

CRITICALLY APPRAISED TOPIC

TITLE

Does yoga impact balance, falls, or fear of falling in stroke patients over the age of 18 years?

AUTHOR

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CLINICAL SCENARIO

Stroke is one of the most common diagnosis among patients treated by occupational therapists in the rehabilitation setting, and the second most common cause of adult disability worldwide (Immink, Hillier, Petkov, 2014; Schmid et al., 2012). Survivors of stroke often develop long term motor and sensory deficits that include balance impairment and an increased likelihood for falling (Schmid et al., 2012). Balance impairments and falls are strongly associated with balance self-efficacy and fear of falling, which in turn decrease the perceived quality of life for older individuals recovering from stroke (Schmid et al., 2012). Yoga is a program of health and well-being that combines physical activity with mindfulness that has been proposed to provide benefits for the management of several chronic health conditions (Thayabaranathan et al., 2017). Some of the benefits of yoga are similar to other forms of physical activity that include building strength, improving flexibility, balance, and overall well-being (Thayabaranathan et al., 2017).

It has been proposed that people with stroke may benefit from both the physical and mindfulness components of yoga (Thayabaranathan et al, 2017). Occupational therapy guidelines suggest that individuals should receive balance training post-stroke to allow motor recovery and decrease likelihood for falling and to prevent fear of falling (Schmid et al., 2012). Despite these suggestions, there are no specific balance training recommendations currently available for therapists to use when working with patients recovering from stroke (Schmid et al., 2012). Yoga has been found to be therapeutic for older adults and some qualitative studies indicate that stroke survivors are physically and cognitively capable of engaging in yoga as a therapeutic activity (Schmid et al., 2012). This CAT explores the use of yoga for patients recovering from stroke with the goal of improving balance and decreasing the instances of falls or fear of falling. One of the two articles appraised found that an 8 week yoga program improved balance and fear related to falling for patients recovering from stroke. Apart from this, there is little conclusive evidence supporting the use of yoga for patients recovering from stroke and no significant evidence that yoga improves fear of falling. For this reason, further randomized control

trial studies with larger sample sizes are indicated to continue exploring the use of this intervention for adult patients recovering from stroke.

FOCUSSED CLINICAL QUESTION

Can yoga be used as an occupational therapy intervention to improve balance, falling, or fear of falling in patients recovering from stroke?

SUMMARY OF SEARCH

- Six studies were located that met the inclusion and exclusion criteria, including one systematic review of randomized control trials, two randomized control trials, one one-group nonrandomized study, one mixed methods study, and one single subject design.
- Two studies were selected for appraisal due to their randomized control design and relevance to our research question. One study (Immink et al., 2014) explored the effect of yoga on motor function, mental health, and quality of life outcomes in individuals with chronic post-stroke hemiparesis. The second study (Schmid et al., 2012) explored the effect of a yoga based rehabilitation intervention on balance, balance self-efficacy, fear of falling, and quality of life after stroke.
- The other studies were not appraised due to their lack of strength of design or because of extensive cross referencing of the articles chosen for appraisal.
- The selected studies provided inconclusive evidence supporting the use of yoga when working with patients recovering from stroke.
- Overall, there is a lack of rigorous research exploring the effects of yoga on balance, falling, or fear of falling for patients recovering from stroke. Lack of significant results and a weak evidence base are important considerations for therapists to keep in mind when determining use of yoga for stroke patients.

CLINICAL BOTTOM LINE

There is insufficient evidence that yoga has a significant effect on balance, falling, or fear of falling on adults recovering from stroke.

Important note on the limitation of this CAT

This critically appraised topic has been reviewed by a course instructor as part of a university assignment

SEARCH STRATEGY

Terms used to guide the search strategy

Patient/Client Group: Seniors, stroke, stroke survivor, neuro, older adult, 18 or older.
Intervention (or Assessment): Yoga, exercise
Comparison: n/a or no yoga
Outcome(s): Preventing falls, decreased instance of falls, balance, improved balance, core strength, prevent, prevention, wellness

Databases and Sites Searched	Search Terms	Limits Used
a. PubMed/MEDLINE b. CINAHL c. Google Scholar d. ClinicalKey	a. Yoga a. Stroke b. Fall Prevention c. Neurological Disorders d. CVA e. Falls f. Balance g. Falling	1997-2017 Peer Reviewed Full Text Available

INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria
<ul style="list-style-type: none"> • Patients older than 18 years, study must include some subjects older than 50 (we had to adapt this inclusion criteria because there was little to no literature exploring stroke and yoga for the specific age range of 65 and older) • Patients with neurological complication (stroke) • Yoga intervention was implemented
Exclusion Criteria
Cancer, rheumatoid arthritis, multiple sclerosis, Parkinson’s, traumatic brain injury, dementia, Alzheimer's (any neurological disease other than stroke), under 18 years old, cerebral palsy, no yoga intervention.

RESULTS OF SEARCH

A total of 6 (insert number) relevant studies were located and categorized as shown in Table 1 (based on Levels of Evidence, Centre for Evidence Based Medicine, 2011)

Table 1: Summary of Study Designs of Articles Retrieved

Study Design/Methodology of Articles Retrieved	Level	Number Located	Author (Year)
Systematic Review/Meta-Analysis	I	1	Thayabaranathan (2017)
Randomized Control Trial	I	2	Schmid (2012) Immink (2014)
One Group, Nonrandomized Study	III	1	Schmid (2016)
Mixed Methods Descriptive Study	IV	1	Portz (2016)
Single Subject Design	IV	1	Bastille (2004)

BEST EVIDENCE

The following study/papers were identified as the ‘best’ evidence and selected for critical appraisal.

- Immink, M.A., Hillier, S., & Petkov, J. (2014). Randomized controlled trial of yoga for chronic poststroke hemiparesis: Motor function, mental health, and quality of life outcomes. *Topics in Stroke Rehabilitation*, 21(3), 256-271. doi:10.1310/tsr2103-256
- Schmid, A. A., Van Puymbroeck, M. L., Altenburger, P. K., Schalk, N. M., Dierks, T. S., Miller, K., . . . Williams, L. (2012). Poststroke balance improves with yoga: A pilot study. *Stroke*, 43(9), 2402-2407. <https://doi.org/10.1161/STROKEAHA.112.658211>

Reasons for selecting these studies were:

<ul style="list-style-type: none"> ● The papers selected are the highest level of evidence that specifically addressed the research question. ● The studies focused on the use of yoga with adults who had a stroke. ● The studies selected are both relevant (<7 years old). ● The other studies were not considered due to their lack of strength of design or because of extensive cross referencing of articles chosen for appraisal.
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SUMMARY OF BEST EVIDENCE

Table 2A: Description and appraisal of: “Randomized controlled trial of yoga for chronic poststroke hemiparesis: Motor function, mental health, and quality of life outcomes”, a randomized control trial by Immink et al., 2014.

Aim/Objective of the Study/Systematic Review:
To assess the efficacy of yoga for motor function, mental health, and quality of life outcomes in individuals with chronic post-stroke hemiparesis.

Study Design

Randomized controlled trial in which participants were not blinded to their allocation, but the researchers were. Outcomes measured were physical outcomes (MAS for overall motor function, BBS for static and dynamic balance, 2MWD and CGS for ambulation), mental outcomes (GDS15 for depression and STAI for anxiety), and quality of life (SIS).

Setting

Group yoga sessions were held at a recreation room at the University of South Australia. Individual practices were held at the participants' residences.

Participants

Twenty-two people participated in this study; 11 in the intervention group and 11 in the control group.

- Participants were recruited via advertisements (posted in local community newspapers) and through local television and radio stations that announced the study and opportunity for participation. Online listings hosted by state and community health and disability organizations also announced the study, as well as local health providers who informed their clients about the study. Recruiting occurred at the metropolitan region of Adelaide, South Australia.
- Interested individuals were screened for eligibility based on self-report via a telephone conversation with the researchers. If they met the inclusion criteria, they were invited for a 30 minute baseline assessment, and then randomized for group placement.
- The inclusion criteria required the participants to be 18 years of age or older, have a diagnosis of stroke at least 9 months prior to baseline assessment and resulting in hemiparesis (one-sided weakness), complete post-stroke rehabilitation, have the ability to follow 2-step commands, and have the ability to ambulate independently or with supervision, with or without an assistive device.
- The exclusion criteria included the presence of neurological or neuromuscular conditions, current or previous participation in yoga or meditation practice, or current participation in structured exercise programs.

Intervention Investigated*Control*

There was no active substitute intervention for the control group. Instead, it was a wait-list design. The participants in the control group were given the opportunity to engage in the yoga intervention after the study had concluded.

Experimental

The ten-week intervention included weekly 90 minute group classes and daily 40 minute individual home practice sessions. (The weekly class started with a 10 minute educational lecture on yoga concepts, followed with 30 minutes of yoga asana, 10-12 minutes of

pranayama, and 20-30 minutes of Satyananda Yoga Nidra. The class concluded with an 8-10 minute discussion. The daily home practice sessions were between 35-45 minutes (10-20 minutes for yoga asana and pranayama, followed by 25 minutes of Satyananda Yoga Nidra). This was done with an illustrated guide book and compact disc containing audio recording to verbally guide the participants).

The weekly group classes were facilitated by two qualified yoga teachers who were selected for their high level of experience in teaching yoga for individuals with special needs. These two were supervised and supported by one of the authors (a qualified yoga teacher with experience in the development and delivery of yoga for chronic conditions, and expertise in motor behavior and clinical exercise physiology).

Outcome Measures (Primary and Secondary)

The Motor Assessment Scale (MAS) evaluates everyday overall motor functions. There are 8 items related to motor function scored on a 7-point scale (0 indicates inability to perform the movement and 6 indicates optimal function). MAS scores range from 0 to 48.

The Berg Balance Scale (BBS) is a 14-item measure of static and dynamic balance in stroke patients. Scores range from 0 to 56, with scores of 46 or less indicating a fall risk after stroke.

The Two-Minute Walk Distance (2MWD) evaluates the distance someone is able to ambulate within 2 minutes (with or without an assistance device).

The Comfortable Gait Speed (CGS) consists of a 7 meter distance test to evaluate ambulation.

The Geriatric Depression Scale (short form-GDS15) was used to measure depression. Scores ranging between 5-7 suggest mild depression, scores between 8-9 suggest moderate levels, and scores 10 or greater suggest severe depression.

The State Trait Anxiety Inventory (STAI, two forms: Form Y1: state anxiety- how the participant feels at the moment in time; and Form Y2: trait anxiety- how they generally feel). Both forms consist of 20 items, rated on a 4-point Likert scale.

The Stroke Impact Scale (SIS) measures quality of life across 9 dimensions, including strength, hand function, mobility, ADLs, emotion, memory, communication, social participation, and stroke recovery. Each dimension is scored with a 100-point scale, with a higher score representing higher quality of life.

Main Findings

This study aimed to test the efficacy of yoga for motor function, mental health, and quality of life outcomes in individuals who have chronic poststroke hemiparesis (N=22, intervention group n=11, control group n=11).

Analysis of the MAS and BBS outcomes led to no significant main effects or interactions. However, a significant main effect of time was found for the 2MWD; across both groups, 2MWD increased significantly from baseline (89.5±52.7m) to post-test (97.1±49.8m). There were no significant changes in 2MWD score within each group. There was also no significant differences found in the CGS either.

There were no significant effects or interactions for depression scores on the GDS15 (ICC=0.52). There was also no significant effects or interactions for state anxiety (ICC =0.11), but a significant main effect of time was found for trait anxiety (t=2.13, p=0.045, ICC=0.28). For both groups, mean trait anxiety scores significantly reduced from baseline (43.6±10.4) to post-test (38.6±10.7). Post-intervention analysis for changes in trait anxiety scores for the intervention group approached significance (p=0.078).

The physical domain of the SIS (which focused on strength, hand function, mobility, and ADLs) found that there was a main effect of time (t=-3.20, p=0.002, ICC=0.86). Post hoc analysis found that a significant increase in mean physical domain scores for the intervention group (p=0.001, Cohen's d=0.57) from baseline (53.5±19.4) to post-test (64.4±20.0), but the change for the control group was not significant (p=0.663, pretest=52.3±19.4, posttest=54.1±23.3).

The memory domain of SIS found a significant effect of time (t=-2.43, p=0.024; group effect almost reaching significance (p=0.056) and a significant group x time interaction (t=2.09, p=0.048, ICC=0.63). There was a significant increase in mean memory domain scores for the intervention group (p=0.022, Cohen's d=0.44; baseline=76.0±22.3, posttest=87.5±11.0) while the change for the control group was not significant (p=0.664, baseline=74.7±19.8, posttest=72.2±21.0).

There were no significant effects or interactions for the emotion, communication, and social domains (ICC=0.60, 0.75, 0.51 respectively).

Original Authors' Conclusions

Although some significant findings were apparent, the sample size of 22 in this RCT was small and underpowered. Therefore, it is difficult to make a definitive statement on the efficacy of yoga for this population. The mobility and balance outcome changes did not reach significance and similar changes were apparent in the control comparison group. There was no clear benefit of yoga for motor function outcomes.

However, yoga may still be beneficial for individuals who had a stroke, especially regarding their emotional well-being, mental health, and quality of life. There was a larger reduction in trait anxiety in participants in the intervention group compared to the control. Also, the mean state anxiety scores after the yoga intervention decreased below a

score of 39 (above 39 indicates a presence of state anxiety). Yoga should only be taught and implemented by a qualified and experienced yoga instructor and individual effectiveness should be monitored.

Critical Appraisal

Validity

- Small sample size means this RCT was underpowered.
- Selection bias likely occurred because volunteers' participation may have been driven by interest in yoga.
- Funding bias is possible as the National Stroke Foundation funded this study.
- Co-intervention bias is possible because participants' medications and treatments outside of yoga were not controlled.
- It is possible that there was a lack of masked, or independent evaluation, as 2 participants disclosed their allocation to the yoga intervention at the post-intervention assessment.
- PEDro Score: 8/10 based on Eligibility Criteria: Yes; Random Allocation: Yes; Concealed Allocation: Yes; Baseline Comparison: Yes; Blind Subjects: No Blind Therapist: No Blind Assessors: Yes; Adequate Follow-up: Yes; Intention-to-treat analysis: Yes; Between Group Comparison: Yes; Point Estimates and Variability: Yes. (Eligibility score does not contribute to total score.)

Interpretation of Results

There is a need for future research to further investigate the use of yoga with stroke rehabilitation, including larger RCTs with appropriate active control conditions. It would be helpful for a consensus to be reached on yoga dose or length of training activities parameters. Although the data appear to support the notion that participation in yoga in comparison to no intervention provides benefits for this population, no definitive statement can be made regarding its efficacy.

Summary/Conclusion

Yoga intervention may benefit patients with chronic stroke, specifically by improving emotional well-being, quality of life, and physical disability management. However, more research is needed to determine the exact impact and efficacy of yoga for stroke rehabilitation. Immink et al. (2014) show that yoga intervention is correlated with improvements related to mental health and quality of life; however, there were no general

similarities or trends among their findings related to the research question at hand. Immink et al. (2014) report no significant changes in balance for the yoga group compared to controls and did not explore fear of falling. This study used small sample sizes, contained sampling bias, and used inappropriate control conditions that created limitations that underpowered the study. Thus, the data presented in this study is not conclusive regarding a role for yoga in stroke rehabilitation when aiming to improve balance or falling/fear of falling.

Table 2B: Description and appraisal of: “Poststroke balance improves with yoga: A pilot study”, a randomized control trial by Schmid et al., 2012.

Aim/Objective of the Study/Systematic Review:
To develop and test the effectiveness of an 8-week yoga-based rehabilitation intervention on balance, balance self-efficacy, fear of falling (FoF), and quality of life after stroke.
Study Design
<p>Prospective randomized controlled trial design with treatment that took place over an 8 week period.</p> <p>Participants were randomized, after baseline assessments were completed, to 1 of 3 groups: (1) group yoga; (2) yoga-plus (group yoga plus at-home yoga/relaxation audio recording); or (3) control. Once the participants had completed the study, an 8-week assessment was given.</p> <p>Randomization lists were computer-generated and treatment group assignments were revealed after completion of baseline assessments by opening a sealed opaque envelope.</p>
Setting
Group yoga sessions were held at Indiana University Rehabilitation and Integrative Therapy laboratory. Individual practices were held at the participants’ residences for the yoga plus home program group.
Participants
<ul style="list-style-type: none"> • 47 people participated in this study; 19 participants in the yoga group, 18 participants in the yoga plus home program group, and 10 participants in the control group. Participants were chosen on the basis of inclusion criteria. • Veteran participants were recruited through chart review to ensure a stroke diagnosis. Non-veteran participants were recruited from local stroke support groups and previously completed stroke research studies. • The inclusion criteria require the participants to be 18 years of age or older, speak and understand English, have a diagnosis of stroke at least 6 months prior to baseline assessment, have completed all stroke-related rehabilitation, have the ability to stand with or without a device, score at least a 4 out of 6 on the short 6-

item Mini-Mental State Examination, and agree to commit to assessments and 16 sessions of group therapy.

- The exclusion criteria included receiving palliative care, the inability to ensure transportation to the sessions, self-reported medical contraindications (serious cardiac condition, serious chronic obstructive pulmonary disease or oxygen dependence, severe weight bearing pain, a history of significant psychiatric illness, uncontrollable diabetes with recent weight loss), and any current enrollment in another research trial.
- In the yoga groups, 29 participants completed all 8 weeks of the study with post-assessments. 3 participants did not complete post-assessments, 4 attended 5 sessions, and 1 was hospitalized for reasons unrelated to the intervention. Participants missed Yoga sessions because of lack of transportation, inclement weather, illness, and work. Participants were physically able to complete all planned yoga activities and no injuries were sustained.
- There were no baseline differences in demographics, stroke characteristics, or baseline scores between those who did and did not complete the study.

Intervention Investigated

Control

The control group (n=10) completed baseline and 8-week assessments without any intervention or contact during the study time.

Experimental

- The yoga-based rehabilitation intervention was developed and taught by a registered yoga therapist with input from the rehabilitation research team. A standardized yoga protocol was developed with modified postures, breathing, and meditation in sitting, standing, and supine positions. Postures were chosen based on previous experience and evidence supporting improved balance via a focus on hip and ankle flexibility and strength. All sessions included focused deep relaxation/meditation.
- Both the yoga group (n=19) and yoga plus home program group (n=18) participated in 1 hour sessions 2x/week for 8 weeks at the Indiana University Rehabilitation and Integrative Therapy laboratory.
- The yoga plus home program group also received a device that was preloaded with a 20-minute relaxation recording. Participants randomized to this group were asked to listen to the recording 3 times each week and to track their use of the device.
- Over the 8-week period, the group yoga sessions were increased in intensity and difficulty to allow for early success and progressive improvement. Mat tables, bolsters, blankets, and yoga straps were used as needed to facilitate yoga postures.

Outcome Measures (Primary and Secondary)

The Modified Rankin Scale measures the degree of disability after stroke, with 6 categories of disability: 0=no symptoms; 1=no significant disability; 2=slight disability; 3=moderate disability; 4=moderately severe disability; 5=severe disability; and 6=deceased. Functional independence was defined as 0 to 2 (slight to no disability) and dependence was defined as 3 to 5 (moderate to severe disability).

The Berg Balance Scale is a 14-item measure of static and dynamic balance. Scoring ranges from 0 to 56, with higher scores indicating better balance. A score of ≤ 46 identifies an individual at risk for falls after stroke.

The Activities-specific Balance Confidence is a subjective measure of confidence in performing various ambulatory activities without falling or experiencing a sense of unsteadiness. Measure contains 16 questions, each one beginning with, "How confident are you that you will not lose your balance or become unsteady when you...". Items are rated on a rating scale that ranges from 0 – 100. A score of zero denotes no confidence, a score of 100 denotes complete confidence

A Dichotomous (yes/no) variable measures Fear of Falling. It is a modified version of a previously developed yes/no question, "are you worried or concerned about falling?"

The Stroke-Specific Quality Of Life is a self-report scale containing 49 items in 12 domains: self-care; vision; language; mobility; work; upper extremity; thinking; personality; mood; family; social; and energy. Provides an assessment of health-related quality of life specific to patients with stroke.

All measures were conducted at baseline and 8 weeks for both yoga groups and the control group.

Main Findings

This research study was implemented in order to develop and test the effectiveness of an 8-week yoga-based rehabilitation intervention on balance, balance self-efficacy, fear of falling (FoF), and quality of life after stroke.

- There were no differences between the control (n=10) and yoga groups (n=37) at baseline or 8-weeks in areas of demographics, stroke characteristics, or variables of interest.
- When assessing within-group differences, there were no significant changes in the variables of interest in the control group but changes were found in the yoga group.
- The researchers addressed the multiple comparison problem by controlling the familywise error rate (FWER) through the use of the Bonferroni correction. The Bonferroni correction is useful when there are a fairly small number of multiple comparisons and the researchers are looking for one or two that might be significant.
- After the Bonferroni correction, balance (BBS, 41.3 ± 11.7 vs 46.3 ± 9.1 ; $p < 0.001$) improved significantly between baseline and 8 weeks for those in the yoga group.

At 8 weeks, fewer subjects said “yes” to FoF (51% vs 46%; $p < 0.001$) and there was a significant increase in the number of people identified as “independent” on the mRS (57% vs 68%; $p < 0.001$).

- Those who completed the yoga intervention ($n=29$) had significant improvement in balance, mRS, and FoF, with a trend toward significant improvement in QoL ($p=0.037$) and balance self-efficacy ($p=0.035$).
- In a post hoc analysis, baseline to 8-week change in balance was assessed for only those with baseline balance impairment ($BBS \leq 46$). Balance scores significantly improved for those in the intervention group ($n=20$; 33.5 ± 10.8 vs 41.5 ± 9.7 ; $p < 0.001$).

Original Authors’ Conclusions

There were no differences between the control ($n=10$) and yoga groups ($n=37$) in stroke characteristics or variables of interest. When assessing within-group differences, there were no significant changes in the variables of interest in the control group but changes were found in the yoga group.

This study demonstrates that a modified yoga intervention for people with chronic stroke is practical and could be of benefit. Group yoga should be further studied as an effective intervention to improve balance, QoL, and participation post stroke.

Critical Appraisal

Validity

- No blinding of subjects, therapists, or assessors introduces measurement bias.
- PEDro Score: 6/10 based on Eligibility Criteria: Yes; Random Allocation: Yes; Concealed Allocation: Yes; Baseline Comparison: Yes; Blind Subjects: No; Blind Therapist: No; Blind Assessors: No; Adequate Follow-up: No; Intention-to-treat analysis: Yes; Between Group Comparison: Yes; Point Estimates and Variability: Yes. (Eligibility score does not contribute to total score.)

Interpretation of Results

This study has a small sample size, was comprised mostly of men, and did not specifically control for different types of strokes and their different side effects. Although no significant between group differences were found, significant improvement in balance and fear of falling was found within the experimental group which indicates a need for further studies to investigate if yoga can in fact improve balance. This is one of the first studies to explore the use of yoga for self-efficacy related to balance and fear of falling. No significant results were recorded, however a trend for improvement coupled with the small sample size calls for studies with a larger sample size to further investigate if yoga can improve balance self-efficacy which in turn, could lead to increased participation in activity post-stroke and decrease risk of falling. These results are promising and further research is warranted to further explore the effect of yoga intervention on balance and self-efficacy related to falling.

Summary/Conclusion

Yoga intervention may be beneficial for patients with chronic stroke by improving physical disability management. However, more research is needed to determine the exact impact and efficacy of yoga for stroke rehabilitation. Schmid et al. (2012) shows yoga intervention is correlated with some types of improvements. However, observed results and study limitations such as small sample size and sample bias leads to inconclusive evidence. Specifically regarding the population of interest, yoga intervention was shown to positively affect balance and fear of falling in stroke patients over 18 years of age. However, due to the issues discussed above regarding the study limitations and mixed results, the degree to which these observations can be generalized beyond the samples within these studies is not known. Regardless of the issues presented yoga interventions may be beneficial for some types of outcome measures in some patients, and future studies can better determine yoga's role in stroke rehabilitation. Since some of the data obtained approached significance in various target areas, including quality of life and mental health, therapeutic yoga is a strong contender as an intervention for chronic strokes.

Table 3: Characteristics of included studies

	Study 1 Schmid, 2012	Study 2 Immink, 2014
Intervention investigated	8 week Group yoga (2x/week, 60min.) <u>or</u> group yoga (2x/week, 60min.) plus at home yoga/relaxation (20min. Audio recording >3x/week)	90min sessions/week for 10 weeks; plus daily home practice for 35-45 minutes using a guide book and compact disc.
Comparison intervention	No yoga (wait-list control group)	No yoga (wait-list control group)
Outcomes used	<ul style="list-style-type: none"> ● Berg Balance Scale (BBS) ● Activities-specific Balance Confidence Scale ● Fear of Falling (FoF) dichotomous variable. ● Stroke-specific Quality of Life Scale (QoL) 	<ul style="list-style-type: none"> ● <i>9 hole peg test (not completed)</i> ● Motor assessment scale ● Berg Balance Scale (BBS) ● Two-Minute Walk Distance ● Comfortable Gait Speed ● Geriatric Depression

		<p>Scale (short form)</p> <ul style="list-style-type: none"> ● State-trait anxiety inventory ● Stroke impact scale (QoL)
<p>Findings</p>	<ul style="list-style-type: none"> ● Balance improved significantly between baseline and 8 weeks for those in the yoga group. ● After 8 weeks fewer subjects said “yes” to fear of falling in the yoga group. ● Those who completed the yoga intervention had significant improvement in balance, mRS, and fear of falling. 	<p>Motor Function: MAS, BBS, and Comfortable Gait Speed results revealed no significant differences between the intervention group and the control group. Although the 2-Minute Walk Distance scores increased significantly from baseline to post-intervention in both groups, there was no significant difference between the two groups.</p> <p>Depression and Anxiety: There were not significant effects or interactions for depression scores on the Geriatric Depression Scale (Short Form) or for state anxiety (State Trait Anxiety Inventory, Form Y). Trait anxiety scores did significantly reduce from baseline to post-intervention in the yoga group.</p> <p>Quality of Life: the SIS revealed a significant increase in mean physical domain scores and memory scores for the yoga group (pre to post-test) but were not significant for the control group. There were no significant effects in the emotion, communication, or social domains.</p>

IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

As of now, the clinical implications for this form of intervention are still significantly limited. The two randomized controlled trials detailed above- our examples of “best” evidence levels from which we currently base our analysis- provide rather mixed results on the benefits of yoga with individuals recovering from stroke. Schmid (2012) found significant improvements in individuals’ balance and fear of falling. On the other hand, while Immink et al. (2014) found significant improvements in individuals’ walking distances and quality of life, many outcomes were not significantly different from the control group. Results from other studies gathered, most with lesser levels of evidence, are similar in depicting *some* improvements to scores like balance (Schmid, 2016; Bastille & Gill-body, 2004) and quality of life (Bastille & Gill-body, 2004). Unfortunately, common limitations among all of these studies are their small sample sizes, mixture of significant and insignificant outcomes, and overall lack of power, reducing their impact to mere suggestions of what can and should be studied further. In a nutshell, studies in this area are largely still in the pilot stages.

Despite these factors, yoga is an intervention method that is becoming more and more prevalent as a treatment with certain populations, including breast cancer survivors (Siedentopf et al., 2013), mothers with high-risk pregnancies (Rakhshani et al., 2012), and veterans suffering from PTSD (Stoller et al., 2012), among others. As the field of occupational therapy continues to seek new and effective ways of improving quality of life, it is likely that yoga will be considered for even more target populations. Though because there are not set protocols for how yoga may be used in conjunction with occupational therapy, costs of its implementation, training for therapists, and other resources needed will certainly vary.

While there are still many variables in considering if and why yoga can assist individuals recovering from stroke, it becomes all the more important for therapists and researchers to continue learning about yoga as a rehabilitative tool and testing its efficacy. Once future studies can incorporate larger sample sizes, utilize valid and reliable measurements, and provide consistently significant outcomes, we can perhaps begin to see the true efficacy of this treatment strategy. The studies described above in this analysis are only but a few of those already existing that have laid the foundation for this treatment strategy (with stroke patients, in particular). Until more significant progress is made, professionals in the field- as well as students preparing to enter the field- can continue to investigate the potential benefits of yoga, hypothesize populations for which it could possibly be effective, and determine how we may go about testing these ideas in a way that shows meaningful change.

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To determine whether fear of falling (FoF) and balance improved after a 12-week yoga intervention among older adults. DESIGN: A 12-week yoga intervention single-armed pilot study. SETTING: A retirement community in a medium-sized university town in the Midwest. PARTICIPANTS: A convenience sample of adults (N=14) over the age of 65 years who all endorsed an FoF. INTERVENTION: Each participant took part in a biweekly 12-week yoga intervention. The yoga sessions included both physical postures and breathing exercises. Postures were completed in sitting and standing positions. Main outcome measure