

## CRITICALLY APPRAISED TOPIC

### FOCUSED CLINICAL QUESTION

In a 72yo female with a fear of falling, is Cognitive Behavioural Therapy (CBT) based intervention or LE strengthening better for decreasing falls risk?

### AUTHOR

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### CLINICAL SCENARIO

The patient is a 72-year-old female who recently fell and now has a fear of falling which negatively affects her daily activities.

Falling in older populations is a common occurrence and can have disastrous consequences such as fractures, subdural hematomas, decreased quality of life, and possibly even death. Medical costs associated with a fall are astronomical with billing to Medicare totalling more than \$31 billion dollars in 2015 and it is estimated that hospital costs following a fall, average over \$30,000.<sup>1</sup> Upwards of 65% of community-dwelling older adults may have a fear of falling even though they have never fallen before.<sup>2</sup> This number rises to possibly 92% in those older adults who have actually suffered a fall.<sup>2</sup> Furthermore, women seem to be more adversely affected by their fear of falling and are more likely to restrict their activities due to this fear.<sup>2</sup>

Rehabilitation efforts that are multifactorial in nature, including cognitive behavioural therapy and lower extremity strengthening strategies, may have the ability to decrease a person's fear of falling, increase their quality of life, increase participation in physical activity, and decrease their risk of falling.

### SUMMARY OF SEARCH

[Best evidence appraised and key findings]

- There are many research articles looking at the effectiveness of cognitive behavioural therapy and exercise to reduce the fear of falling. However, there are fewer articles comparing these exercises individually and together specifically in one research article. My search revealed thirteen articles that were related to lower extremity strength training and cognitive behavioural therapy. This was narrowed down to 8 of the best 13, of which there were 7 randomized controlled trials and one systematic review. The two that specifically compared lower extremity exercise to cognitive behavioural therapy were randomized controlled trials and were chosen for further review.
- Lower extremity strengthening programs and cognitive behavioural therapy programs may reduce the fear of falling when provided individually, however it may be more beneficial to provide combination therapy of both of these areas combined to have the best positive overall effect.
- Future research should involve directly comparing both of these programs specifically as well as comparing other programs used to reduce the fear of falling in order to provide the most efficient and cost-effective fear of falling prevention program.

### CLINICAL BOTTOM LINE

- Lower extremity strengthening and cognitive behavioural therapy alone may have a positive impact in reducing the fear of falling in older individuals, however a comprehensive and multifactorial approach which includes both of these programs is the most beneficial to not only reducing the fear of falling but improving other factors as well.

***This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor***

*The above information should fit onto the first page of your CAT*

## SEARCH STRATEGY

Terms used to guide the search strategy			
<u>P</u> atient/Client Group	<u>I</u> ntervention (or Assessment)	<u>C</u> omparison	<u>O</u> utcome(s)
Fear of falling FOF Fear of falling in older adults	Cognitive behavioural therapy Cognitive behavioural therapy based intervention CBT	Lower extremity strengthening Lower body rehabilitation LE strength training LE Exercise program Lower body exercise program	Fall* Fall risk

### Final search strategy (history):

*Show your final search strategy (full history) from PubMed.*

1. "Fear of Falling"
2. Fear of Falling [MeSH term]
3. Cognitive behavioural therapy
4. (strengthening OR strength training OR exercise) AND ("lower extremity" OR "lower limb" OR "lower body")
5. Fall\* OR fall risk
6. #1 AND #3 AND #4 AND #5 (3 results)
7. #2 AND #3 AND #4 AND #5 (3 results)
8. #1 AND #3 AND #5 (81 results)
9. #1 AND #4 AND #5 (47 results)
10. cognitive behavioural therapy [MeSH]
11. #1 AND #10 AND #5 (27 results)
12. #1 AND #4 AND #10 (20 results)

*In the table below, show how many results you got from your search from each database you searched.*

Databases and Sites Searched	Number of results	Limits applied, revised number of results (if applicable)
PubMed	27 & 47 (search 9 & 11)	Not applicable
PsycINFO	35 (combining 2 different searches- CBT/(str &LE))	
Web of Science	23 and 45 (CBT/(str & LE))	

### INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria
English language Published in last 15 years Case studies, RCT's, systematic reviews, meta-analyses, single-group pre-post design

Older adults Independent or Modified independent ambulator
<b>Exclusion Criteria</b>
Abstracts Letters to the editor Not published in English Studies involving Nonambulatory individuals

## RESULTS OF SEARCH

### Summary of articles retrieved that met inclusion and exclusion criteria

*For each article being considered for inclusion in the CAT, score for methodological quality on an appropriate scale, categorize the level of evidence, indicate whether the relevance of the study PICO to your PICO is high/mod/low, and note the study design (e.g., RCT, systematic review, case study).*

Author (Year)	Risk of bias (quality score)*	Level of Evidence**	Relevance	Study design
Huang TT (2016)	PEDro Scale - 9/11	1b	High	Prospective RCT
Sipardo (2017)	AMSTAR - 10/11	1a	Moderate	Systematic Review of RCT's
Liu (2014)	Downs & Black (modified) - 23/29, PEDro - 8/11	1b	High	RCT
Parry (2016)	PEDro Scale - 7/11	1b	High	RCT
Hwang (2016)	PEDro Scale - 7/11	1b	Moderate	RCT
Freiberger (2012)	PEDro Scale - 9/11	1b	Moderate	RCT
Oh (2012)	PEDro Scale - 5/11	2b - This was downgraded due to the poor PEDro score and lack of adequate follow up.	Moderate	RCT
Brouwer (2003)	PEDro Scale - 7/11	1b	Moderate	RCT

\*Indicate tool name and score

\*\*Use Portney & Watkins Table 16.1 (2009); if downgraded, indicate reason why

## BEST EVIDENCE

The following 2 studies were identified as the 'best' evidence and selected for critical appraisal. Rationale for selecting these studies were:

- Huang, TT, Chung ML, Chen FR, Chin YF, Wang BH. Evaluation of a combined cognitive-behavioural and exercise intervention to manage fear of falling among elderly residents in nursing homes. *Aging Ment Health*. 2016; 20: 2-12.
  - This randomized controlled trial looked at cognitive behavioural interventions with and without exercise and compared to a control group. This is very similar to my question as it contained lower extremity exercises and the cognitive behavioural therapy to see if there were differences in outcomes on fear of falling. This study also scored well on the PEDro scale, has a high level of evidence, small confidence interval, and is clinically significant to my question.
- Liu, YWJ, Tsui CM. A randomized trial comparing Tai Chi with and without cognitive-behavioral intervention (CBI) to reduce fear of falling in community-dwelling elderly people. *Arch Gerontol Geriat*. 2014; 59: 317-325.
  - This randomized trial again compared exercise versus cognitive behavioural therapy. While the Tai Chi may not specifically be considered a lower extremity strengthening program the exercises do target the lower extremity and generally can be considered as such. Similarly, this study scored pretty well on the PEDro scale, has a high level of evidence, determined the NNT and effect size, has a small confidence interval and is clinically significant to my question.

## SUMMARY OF BEST EVIDENCE

### (1) Description and appraisal of (study title) by (authors, Year)

*Evaluation of a combined cognitive-behavioural and exercise intervention to manage fear of falling among elderly residents in nursing homes by Huang et al (2016)*

#### Aim/Objective of the Study/Systematic Review:

The aim and objective of the study was to examine the effect of cognitive behavioural therapy with and without exercise in decreasing the fear of falling in the elderly.

#### Study Design

[e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]

Note: For systematic review, use headings 'search strategy', 'selection criteria', 'methods' etc. For qualitative studies, identify data collection/analyses methods.

This study was a prospective randomized controlled trial where the subjects and therapists were not blinded. However, there was random and concealed allocation and they provided adequate follow-up with the groups. Outcomes for five areas were taken at baseline, with follow-ups at two-months and five-months.

#### Setting

[e.g., locations such as hospital, community; rural; metropolitan; country]

The settings for this study were spread out through six nursing homes in northern Taiwan.

#### Participants

[N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]

Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article.

The participants included in the study were all over the age of 65 years with a mean age of 79.4 years. All participants scored 13 or greater on the Mini-Mental State Exam score with a mean of 23.5. All participants were independent or modified independent ambulators and there were 40 men and 40 women. Some of the participants had had a fall in the last year and some reported they had not fallen in the last year. There were 5 participants who were lost at follow-up due to discharge from the nursing home or hospitalization before the

final follow-up session was conducted. The groups were all comparable at baseline in that there were no significant differences between the groups for all variables. The education levels varied where 36 participants had less than 6 years of education and 44 had greater than 6 years of education. The majority were on medicines that may induce hypotension (74 to 6), the average BMI was 22.83, and their level of being able to independently perform ADL's averaged at 58.5. All three groups were comparable at baseline and the participants were recruited (without stating how) from nursing homes in northern Taiwan.

### Intervention Investigated

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

*Control* – Participants in the “comparison group” received a fall prevention brochure at the beginning of the study then received usual care throughout the study.

*Experimental* – there were two experimental groups – 1. Cognitive behavioural therapy group only and 2. Cognitive behavioural therapy plus exercise.

1. The cognitive behavioural therapy group received treatment from a training professional (nurse) who was also a geriatric specialist. This group participated in sessions that were approximately 25 minutes in length, included a small number of people (6-8), and these sessions lasted for 8 weeks in duration. There were 8 topics that were covered during each session and these included: “(1) introduction (defining falling and FOF); (2) the risks of falling and FOF; (3) the consequences of falling and FOF; (4) associations with falls or FOF; (5) participants’ point of view of FOF (positive and negative aspects regarding the topic); (6) strategies to manage FOF and family support; (7) implementation in the participants’ daily life; and (8) problem solving (learning how to fall, stand up, and call for help when falling does occur).
2. The cognitive behavioural therapy with exercise group received treatment from two nurses who were specialized in geriatrics and received training from the authors to conduct the sessions appropriately. This group performed the sessions for 8 weeks and the exercising program was administered twice a week for 30 minutes with the goal of improving upper and lower extremity strength. They performed 3 sets of 10 repetitions for their upper extremity with 1 minute, 30 seconds rest between sets for the first 4 weeks then progressed to 3 sets of 15 repetitions and 1-minute rest for the final 4 weeks. These upper extremity exercises included gripping a ball for 5 seconds (handgrip Swiss ball) and upper limb elevation (raised plastic water bottles filled with water) for 5 seconds. The lower extremity exercises included ankle plantar and dorsiflexion and elevation knee exercises both of which lasted 10 seconds and were performed at 2 sets of 10 repetitions with 1 minute and 30 seconds rest for the first 4 weeks and 2 sets of 15 repetitions and 1-minute rest for the final 4 weeks. Lastly, they also performed sit-to-stand activities within the parallel bars 1-5 times during the first 4 weeks and 3-10 times in the final 4 weeks.

### Outcome Measures

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

1. Geriatric Fear of Falling Measurement (GFFM)– This is a questionnaire that the participant filled out themselves and a research assistant with higher scores indicating a greater fear of falling. It looks at aspects of 3 areas – “psychomatic symptoms, adopting an attitude of risk prevention, and modifying behaviors”.<sup>4</sup> This outcome includes 15 items and ranges from 15-75.<sup>3</sup> The scores for this measure ranged from 47.15 to 55.71.
  2. Falling Efficacy Scale (FES)(Chinese Version) – This is also a questionnaire that the participant filled out themselves and a research assistant where higher scores indicate more confidence in performing and maintaining daily activities such as transfers, ambulation, and reaching. The scores range from 1-100 and the scores for this group ranged from 22.00-30.31.
  3. Falls Record Checklist – This is a list that describes how many falls a person has had. Their terms of a fall meant a situation in which a part of the person’s body touches the ground unintentionally. The range for falls was from 0 -10.
- Secondary Measures –**
4. Taiwanese Depression Scale (TDS) – This is a questionnaire that was also done by the participant with a research assistant. This scale assesses “emotional, cognitive, and physical aspects of depression”.<sup>4</sup> The scale ranges from 0-54 with higher scores indicating greater depressive symptoms. The range for this study was 3.56-20.50 with a cut-off score of 19.
  5. Tinetti Mobility Scale – This scale assesses gait and balance. Lower scores are considered to display a person has decreased mobility or balance where a score of <14+/- 6 the person may be at risk of falling and having gait scores <9 or balance scores <10 the person is at risk for falling. The range for this scale was 9.15-16.56 for mobility, 3.33-7.22 for gait, and 6.00-9.33 for balance. The article failed to mention who administered this scale.

6. Micro FET2 – This was performed by a physical therapist who was blinded to the group allocations. Three measurements were taken on both upper and lower extremities and the highest value was recorded of the three trials. Higher scores in pounds of force indicate greater strength. Right upper extremity strength ranged from 8.58-10.97lbs, left upper extremity strength ranged from 6.66-9.04lbs, right lower extremity strength ranged from 7.33-10.30lbs, and left lower extremity strength ranged from 7.07-9.81lbs.

All of these outcomes were administered in a secluded area away from other participants such as in their own rooms or the conference room.

### Main Findings

[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.]

The study was performed with 25, 25, and 24 individuals in each group which the authors found was enough to provide 80% power with alpha set at .05. (To achieve this number at least 21 people were required in each group).

The study demonstrated that the cognitive behavioural therapy group plus exercise had significantly better results than the comparison group at the end of the program (5 months) in all outcomes tested. In addition, it was found that the cognitive behavioural therapy group without exercise had a significantly improved GFFM at the 2-month assessment and at the end of the 5 months had a decreased incidence of falling when compared to the control group.

For the GFFM scale differences between the groups was calculated as being significant with a p-value at .001 and F-value at 10.95 (measured with mixed-model analysis) and there was a significant difference between the cognitive behavioural group combined with exercise compared to the control group with a p-value of .05 and F-value at 3.8.

For the FES scale it was found that there was a significant difference between the three groups with a p-value of .001/F-value 12.88, and when comparing the cognitive behavioural group plus exercise compared to the control group there was a significant difference at the end of the program with a p-value at .05/F-value-3.74.

For the fall incidence among the groups there was a significant difference with  $X^2 = 16.16$  and p-value at .001 (using Kruskal – Wallis statistics).

If not specifically stated above, then a significant finding was not found.

There were also secondary findings but these do not specifically pertain to my clinical scenario so these have not been included for further discussion in this section.

### Original Authors' Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

The authors concluded that the dual cognitive behavioural therapy combined with exercise program administered over an 8-week period can decrease the fear of falling as well as incidence of falls in older persons residing in a nursing home. They also concluded that there are secondary benefits of administering this program which include improved mood and encouraging increased strength and mobility.

### Critical Appraisal

#### Validity

[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.]

This study scored a 9/11 on the PEDro scale with blinding being the only areas in which the study was lacking. The authors tried to blind the subjects but noted that they could not guarantee the subjects either did not talk about what they were doing with other residents or that residents did not see them participating in the study by walking by the room and observing them. They attempted to conduct the study in a conference room away from the rest of the residents of the home but this was not always fool proof. They also discussed with the residents that they were not to speak with others in the nursing home about the program they were involved in. This was a well-designed study and the results are believable, significant and the improvements seem to be due to the interventions that were imposed. These results may be generalizable to frail older persons living in a nursing home or those of similar demographics in the community as this was a small sample size and the follow-up was of short duration. This study did not control for the mental state of the participants other than they had to score greater than a 13, so there may be discrepancies in those participants who had less than 24 on the MMSE. It was also noted that the cognitive behavioural plus exercise group had higher overall MMSE

scores but that this difference was not significant.

### **Interpretation of Results**

[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.]

This was a good well-designed study. There were limitations in terms of duration of intervention, a smaller sample size, and only a 3-month follow-up post exercise, but overall the study was good and had significant believable results. Even though this study lost 5 participants it was still able to maintain the necessary number to attain 80% power and have a significantly large effect size. It would be interesting to see a study of this kind that also included an exercise group only so as to see the differences in effect of exercise alone compared to the other 3 groups. These participants were considered to be of older age (mean of 79.59 years old) and frail in that they had a mean ADL score of 58.80 but this group may still be generalizable to my patient as she was 72-years old without mention of her health. The differences in means at baseline was small which is good, and was much larger at 2-months after the intervention. However, at the end of the 3-month follow-up post intervention the differences decreased a lot but were still considered significant differences compared to the baseline measurements. This to me demonstrates the need for continued intervention, or a more sustainable program for the future or the results may be lost with a longer follow-up time. These results also demonstrate the cognitive behavioural therapy alone may have a significant impact on reducing the fear of falling but that the combination of cognitive behavioural therapy and exercise has the best and most desirable impact. This is why it would have been significant to have an exercise group alone so as to compare the significance between exercise and cognitive behavioural therapy each in their own respects. It was also found that the CBI + exercise group sustained a significant difference at the 3-month follow-up whereas the CBI group alone only displayed a significant difference at the first check-in and not the 3-month follow up. This would demonstrate that the CBI + exercise group provided more sustainable and long term results than the CBI alone. Which demonstrates further need as mentioned above to evaluate whether the exercise is what makes this group sustainable in the long-term.

### **Applicability of Study Results**

[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.]

While this study focused on older, frail adults living in a nursing home I feel the results may be generalizable to a greater population. My clinical scenario did not delve into specifics about the person's capabilities of performing ADL's or their residential status however, it is thought that this female would be eligible to reside in a nursing home if needed. The exercises performed in this study were very basic and would be very easy to perform in a clinical situation. The cognitive behavioural therapy also seemed very basic and would be something a physical therapist would be able to implement in the clinic. However, due to the short (30 min) treatment times allotted to most PT clinics the chances of being able to perform both treatments together might be limited. The clinician would have to decide how much time is allotted for each intervention and treat accordingly. It might also be feasible to perform the cognitive behavioural therapy in the clinic and have the participant religiously perform an HEP program at home to get the benefits of both.

## **(2) Description and appraisal of (study title) by (authors, Year)**

*A randomized trial comparing Tai Chi with and without cognitive-behavioral intervention (CBI) to reduce fear of falling in community-dwelling elderly people by Liu et al in 2014.*

### **Aim/Objective of the Study/Systematic Review:**

The aim and objective of this study was to look at the effects of Tai Chi alone compared with Tai Chi combined with cognitive behavioural therapy on the fear of falling as well as their effects on improving sociability, well-being, and mobility in elderly persons.

### **Study Design**

[e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]

Note: For systematic review, use headings 'search strategy', 'selection criteria', 'methods' etc. For qualitative studies, identify data collection/analyses methods.

This study was a prospective randomized control trial where the subjects and therapists were not blinded and there was lack of adequate follow-up. However, there was random and concealed allocation. There were six outcome measures taken at baseline, 8 weeks and 16 weeks.

**Setting**

[e.g., locations such as hospital, community; rural; metropolitan; country]

The settings for this study were in 4 elderly community centers in Hong Kong within the Wing Tai Sin District.

**Participants**

[N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]

Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article.

The participants in this study were recruited from four community centers in Hong Kong and were considered community dwelling adults. The groups were found to be similar at baseline and were eligible for the study if they had had a fall in the last year and were found to have had a fear of falling. They were also needing to be in stable physical health and be able to stand on one leg for at least 5 seconds to be able to perform the necessary Tai Chi movements which would be implemented during the study. There were 122 participants in the study with 15 participants who were lost to follow-up due to health problems or unknown reasons. The average age of the participants was 74.5, there were 106 females and 16 males, they averaged 5.1hrs of exercise per week, and had an average of 1.28 diseases. The majority were widowed (79) compared to married (43), 41 lived alone and 80 lived with their families. The education levels varied widely with 42 saying they had no education, 66 saying they had 1-6yrs of education, and 14 saying they had greater than 6 years of education. 119 stated they had had at least 1 fall in the last year and 3 stated they had more than one fall in the last year. 92 of these falls resulted in no injuries, and 3 resulted in minor injuries.

**Intervention Investigated**

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

*Control*

The control group in this study was considered the group that underwent Tai Chi only. Both groups were given an educational booklet about Tai Chi at baseline. This groups had 8-weeks of Tai Chi intervention where they performed a warm-up, then had 50 minutes of Tai Chi, and then this was followed-up with a 5-minute cool down. These sessions were done in groups of 10-11 participants and the instructors were educated on providing a basic 10-step Tai Chi Program which was designed by the author and Tai Chi coach. This program was the same program given to the experimental group as well. This group was instructed by a certified Tai Chi coach who had over 20 years of experience.

*Experimental*

The experimental group underwent the same Tai Chi intervention as stated above as well as having cognitive behavioural therapy for 60-90 min each week for 8-weeks. This cognitive behavioural therapy consisted of strategies to increase confidence within the participants in terms of being able to control falling as well as increasing their mental health about falling. These were performed under the premise that cognitive behavioural therapy aims to "(1) [re-structure] misconceptions to promote an understanding of the fear and risk of falling as controllable, (2) setting realistic goals for safely increasing activity (personal capabilities were taken into account), and (3) shifting from negative thoughts to positive responses with concrete activities such as exercise and recognizing and eliminating hazards related to falls."<sup>5</sup> The cognitive behavioural therapy sessions were designed by the author as well as a certified cognitive behavioural therapist and were given by the author as well as another individual who received 8 hours of training. The sessions were observed to demonstrate standardization among the groups and each session was run by the same person for each group.

**Outcome Measures**

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

1. Chinese Falls Efficacy Scale (CFES-I) – This is a tool that assesses a person’s fear of falling. This self-assessed questionnaire focuses on 16 different activities in and around their home as well as their community. There are 16-items with scores ranging from 16-64 with the higher number indicating a higher fear of falling. These outcomes were administered by a blinded research assistant. The scores for this study ranged between 30.02 to 22.93. Cut-off points determining a high or low concern about falling have been set at 16-22 and 23-64.
2. Personal Wellbeing Index-Chinese Version (PWI-CV) - This scale looks to assess a person’s well-being in seven domains – “standard of living, personal health, achievement in life, personal relationships, personal safety, community-connectedness, and future security”<sup>5</sup>. Scores range from 0-70 with higher scores indicating better subjective wellness. The scores for this study ranged from 57.09-61.29.



3. Social Participation – This section was determined by five pre-planned questions which looked at the participant’s involvement in activities outside the home, exercise, shopping, eating at a restaurant, and traveling. The scores could be from 0-10 with higher scores indicating greater social participation. The range of scores for this study were 5.79-6.87.
4. Tinetti’s Balance – This measure has 13-items to assess balance in an individual. These include – “sitting balance, sit to stand, immediate standing balance (first 3-5 s), standing balance, balance with eyes closed, turning 360°, nudging the sternum, turning the neck, unilateral stance, extending the back, taking an object down from above, picking an object up, and sitting down.”<sup>5</sup> The scores can range from 0-26 with higher scores indicating better balance. The scores for this study ranged from 15.46-15.82.
5. Tinetti’s Gait – This is a scale to assess a person’s mobility. This test looks at 9 different areas which include: “initiation of gait, step height and length, step symmetry and continuity, path deviation, trunk stability, walking stance, and turning while walking.”<sup>5</sup> This scale ranges from 0-12 with a higher score meaning better mobility. The scores for this study ranged from 11.61-11.67.
6. Tinetti’s Total – This is the total of the balance and gait scores combined. The scores could range from 0-28 and in this study they ranged from 27.07-27.47.

\*There were discrepancies with the scoring noted in the article written section and the table for the Tinetti scales. In the written section it had the balance scores totally at a max of 26 and the gait totalling at 9. So the total Tinetti with both combined should be 35 points. However, when looking at the table the balance scores max at 16 and the gait maxes at 12 so the total Tinetti’s is at 26.

### Main Findings

[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.]

The results demonstrate that there was a significant reduction in the fear of falling based off of their CFES-I scores for both the Tai Chi group at 8 weeks - “(mean difference: - 5.11, 95% CI: -6.28 to -3.94, p<0.00)”<sup>5</sup> and 16 weeks - “(Mean difference: -6.08, 95% CI: -7.26 to -4.89, p<0.00)”<sup>5</sup>, and for the Tai Chi plus CBI group at 8 weeks “(mean difference: -4.47, 95% CI: -5.56 to -3.38, p<.00)”<sup>5</sup> and 16 weeks “(mean difference: -6.22, 95% CI: -7.32 to -5.12, p<0.00)”<sup>5</sup>.

It was found that both of these interventions resulted in significant changes in the participants fear of falling, however it was found that there was not a statistical significant difference between the groups at baseline, 8-weeks, and 16-weeks. Between groups mean difference: -0.46, 95% CI: -2.74 to 1.81, p<0.69 and interaction effect (group x time) mean difference: .13, 95% CI: -0.82 to 1.09, p<.78.

### Original Authors’ Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

The authors concluded from this study that both interventions of Tai Chi and Tai Chi combined with Cognitive Behavioural Intervention significantly improved the participants fear of falling. In addition, they also concluded that the combined therapy group improved wellbeing and that neither intervention had a significant effect on social participation or mobility. Furthermore, they question the use of adding CBI to Tai Chi since this addition does not have a significant effect on outcomes compared to Tai Chi alone.

### Critical Appraisal

#### Validity

[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.]

This study scored an 8/11 on the PEDro scale where it was lacking in blinding of the subjects and therapists and failed to meet the follow-up criteria. The authors set the number 49 as the number needed in each group to adequately evaluate the mean difference in each group and have an effect size of .41. They also stated that they had 64 participants in each group which they did not. The Tai Chi group had 58 participants and the combined group had 64 for a total of 122 not 128. With their attrition rate the Tai Chi group dropped to 45 participants at the first set of outcome measures and 43 for the 2<sup>nd</sup> set of outcome measures which falls below the 49 participants that are needed. The combined group dropped from 64-54-53 at each respective time frames. This was a small study that only followed participants for 2-months following the end of the interventions. The groups were similar at baseline which is good however, their activity level seems to be higher than a typical 75-year-old person. The groups averaged 5 hours of exercise per week. The results may not be generalizable to the typical older adult. This study also did not include a group which did not receive treatment, comparing these groups to an exercise group, or including a group which only had cognitive behavioural therapy.

### **Interpretation of Results**

[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.]

Overall, this was an ok study. The risk of bias in this study may be higher than others since it did not include blinding of the participants or the therapists and lacked adequate follow-up. It was also noted in the article that attendance for the Tai Chi group remained above 50% during the intervention period while the CBI group had 15 participants who participated in less than 50% of the sessions. This seems to me like it could have an effect on the results for both groups and the expectation of only having the participants partake in the intervention for 50% of the time seems to be damning to the results. This study also consisted of 95% female participants. While this may be generalizable to my clinical scenario specifically it would most likely not be generalizable to everyone. The results demonstrated that both groups had a significant effect on the fear of falling however there was not a difference between groups for this effect. It would have been beneficial to include another intervention group for CBI only so as to determine if there was a difference individually for these interventions as well as adding in a control group which received no therapy at all. The authors aimed to achieve a .41 effect size which is considered large however, with the attrition rate for the Tai Chi group I don't believe this was achieved and may be why the mean difference was not found to be significant between the groups. In any case, despite some of these short comings this study did demonstrate that a significant difference can be made in affecting participants fear of falling by instituting Tai Chi and CBI. It is unknown in this study if CBI alone would have a significant effect but seems it would be logical to only perform Tai Chi in terms of being time/cost efficient, unless one was looking to provide other benefits, such as increasing personal well-being then it would be beneficial to combine both Tai Chi and CBI.

### **Applicability of Study Results**

[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.]

This study is applicable to my clinical scenario as the demographics of the groups are similar to the demographics of my patient. This study was also comparing an intervention similar to lower extremity exercise versus CBI but with both combined. This study would have been more applicable to have a CBI group only so as to have more information to perhaps decide between one intervention over the other rather than combined interventions. The Tai Chi intervention would be difficult to perform in the clinic unless one underwent the special certification needed in order to put on a session such as this. The 8hrs of training required for the CBI intervention seems reasonable (however, it is unknown how many hours it would take to be certified in Tai Chi but it is assumed it would be greater than 8hrs). The Tai Chi was also done in 1hr increments which may be hard in a clinic which has 30-minute appointments, but this might be circumvented by providing group therapy for an hour at a time. It would be practical to have approximately 60-90 minutes of CBI/week but most likely not for 8 weeks as I am sure insurance would frown upon seeing a patient 3 times per week for 8 weeks. This study does demonstrate the CBI combined with Tai Chi (lower extremity exercising) and Tai Chi alone can make a significant difference in the fear of falling in community dwelling individuals.

## **SYNTHESIS AND CLINICAL IMPLICATIONS**

[Synthesize the results, quality/validity, and applicability of the two studies reviewed for the CAT. Future implications for research should be addressed briefly. Limit: 1 page.]

### **Implications for clinical practice:**

Falls among older populations continue to be feared and with good reason as they can produce devastating injuries and cause a major financial burden due to their astronomical hospital costs. There are many programs currently available to combat the incidence of falls such as the *OTAGO program, A Matter of Balance, and Stepping On*. For clinicians in an outpatient clinic it is necessary for them to be able to prescribe exercises or interventions that are feasible, practical, and time efficient as well as evidenced based in their efficacy for their clientele. Many older adults who have experienced a fall and even those who have not experienced a fall, may have a fear of falling that limits their daily activities, affects their socialization, and causes them to be less active which may lead to negative health outcomes and actually increase their chances of having a fall.

This paper analysed 2 randomized controlled trials that were comparing cognitive behavioural therapy and lower extremity exercises (which includes Tai Chi) as interventions that may reduce the fear of falling and therefore decrease the incidence of falls and their associated negative consequences. Based on the findings of these two articles it was found that both CBI and lower extremity exercises alone may be effective at decreasing an older person's fear of falling, however it may be more beneficial to combine both of these interventions to achieve the best outcomes. These interventions were not only effective at reducing the fear of falling but also had secondary benefits for our patients as well that pertain to increased socialization, mood, strength, and mobility.

There are upwards of 65-92% of community dwelling older adults who are fearful of falling.<sup>2</sup> Many older adults will make their way into our clinics for not only their fear of falling but for other ailments that are bothering them. It is imperative that with percentages this high among our older citizens that we not only treat their primary ailments but also inquire about their fear of falling and if it negatively impacts their daily lives. These articles demonstrate that they are practical and feasible interventions that can be performed in the clinic to decrease the fear of falling among older adults. There are many papers which demonstrate the effectiveness of these interventions separately however, this critical appraisal focused on comparing these two interventions separately and combined. By combining both lower extremity exercises with cognitive behavioural therapy this may produce the most favourable results in order to decrease the fear of falling in older populations.

### **Implications for future research**

These two studies looked at CBI with and without exercise as well as Tai Chi with and without CBI and found significant results. Further research would be beneficial to delve further into the specifics of each intervention alone and combined. A research study that included a control group, a lower extremity exercise group, a CBI group, and CBI combined with lower extremity exercises would be ideal. This study would be most beneficial if it had a larger sample size compared to these studies as well as a longer follow-up to determine sustainability and long-term implications of the interventions. This type of study may show definitive results for which intervention would be the most beneficial and efficient to prescribe to the older adult population in order to decrease their fear of falling and therefore their incidence of falling which would have many positive benefits.

### **REFERENCES**

[List all references cited in the CAT]

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3. Chen TY, Edwards JD, Janke M. Examination of the psychometric properties of the geriatric fear of falling measure among community-dwelling older adults in the United States. *JAG*. 2017; 00(0): 1-15.
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5. Liu, YWJ, Tsui CM. A randomized trial comparing Tai Chi with and without cognitive-behavioral intervention (CBI) to reduce fear of falling in community-dwelling elderly people. *Arch Gerontol Geriat*. 2014; 59: 317-325.