



# Effectiveness Study of the Tai Chi 4 Health & Balance (TC4HB) Program

## Summary

The study was a self-assessment survey where participants ranked twenty-four separate measures of Health, Strength, Flexibility, Pain and Balance. The evidence conclusively supports the effectiveness of the Tai Chi 4 Health & Balance (TC4HB) program.

Significant findings include high rates of pain reduction, high rates of improvement in health issues and strong rates of improvement in Balance, Strength and Flexibility.

### FEW MEN BUT MEN DO BETTER

There were 46 participants in the study. Four male participants and Forty-two Female participants. These results reflect observations on the male/female composition of the class. Male participants improved more than their female counterparts in all but one category. 50% of the male participants reported that attending with their wives was one of the reasons they came to the program.

### MOST PARTICIPANTS ARE OVER 75

The average age bracket of the participants was 76-80 years old. The most frequently reported (mode) age bracket was 81-85 years old. Two participants were in the 90+ category.

### AGE DOESN'T CHANGE BENEFITS OF PROGRAM

In six of the seven primary categories measured by the study there was less than 3.26% deviation between participants OVER 75 years old and participants UNDER 75 years old. The results indicate that the age of the participant does not significantly change the amount of benefit the participant can achieve.

### LONG TERM PARTICIPATION HELPS PAIN AND HEALTH CONCERNS

The average number of years of participation was four (4) with the most commonly reported length of attendance (mode) being two (2) years.

There was significant improvement in the Over 2 Years Participation (All Age) group over the average of the (All) group and the Under 2 Year Participation (All Age) group in the Pain and Other Health



categories. This indicates that long term participation in the TC4HB provides additional improvement in reducing pain and health concerns.

#### MOST PEOPLE COME FOR BALANCE, HEALTH AND FUN

Participants were given multiple choice responses to why they attend. Participants were allowed to make multiple selections. 95.65% of people came to improve their balance, 93.48% came to improve their health and 67.39% came for fun and social interaction.

#### IMPROVEMENT IN MULTIPLE AREAS

100% of the people surveyed reported improvements in SEVEN or more of the 25 measured sub-areas. 78.26% of the people surveyed reported improvements in TWELVE or more of the sub-areas of the study. 67.39% of the people surveyed reported improvements in TWENTY or more of the sub-areas of the study.

In the seven major categories the average improvement over all age brackets and all number of years participated is as follows:

Category	Average Improvement
Overall	22.56%
Balance	24.37%
Strength	22.00%
Flexibility	22.68%
Health	25.99%
Pain	38.19%
Other Health	38.56%

#### OVER 20% IMPROVEMENT IN HEALTH, QUALITY OF LIFE AND ENERGY

93.48% of participants reported Health as one of the reasons for joining the TC4HB program. Participants reported a 22.26% improvement in Overall Health, a 21.54% improvement in Quality of Life and a 22.87% improvement in Energy Levels.

#### 27.17% GAIN IN OVERALL BALANCE AND 25.93% MORE CONFIDENCE IN BALANCE



95.65% of participants reported balance as one of the reasons they attend the TC4HB program. Participants reported a 27.17% gain in their overall balance and a 25.93% gain in confidence of their balance.

19.05% IMPROVEMENT CLIMBING STAIRS, 24.62% IMPROVEMENT IN BACK STRENGTH

One of the most common “Other Reason for Attending” write-in response was improving strength. Participants made between 19.05% to 24.62% improvement in the eight (8) measures of the strength category including a 19.05% improvement in climbing stairs, a 22.92% improvement in getting up from bed/chair/car and a 24.62% improvement in back strength.

23.64% IMPROVEMENT IN BACK FLEXIBILITY, 21.73% IMPROVEMENT IN SHOULDER FLEXIBILITY, 25.40% IMPROVEMENT REACHING OVERHEAD, 26.59% IMPROVEMENT BENDING TO THE GROUND.

Back pain (36.95% of participants) and Shoulder pain (21.73% of participants) were the two most frequently reported pain types. Participants reported an improvement in flexibility in their back (23.64%) and legs (21.21%) aiding in a reduction of back pain by 43.14%. Participants reported an improvement in neck (25.79%) and shoulder (24.60%) flexibility aiding in a reduction of shoulder pain by 30.00%.

Participants showed functional movement improvements in Reaching Overhead of 25.40% and an improvement of 26.59% in Bending to the Ground.

IMPROVEMENTS IN BLOOD PRESSURE (24.03%) DIGESTION (25.00%), AND BLOOD SUGAR (33.33%)

Participants reported an improvement in their blood pressure of 24.03% with 47.82% of participants reporting a problem with Blood Pressure. Participants reported improvement in their Blood Sugar regulation of 33.33% but only 17.39% of participants reported a problem with Blood Sugar/Diabetes. Participants reported an improvement of 25.00% in their digestive systems with 30.43% of participants reporting a problem.

30-61.11% REDUCTION IN PAIN

Participants reduced their pain in the top reported categories by 30-61%. 36.95% of participants reported back pain and achieved an average pain reduction of 43.14%. Shoulders were the next most reported problem and participants reported improvement of 30.00%. Neck, Legs and Hands were the other top reported conditions with pain reductions of 42.59%, 33.33% and 41.67% respectively.

TC4HB AND PHYSICAL THERAPY WORK TOGETHER



67.50% of participants responding have taken Physical Therapy. The most reported comments were “Physical Therapy got the process started but TC4HB took it further” with 35.00% of respondents making the comment and “TC4HB was a helpful addition to the Physical Therapy process” with 30.00% of respondents making the comment.

Other comments included “Noticed crossover exercises” with 10.00% making the comment, “TC4HB was more enjoyable” with 7.50% making the comment, “TC4HB helped more” with 5.00% making the comment and “Physical Therapy worked one area, TC4HB was more comprehensive” with 5.00% making the comment.

#### EXPLAIN IT AND BRING BACK TWO CLASSES PER WEEK

The most frequent comment about the TC4HB program was that the participants liked having the exercises and their benefits explained. Explanations and Understanding is a key element of the TC4HB and from the comments is one of the more enjoyed aspects.

The second most frequent comment was either to bring the program back to a twice a week program or maintain the twice a week status.

#### CONCLUSION

The evidence obtained in this study proves conclusively that the Tai Chi 4 Health & Balance program is effective.

Most participants of the Tai Chi 4 Health & Balance program are women over 75 years old who have been attending over two years.

The main reasons people give for attending are health, balance and fun/social interaction.

The Tai Chi 4 Health & Balance (TC4HB) program was effective across all the sub-areas measured. It was most effective in Pain reduction, Health Issues and Balance categories.

Further study is merited.



## How The Study Was Conducted

The study was a self-assessment survey presented to participants of the Tai Chi 4 Health & Balance (TC4HB) program. The study asked participants to rate their condition before starting the program and now or at the time of leaving the program.

The seven primary Categories were: Overall, Balance, Strength, Flexibility, Health, Pain and Other Health.

Additionally two other categories were included. The first asked participants to discuss the role of TC4HB with traditional Physical Therapy. The second was a general comments/suggestions section.

The primary categories of Overall, Balance, Strength, Flexibility and Health were further divided into twenty four total sub-areas. The sub-areas were comprised of detailed questions in the primary category. IE: Under the primary category of Balance, participants were asked to rank their balance while walking, while twisting/turning, while standing on one leg and confidence in their balance. The primary categories of Pain and Other Health contained three optional fill in sub-areas in each category.

A One to Seven ranking system was used. This system was chosen because it provides a true “middle” number (4) which was used to represent normal or normal for their age. The survey was further coded with smiley faces to ensure it was clear to the participants which of the numbers (1-7) represented Positive conditions and Negative conditions.

To be eligible to participate in the survey an individual must be at least sixty years old as of August 19, 2012 and have attended a Tai Chi 4 Health & Balance class for at least two months from July 1, 2010 to October 19, 2012 at one of four locations: Mary Schaner Senior Adult Center, Mechanicsburg Place (formerly Mechanicsburg Senior Center), West Shore Senior Center and Hampden Recreation Center. Video users of the TC4HB program were excluded.

No compensation was offered or implied for participation in the study. Participants were made aware that the study was done to become certified in the Administration On Aging’s Title IIID program. Participants were given multiple ways to contact the Study Administrator. Options were provided for sight impaired and Spanish speaking participants to have someone orally proctor the survey.

The survey period was open from November 5, 2012 to December 14, 2012.

The study was conducted by Movement Arts Institute with cooperation from the Cumberland County Office of Aging and Community Services, the Mary Schaner Senior Adult Center, Mechanicsburg Place, West Shore Senior Center, the Hampden Recreation Center and the TC4HB program participants. The study was completely funded by Movement Arts Institute. Movement Arts Institute is the creator of the Tai Chi 4 Health & Balance (TC4HB) program.



## Full Results

### PARTICIPANT CATEGORY:

There were 46 participants in the study. Six surveys were deemed ineligible - three from participants with less than two months participation, one did not include a name or signature, one had unintelligible results, and one rated their current deteriorated condition not their condition when they left the program. The total study participation was approximately 60% of the number of eligible participants.

100% of the people surveyed reported improvements in SEVEN or more of the 25 measured sub-areas. 78.26% of the people surveyed reported improvements in TWELVE or more of the sub-areas of the study. 67.39% of the people surveyed reported improvements in TWENTY or more of the sub-areas of the study.

### Gender

There were four (4) Male participants and forty-two (42) Female participants. These results reflect observations made of the male/female composition of all participants in the TC4HB program.

Male participants improved more than their female counterparts in all but one category.

<u>Category</u>	<u>Female (All)</u>	<u>Male (All)</u>
Overall	22.15%	25.00%
Balance	23.59%	32.50%
Strength	21.27%	29.69%
Flexibility	22.06%	29.17%
Health	26.59%	22.22%
Pain	37.38%	43.06%
Other Health	34.52%	57.41%

### Age Bracket

The average age bracket of the participants was 76-80 years old. The most frequently reported (mode) age bracket was 81-85 years old. Two participants were in the 90+ bracket.



There was less than 3.26% deviation from the average of participants that were over 75 years old and the average of participants that were under 75 years old in six of the seven categories. The seventh category “Health” had a 6.08% deviation. The results indicate that age of the participant does not significantly change the amount of benefit the participant can achieve.

<b>Category</b>	<b>Average under 75</b>	<b>Average Over 75</b>	<b>Average (All)</b>
Overall	22.53%	22.44%	22.56%
Balance	24.21%	24.65%	24.37%
Strength	24.24%	21.13%	22.00%
Flexibility	25.01%	21.75%	22.68%
Health	32.01%	32.01%	25.99%
Pain	39.63%	38.19%	38.19%
Other Health	38.38%	38.89%	38.56%

### **Time Participating in the Program**

The average number of years of participation was four (4) with the most commonly reported length of attendance (mode) being two (2) years.

There was significant improvement in the Over 2 years Participation (All Age) group over the averages of the (All) group and the Under 2 Year Participation (All Age) group in the Pain and Other Health categories. This indicates that long term participation in the TC4HB program provides additional improvement in reducing pain and health concerns. There was less than a 4.4% deviation between the Over 2 Year and Under 2 Year groups in the other five categories.

<b>Category</b>	<b>Average under 2yrs</b>	<b>Average Over 2yrs</b>	<b>Average (All)</b>
Overall	22.01%	22.89%	22.56%
Balance	23.02%	25.08%	24.37%
Strength	24.87%	20.47%	22.00%
Flexibility	23.81%	22.07%	22.68%



Health	25.30%	26.47%	25.99%
Pain	32.10%	41.08%	38.19%
Other Health	30.56%	45.68%	38.56%

**Location Attended**

Of the respondents, 30.43% attended the Mary Schaner Senior Center, 19.56% attended Mechanicsburg Place, 30.43% attended West Shore Senior Center and 19.56% attended Hampden Recreation Center.

**Reasons for Attending**

Participants were given multiple choice responses to why they attend. Participants were allowed to make multiple selections.

<u>Response</u>	<u>% Attending for that purpose</u>
Balance	95.65%
Better Health	93.48%
Continue Physical Therapy	30.43%
Doctor Recommended	19.56%
Fun/Social Interaction	67.39%
Other	15.21%

The most common “other” responses were “Attend with Wife”, “Strength” and “Flexibility” each received the same number of write- in responses.

OVERALL CATEGORY:





93.48% of participants reported Health as one of the reasons for joining the TC4HB program. Participants reported a 22.26% improvement in Overall Health, a 21.54% improvement in Quality of Life and a 22.87% improvement in Energy Levels.

There were three areas in the Overall category. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All three measures were used to determine the Overall Category averages used in this report.

<b>Sub-Area</b>	<b>Average Improvement (All)</b>	<b>Most Common Response (All)</b>
Overall Health	22.26%	33.33%
Overall Quality of Life	21.54%	16.67%
Overall Energy Level	22.87%	16.67%

**BALANCE CATEGORY:**

95.65% of participants reported balance as one of the reasons they attend the TC4HB program. Participants reported a 27.17% gain in their overall balance and a 25.93% gain in confidence of their balance.

There were five sub-areas in the Balance Category. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All five measures were used to determine the Balance Category averages used in other areas of this report. Initially Overall Balance was meant as a check sum for the other measures but feedback from multiple participants indicated that they viewed and consequently rated it as a unique measure of balance not as an average of the other measures.

Gains in the Overall and Confidence in Balance sub-areas are higher than in the other three measures indicating that there may be additional types of balance measures of concern and at the attention of participants.

<b>Sub-Area</b>	<b>Average Improvement (All)</b>	<b>Most Common Response (All)</b>
Overall	27.17%	16.67%
While Walking	21.97%	16.67%
While Turning/Twisting	24.81%	16.67%
Standing on One Leg	24.24%	33.33%



Confidence in balance                      25.93%                                      33.33%

**STRENGTH CATEGORY:**

One of the most common “Other Reason for Attending” write-in response was improving strength. Participants made between 19.05% to 24.62% improvement in the eight (8) measures of the strength category.

There were nine sub-areas in the Strength Category. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. Eight of the nine measures were used to determine the Strength Category averages used in other areas of this report. Overall Strength was used as a check sum of the other eight measures.

The least gain was made in the Climbing Stairs measure (19.05%). Yet Leg Strength had a 23.70% improvement rate and Getting Up had a 22.92% improvement rate. Additional investigation will be necessary to determine what aspects of climbing stairs causes it to be rated lower than the Overall Check sum measure and the Leg strength and Getting Up measures.

The check sum measure - Overall Strength - was consistent with the other measures.

<b><u>Sub-Area</u></b>	<b><u>Average Improvement (All)</u></b>	<b><u>Most Common Response (All)</u></b>
Overall	22.62%	16.67%
Neck	22.22%	16.67%
Shoulders	23.98%	16.67%
Arms	22.80%	16.67%
Mid-Section/Core	23.48%	16.67%
Back	24.62%	16.67%
Legs	23.70%	16.67%
Getting up	22.92%	16.67%
Climbing Stairs	19.05%	16.67%



**FLEXIBILITY CATEGORY:**

Flexibility aids in pain reduction and in functional movement such as reaching overhead, getting dressed, and bending down.

Back pain (36.95% of participants) and Shoulder pain (21.73% of participants) were the two most frequently reported pain types. Participants reported an improvement in flexibility in their back (23.64%) and legs (21.21%) aiding in a reduction of back pain by 43.14%. Participants reported an improvement in neck (25.79%) and shoulder (24.60%) flexibility aiding in a reduction of shoulder pain by 30.00%.

Participants showed functional movement improvements in Reaching Overhead of 25.40% and an improvement of 26.59% in Bending to the Ground.

There were seven sub-areas in the Flexibility Category. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All seven of the measures were used to determine the Flexibility Category averages used in other areas of this report. There was no check sum for this category. That was an error in the design of the study.

<b><u>Sub-Area</u></b>	<b><u>Average Improvement (All)</u></b>	<b><u>Most Common Response (All)</u></b>
Neck	25.79%	16.67%
Shoulders	24.60%	16.67%
Hands	19.32%	16.67%
Back	23.64%	16.67%
Legs	21.21%	16.67%
Reaching Overhead	25.40%	16.67%
Bending to the Ground	26.59%	16.67%

**HEALTH CATEGORY:**

Participants reported an improvement in their blood pressure of 24.03% with 47.82% of participants reporting a problem with Blood Pressure. Participants reported improvement in their Blood Sugar regulation of 33.33% with 17.39% of participants reporting a problem with Blood Sugar/Diabetes.



Participants reported an improvement of 25.00% in their digestive systems with 30.43% of participants reporting a problem.

There were four sub-areas in the Health Category. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All four of the measures were used to determine the Health Category averages used in other areas of this report. The check sum for this category was the Overall Health question from the Overall Category.

While participants reported a 33.33% improvement in their Blood Sugar only 17.39% reported having a problem. While all Tai Chi will help regulate Blood Sugar, targeting a program to only this problem would exclude 82.61% of the participants in the TC4HB program. The other measures in the Health category had significantly more participants reporting a problem in that sub-area.

The Getting Sick sub-area was intended to provide insight into the Immune System Boosting benefits of Tai Chi. The vast majority of people reporting no improvement in Getting Sick either reported they had a low incidence of the problem or a normal for their age rating of the problem as their starting measurement. It is not possible to improve from the best rating. This measure needs to be better broken out to provide meaningful insight into Immune System Boosting.

The first three sub-areas require medical care with better records existing. It is likely that the improvement measurements in those sub-areas are less subjective than the other sub-area measurements.

The check sum measure - Overall Health (in the Overall Category) - of 23.26% was consistent with the other measures.

<u>Sub-Area</u>	<u>Average Improvement (All)</u>	<u>Most Common Response (All)</u>
Blood Pressure	24.03%	16.67%
Blood Sugar	33.33%	16.67%
Digestion	25.00%	16.67%
Getting Sick	24.17%	0%

**PAIN CATEGORY:**

Participants reduced their pain in the top reported categories by 30-61%. 36.95% of participants reported back pain and achieved an average pain reduction of 43.14%. Shoulders were the next most



reported problem and participants reported improvement of 30.00%. Neck, Legs and Hands were the other top reported conditions with pain reductions of 42.59%, 33.33% and 41.67% respectively.

There were three write-in options with a space provided for describing the pain and the same 1 to 7 rating system used throughout the study. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All varieties of pain were used to determine the Pain Category averages used in other areas of this report. “Reducing pain” has individual and different meanings to each person therefore averaging a variety of pain types gave an accurate measure of “reducing pain”.

In comparisons of Under 2 Year Participation (All Age) and Over 2 Year Participation (All Age) groups, a significant improvement in Pain reduction presented. The Under 2 Year Participation (All Age) group had pain reduction of 32.10% while the Over 2 Year Participation (All Age) group had pain reduction of 41.08%. Since pain is both memorable and frequently professionally treated it is likely that these numbers are less subjective than other study measures.

Further study will be needed to validate the results indicating that long term participation provides more pain reduction.

<b><u>Pain Type</u></b>	<b><u>Improvement</u></b>	<b><u>Percent of Participants Reporting a Problem</u></b>
Back	43.14%	36.95%
Shoulders	30.00%	21.73%
Neck	42.59%	19.56%
Legs	33.33%	10.87%
Hands	41.67%	8.69%
Knees	61.11%	6.52%

**OTHER HEALTH CATEGORY:**

Participants reported Other Health Conditions such as Arthritis, Breathing, Stress, Lethargy and others. Participants showed between 33-50% improvement in their reported conditions.

Arthritis was the most frequently reported Other Health condition. Participants showed a 33.33% reduction in their arthritis pain with 13.04% of participants reported Arthritis as a condition they have. While all Tai Chi will help joint mobility and reduce pain, targeting a program specifically to arthritis would therefore exclude 86.96% of TC4HB participants.



There were three write-in options with a space provided for describing the condition and the same 1 to 7 rating system used throughout the study. Participants were asked to rank these areas before starting the program and now or at the end of their attendance of the program. All varieties of health issues were used to determine the Other Health Category averages used in other areas of this report.

In comparisons of Under 2 Year Participation (All Age) and Over 2 Year Participation (All Age) groups, a significant improvement in Other Health conditions presented. The Under 2 Year Participation (All Age) group had Other Health improvements of 30.56% while the Over 2 Year Participation (All Age) group had Other Health improvements of 45.68%. Since most of the conditions listed are medically treated it is likely that these numbers are less subjective than other study measures.

Further study will be needed to validate the results indicating that long term participation provides more health benefits.

<b>Other Health Condition</b>	<b>Improvement</b>	<b>Percent of Participants Reporting a Problem</b>
Arthritis	33.33%	13.04%
Breathing	38.89%	6.52%
Stress	41.67%	4.35%
Lymphadema	33.33%	4.35%
Lethargy	50.00%	4.35%

**PHYSICAL THERAPY AND TC4HB SECTION:**

67.50% of participants responding have taken Physical Therapy. The most reported comments were “Physical Therapy got the process started but TC4HB took it further” with 35.00% of respondents making the comment and “TC4HB was a helpful addition to the Physical Therapy process” with 30.00% of respondents making the comment.

Other comments included “Noticed crossover exercises” with 10.00% making the comment, “TC4HB was more enjoyable” with 7.50% making the comment, “TC4HB helped more” with 5.00% making the comment and “Physical Therapy worked one area, TC4HB was more comprehensive” with 5.00% making the comment.

Participants were asked to circle selections (Before, After, During, Both or Never) in response to taking Physical Therapy while participating in TC4HB. Participants were asked to compare/discuss TC4HB and physical therapy. Participant responses were grouped by similarity.



<u>Response</u>	<u>Percent of Participants Responding</u>
Before	28.26%
During	19.56%
Both	10.87%
Never	28.26%
No Response	13.04%

### COMMENTS AND SUGGESTIONS SECTION:

Participants were given the opportunity to discuss what they liked about the program, any suggestions for improvement and general comments.

The most frequent comment about the TC4HB program was that the participants liked having the exercises and their benefits explained. Explanations and Understanding is a key element of the TC4HB and from the comments is one of the more enjoyed aspects.

The second most frequent comment was either to bring the program back to a twice a week program or maintain the twice a week status. It should be noted that three of the four programs were twice a week programs until funding required cutting two of the programs to once a week program. One program – West Shore Senior Center – still maintains a twice a week program with donations. It has been observed by TC4HB instructors that groups that were twice a week then reduced to once a week displayed noticeably strength and energy loss after less than six weeks of the reduced cycle.

### **Considerations**

A self-assessment survey is subjective by nature. It was selected because there was a large existing body of members to act as the subject group and those members had been attending for a variety of times.

The study was designed to concretely prove that the Tai Chi 4 Health & Balance (TC4HB) program was effective by measuring improvement in a number of areas. That improvement exists is evidence that



the program is effective. That the results were consistent among participants and check sum measures validates the improvement.

The results from this self-assessment survey can effectively form the starting point for additional studies. Those additional studies should use a subject group with no experience and concrete measurements of strength, flexibility, pain and health sub-areas at the start of the study and at various intervals throughout the study period.

A long term study would be required to validate the initial findings that long term participation provides additional pain reduction and health improvements.

Additional considerations of self-assessment format.

Many of the participants have been attending for multiple years. It is assumed that since they had no record of their condition for many of the measures that they could not accurately recall their condition prior to attending the TC4HB program. It is further assumed that instead they are remembering and rating their condition 1-2 years prior to the study. These assumptions are partly validated by the small deviation in measurements between the Over 2 Years Participation groups and the Under 2 Years Participation groups. These findings were consistent even when the groups were further divided by Participant Under 75 and Over 75.

The rating assumptions are additionally supported by the larger deviation between the two groups in the Pain and Other Health categories. Pain is highly memorable and it is likely that long term participants are more accurately rating the before section of this category. The Other Health category is populated by health issues that require medical care and therefore better records of those conditions exist. It is likely that participants more accurately rate the Other Health category for this reason.

Inconsistencies with check measures exist. Examples of inconsistencies found include rating Overall Health as Low or No gains but rating individual health measurements with gains in some cases dramatic gains. Overall Health is a subjective measure but the individual Health sub-areas may have medical records and a more accurate before/now measurements.

Other inconsistencies exhibited include higher pain reduction measurements (38.19%) than gains in strength(22.00%) and flexibility (22.68%) although strength and flexibility are principal reducers of pain. Again pain is memorable and therefore more accurately measurable.

Another inconsistency appeared with Climbing Stairs. Leg strength was rated at 23.70%, balance was rated at 24.37% but Climbing Stairs was rated at 19.05%

All of these concerns can be addressed with concrete measures of strength, flexibility, pain and health being gathered at the beginning of any following studies and at various intervals in the studies.

Further exploration needed.





Gains in the Overall and Confidence in Balance sub-areas are higher than in the other three measures indicating that there may be additional types of balance measures of concern and at the attention of participants. Additional inquiry is necessary to identify areas of balance concerns and ways to measure them for future studies.

Long term participation resulting in additional gains in the Pain and Health areas require further exploration. It would be difficult to measure long term gains in any way other than a long term study.

Male Participation in the TC4HB and other observed exercise programs is typically low. Yet the Male Participants did significantly better than their female counterparts. It should be cautiously interpreted data however since the amount of male participants was so small that it would be potentially inaccurate to extrapolate their results across a larger population.

Several possibilities exist for the disparity. One is social attitude. Men have only begun to accept exercise. It is possible that many senior men still maintain a negative attitude towards exercise. The population of the TC4HB program is largely over 75 years old. It is possible that many of the men that age are not able to attend or feel they would be unable to participate because of their health condition. The men that do attend largely attend with or because of their spouse. This is a potential starting point to increase male participation with Bring Your Man type promotions. Additionally, ways to reach younger males with better health and more modern attitudes towards exercise should be explored.