as confidently progressing in your stroke recovery process helps improve your recovery (Harell, 2013).

**Did stroke survivors enjoy participating in the Tai Chi exercise intervention?**
Stroke survivors enjoyed participating in the intervention and also enjoyed the connection they made with the other survivors and the instructor. It was clear through reading their stories that the interaction they gained while participating in the intervention was as important to many stroke survivors, as the physical benefits they gained from Tai Chi. The ability to connect with one another and help each other was clear from their stories and proved to be a factor in how much these participants enjoyed Tai Chi. According to the Stroke Association, UK (2013), enjoying an exercise is critical in maintaining adherence to exercise. If these results are confirmed in other studies, Tai Chi may be an easier exercise intervention to get stroke survivors to do on a regular basis.

**Did participating in the Tai Chi exercise intervention foster the feeling of hope among stroke survivors?**

Tai Chi did not foster feelings of hope when looking at these stories from a content analysis perspective, by staying close to the words these stroke survivors used. Hope was the least common feeling participants reported in their stories. Hopefulness is a powerful emotion that can be very important when attempting to recover from any major health crisis. The ability to heal requires a sense of hopefulness, and whether there is a complete healing or a partial recovery, hope is important (Garritano, 2015). However, in this study, Tai Chi did not appear to elicit feeling of hopefulness for most of the participants. The time between the end of the study and when the participants shared their story may have played a role in why more participants did not report a feeling of hopefulness. The time from the stroke to enrollment into the study could have also played a role in not seeing more participants report a feeling of hopefulness. Many of
the participants had their stroke a couple of years prior to the study and may have already
adjusted to their current level of physical ability.

While completing a literature review on Tai Chi and fostering hope, no studies were
found. Many studies talk about the calming effects and the psychosocial benefits of Tai Chi;
however, no studies have specifically researched the feeling of hope or hopeful in stroke
survivors and Tai Chi. There are some studies that have looked at the importance of hope when
recovering from a stroke. According to Soundy, Liles, Stubbs, and Roskell (2014), hope is
important in recovery and physical therapists and others working with stroke survivors should
foster hope so that survivors can better cope with their disease and move forward. Asking
participants specifically about their perceptions of hope will be important in future research to
see if Tai Chi does foster hope in stroke survivors.

**Did stroke survivors feel that participating in the Tai Chi exercise intervention was
helpful?**

In their stories, participants used the word helpful more than any other word. The stroke
survivors felt that Tai Chi was helpful in almost every area of their life and in their recovery.
They felt it helped them physically, mentally, and socially. Tai Chi helped them move forward
and come to terms with their new “normal.” It helped them to connect with the outside world and
people processing the same health struggles together.

Desrocher, Kairy, Pan, and Correveau (2016), found that most people report Tai Chi to be
helpful and beneficial in their recovery. A person’s perception that something is helpful is so
important during any major health crisis in order to motivate a person to stick with the
intervention or plan. More stories that expand on feelings of Tai Chi being helpful are important
to discover how Tai Chi is beneficial, so professionals working with stroke survivors can promote those feelings and tailor the Tai Chi intervention during the recovery process. This current study adds to the body of research that Tai Chi is a helpful intervention for stroke survivors.

**Aim 2 Findings**

**What were the stroke survivors’ views of their perceived physical abilities following the Tai Chi exercise intervention?**

Perceptions of the impact Tai Chi had on stroke survivors’ physical abilities was the most common theme found in this study. Almost everyone who participated in this study reported improvement in balance, as well as a decrease in falls. Several of the participants reported the ability to be more independent and to interact in their communities again. They associated connecting with old friends or meeting new friends to their improved physical abilities after participating in the study. It is not surprising that a perception of improved physical abilities is the most common theme in this study. Multiple quantitative studies have shown that Tai Chi does indeed improve balance, decreases falls and improves range of motion. This qualitative study confirms the perception that stroke survivors benefited from Tai Chi and is another tool they can use during their recovery to improve physical abilities.

The improved physical abilities of Tai Chi are well documented by Au-Yeung (2009), Kim (2014), Taylor-Piliae (2012, 2014), and Wang (2010) among stroke survivors. This study now adds more evidence looking at the data from a qualitative perspective; that stroke survivors perceived an improvement in their physical abilities after participating in the Tai Chi intervention. When a research problem or health issue is fully investigated from all perspectives,
it allows for a fuller understanding of that particular phenomenon. The perceptions these stroke survivors had regarding Tai Chi, allow future researchers to be more specific in their inquiry on how and what about Tai Chi is perceived as beneficial to stroke survivors.

**What were the stroke survivors’ views of their perceived mental/cognitive abilities following the Tai Chi exercise intervention?**

The mental and cognitive abilities were improved in many of the stroke survivors and lend more evidence to the current research regarding Tai Chi and improved cognitive and mental abilities in stroke survivors. According to Cheng (2007), Tai Chi improved mood, decreased anxiety, and improved feelings of control over their circumstances in cardiac patients. The ability to focus and challenge themselves to participate in the exercise intervention was reported by several participants in this study. The stroke survivors reported an ability to handle other problems in their life as well, due to participating in Tai Chi. They used the principles of Tai Chi to help them accept their physical limitations and expressed that remembering important information became easier, due to the meditative effects of Tai Chi.

Having worked with the elderly for a long time has provided the researcher insight into some of the biggest fears the senior population has about the aging process. The number one fear for older adults is losing their cognitive abilities. Very few are afraid of dying; in fact, most comment that they hope they die before they start having problems with their memory and become a burden to their family and community. The mental and cognitive ability of our community-dwelling elders is critical so they are able to remain in the community and remain productive. Again, Tai Chi exercise research studies have reported in quantitative studies improved memory, and an increase in brain size when practiced regularly (Wayne et al., 2014).
For many participants, this qualitative study also found the participants perceived Tai Chi had a positive impact on their cognitive ability.

**What challenges did the stroke survivors perceive they had during the Tai Chi exercise intervention?**

Physical or environmental challenges were rarely discussed in the stories of the stroke survivors. There were some transportation issues that were problematic for the participants, but only three people discussed challenges related to Tai Chi. Having faced many challenges in their life since the stroke may have played a role in them not perceiving any challenges related to participating in the Tai Chi study. Some of the stroke survivors reported how happy they were to have been chosen for the Tai Chi arm of the study, and possibly minimized any challenges they may have had.

Barriers can play a significant role in either real or perceived reasons people are unable to regularly participate in physical activity and this is especially true for those who have chronic illnesses. According to Yi, Han, Lee, and Ha (2015), the most reported barriers to exercise were debility, balance problems, cost, and transportation. In order to decrease barriers in participating in physical activities, stroke survivors need to be questioned further on barriers and challenges that impact their ability to exercise and discover solutions that will promote participation in Tai Chi or other exercise on a regular basis.

**What were stroke survivors’ views of their perceived ability to move forward and make friends?**

These two themes were unexpected and were reported by several participants; many reported future plans and looking into the future with a new perspective and excitement. The
participants of the Tai Chi intervention reported being able to help friends and family again and volunteering in the community after the Tai Chi intervention. The connections they made and meeting new friends through the intervention was also important to these stroke survivors. One stroke survivor even reported that he was empowered by his ability to help another stroke survivor in their recovery process.

At this time, there are no current studies that look at the perceptions of stroke survivors participating in Tai Chi and the ability to move forward, or that Tai Chi is perceived to be a great tool to promote friendship and connections. However, there is a recent study that reported Tai Chi does promote friendship and volunteering in healthy people (Clift & Camic, 2016). This may or may not be transferable to people suffering from chronic or debilitating health issues like a stroke. Future studies need to delve deeper into the psychosocial and personal connections that may be promoted while participating in a group activity like Tai Chi. It is well documented that people suffering from a stroke often feel isolated and any intervention that decreases feelings of isolation is going to aid in the recovery process (Chau, Thompson, Twinn, Chang, & Woo, 2009).

Staying connected and involved is challenging, as we get older, it becomes even more challenging when a person suffers a stroke. Almost 67% of stroke survivors report anxiety and depression at some time during their recovery and isolation increases those feelings of anxiety and depression (Stroke Association, UK, 2013). Tai Chi is a group intervention that can help alleviate some of the isolation that is common among stroke survivors. As stated by one of the participants, Tai Chi allows stroke survivors to recognize that they are not the only one
struggling to overcome the many complications and disabilities commonly associated with a stroke.

**Conclusion**

These stories revealed that Tai Chi promotes perceptions of well-being and recovery among stroke survivors. Participants reported improved physical and mental abilities after participating in the Tai Chi intervention. Future studies are needed to further verify these results and expand on the themes that were discovered in this study. For example, a focus group study to explore in-depth, the feelings and perceptions identified in this study, would be beneficial for a greater understanding of what stroke survivors experience when participating in Tai Chi.

**Theoretical Perspective: Story Theory**

Due to the type of data and study that was completed for this DNP project, there are some limitations to connecting this study to Story Theory (Smith & Liehr, 1999; Liehr & Smith, 2007; 2008) and the Story-Recovery Model (Zeimantz, 2016); because this study was a formative study and did not ask pointed questions about their “story”, the researcher was unable to pull out information or expand on a theme from these stroke survivors. This study was intended as a preliminary study to discover themes that can be used in future studies; however, there are still some important themes that can be linked to both Story Theory and the Story-Recovery Model.

Story Theory (Smith & Liehr, 1999; Liehr & Smith, 2007; 2008) has three assumptions. First, people change as they connect with their world. This was observed in several participants’ stories. Every one of the participants reported that either their physical or mental abilities, or both, had changed due to participating in Tai Chi. They reported stronger connections to their community and their cohorts during and after the study. Some participants directly attributed
their increased volunteering and willingness to help others with their involvement in the Tai Chi study. Tai Chi gave them confidence to move forward and return to some pre-stroke activities they had not participated in since the stroke.

The second assumption is that people exist in the here and now that ties the future and past events together (Smith & Liehr, 1999; Liehr & Smith, 2007; 2008). This was evident with remarks of how Tai Chi had affected their past and how looking into their future became easier after the Tai Chi intervention. One participant reported a more “colorful life” after the interaction they had with the other stroke survivors, the instructor, and study investigators.

The third assumption is that people gain insight, significance, and clear knowing while evolving through interactions with others (Smith & Liehr, 1999; Liehr & Smith, 2007, 2008). Many people reported feeling a sense of “ease” and reconnecting with themselves while they participated in the Tai Chi study. They discovered that setting goals and taking an active role in their recovery process was still possible. They reported they gained this perspective during their interaction with the other stroke survivors during Tai Chi.

**Story-Recovery Model**

The Story-Recovery Model (Zeimantz, 2016) differs from Story Theory (Smith & Liehr, 1999; Liehr & Smith, 2007; 2008), in that it expands on the intentional dialogue between nurse and patient to include peer-to-peer and/or “person-self-healing promoting process”. The stories of the stroke survivors told of how the intervention allowed them to move forward in their healing process. Many participants saw their own process of healing in others and reached out to those participants to encourage them. When making new friends during their time together, these
survivors discussed their stroke story and it allowed them to make sense of their own health challenges and at times give back to others.

Many survivors talked of moving forward in their life and coming to terms with their limitations and embracing their newfound strength and independence. The participants used the Tai Chi experience, self-reflection and interactions with other stroke survivors to face their future. Even though many of the survivors have not been in contact with a nurse to tell their story, it was clear through many of their stories that they continued to evolve through their recovery as a result of Tai Chi and interactions with the other stroke survivors.

**Strength of Study**

One of the strengths of this study is that it provided an unstructured format to explore perceptions and feelings stroke survivors had in regards to participating in Tai Chi. Participants were not guided about their perceptions or feelings, which may have happened if they had been interviewed and asked specific questions regarding their feelings or perceptions. Participants were not led to answering that Tai Chi was helpful; they volunteered that Tai Chi was helpful in their recovery. The amount of men represented in this study (65%) was another strength in this study. Men are highly represented in traditional research projects; however, a lot of the qualitative research surrounding perceptions and feelings are not generally highly represented with male participants. Finally, the parent study was a highly regarded randomized clinical trial.

**Limitations of Study**

One of the limitations to this study is that there was no analysis of stories from the other exercise group, SilverSneakers®, to see if Tai Chi was perceived as a superior intervention.
compared to SilverSneakers®. Comparing the two groups may have provided a stronger argument for Tai Chi being helpful for stroke survivors. The analysis of the two different groups may have also identified weaknesses pertaining to Tai Chi, compared to SilverSneakers®. A comparison of the two interventions may also give greater clarity to the different strengths of Tai Chi (i.e., more helpful or less effective in confidence building).

Another limitation was that the stories were not able to fully capture the impact that Tai Chi had on the stroke survivors. The researcher was unable to interview the participants in order to clarify statements that may have led to different conclusions, or may have provided a stronger or weaker connection between the perceptions and feelings stroke survivors had in terms of the benefits of Tai Chi as an intervention for stroke survivors. The risk of allowing personal bias is stronger when unable to clarify a statement or word while conducting a qualitative study. The stories from the participants were also very short, likely creating an incomplete picture of the perceptions and feelings of the participants. Finally, the inexperience of the researcher performing the qualitative data analysis may have impacted the results of this study.

**Directions for Future Research and Practice**

Future research to validate the results of this study is necessary. More focused studies that delve deeper into the perceptions and feelings of stroke survivors are needed. Using the information discovered in this study, future research can begin to explore how stroke survivors felt Tai Chi helped stroke survivors in their recovery. Exploring the perceptions that the stroke survivors had regarding Tai Chi and comparing those perceptions to SilverSneakers® or usual care, can aid in discovering which interventions are most effective in stroke rehabilitation. All of
these inquiries are important for future research projects, in order to make clinical recommendations using Tai Chi among stroke survivors, as part of their recovery.

Ultimately, the initial goal when starting this DNP project was to research and if found to be an effective tool, use the Story-Recovery Model (Zeimantz, 2016). The stories obtained by stroke survivors can be effective in helping to create evidence-based interventions and tools for healthcare professionals that are cost effective, and easy to implement in a variety of community settings. Finally, further research regarding Tai Chi and storytelling with people suffering from other health issues is needed to see if these tools would be effective in other populations.

Among healthcare providers, storytelling is a common strategy to use when caring for patients with a chronic illness. It is used either to provide comfort or as a teaching tool to help people understand their disease. Storytelling can guide a person on how to overcome or live with their diseases in order to lead a healthy and productive life. In the future, if the Story-Recovery Model (Zeimantz, 2016) is found to be effective, it could also help people suffering from a chronic illness or a health crisis in a less formal or informal setting. This model has the potential to help patients take a more proactive role in their health and empower themselves and others to take control of their illnesses and health conditions.

**Dissemination of Evidenced-Based Practice**

It is important to encourage healthcare providers to discuss the benefits of Tai Chi with their patients, be aware of what programs are available in their communities, and make those resources available to their patients. Using storytelling, healthcare providers can discuss the benefits of Tai Chi and reinforce the importance of staying active and educating patients on the benefits of exercise to prevent or diminish the complications of chronic disease, like
cardiovascular disease. The stories do not need to be long or involved and can be part of the education that is provided regularly in every office or health setting. According to the American College of Sports Medicine (2017), “Exercise is Medicine”, with regular exercise reported to decrease stroke risk by 27%, without side effects that are common with medications. They recommend writing a prescription for exercise for all patients at least once a year, and then reviewing it with patients at least twice a year, to reinforce the importance of exercise, like Tai Chi, to maintain an active and healthy life. These are important and easy ways for nurse practitioners to disseminate the benefits of Tai Chi in our communities.

Summary

Tai Chi is a well-established, beneficial form of exercise that if used regularly can promote health, prevent chronic disease, and decrease cost, debility, and isolation in our communities. Storytelling is an intervention used to promote health and teach patients in many settings in the community. It is the hope of the researcher that combining these two interventions will help empower healthcare providers, stroke survivors, and community-dwelling elders.

This study found in many cases that Tai Chi promotes perceptions of well-being and recovery among stroke survivors. The next step in the process is to confirm these results and examine the Story-Recovery Model (Zeimantz, 2016) to discover if both Tai Chi and storytelling are effective for stroke survivors. Future research and use of this model is important because so little recovery time is actually spent in a formal setting. It is imperative that interventions that are easy to learn and implement are investigated, so stroke survivors or other people suffering from a
chronic illnesses can use these interventions to empower themselves and others during their recovery in any community setting.
APPENDIX A:
TELL US YOUR STORY

Tell Us Your Story

We are developing a Story Bank about how participating in The Tai Chi Exercise for Stroke Survivors Study has changed your life. We would like to use your story to encourage other stroke survivors to participate in future exercise studies or to begin a regular exercise program. If you would like to share your story with us, please do so below. Your story can make a difference!

Name: _____________________________________________________________________
Address: __________________________________________________________________
Phone number: ______________________________________________________________
Email address (optional): _______________________________________________________
Best Time to reach you: _________________________________________________________

Your Story (use additional paper if needed):
APPENDIX B

OFFICE OF RESEARCH AND DISCOVERY FORM
APPENDIX B: 
OFFICE OF RESEARCH AND DISCOVERY FORM

Date: January 06, 2017
Principal Investigator: Melinda Ann Zeimantz
Protocol Number: 1701100809
Protocol Title: Does Tai Chi promote perceptions of well-being and recovery among stroke survivors?

Determination: Human Subjects Review not Required

The project listed above does not require oversight by the University of Arizona because the project does not meet the definition of 'research' and/or 'human subject'.

- **Not Research as defined by 45 CFR 46.102(d):** As presented, the activities described above do not meet the definition of research as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "research means a systematic investigation, including research development, testing and evaluation, designed to contribute to generalizable knowledge".

- **Not Human Subjects Research as defined by 45 CFR 46.102(f):** As presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual, or identifiable private information".

Note: Modifications to projects not requiring human subjects review that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination (e.g. addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the research question). Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
REFERENCES


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