ORIGINAL ARTICLE

Effect of a 12-Week Yoga Intervention on Fear of Falling and Balance in Older Adults: A Pilot Study

Arlene A. Schmid, PhD, OTR, Marieke Van Puymbroeck, PhD, CTRS, David M. Koceja, PhD

ABSTRACT. Schmid AA, Van Puymbroeck M, Koceja DM. Effect of a 12-week yoga intervention on fear of falling and balance in older adults: a pilot study. Arch Phys Med Rehabil 2010;91:576-83.

Objective: 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 Measures: We measured FoF with the Illinois FoF Measure and balance with the Berg Balance Scale. Upper- and lower-body flexibility were measured with the back scratch test and chair sit and reach test, respectively.

Results: FoF decreased by 6%, static balance increased by 4% (P=.045), and lower-body flexibility increased by 34%.

Conclusions: The results indicate that yoga may be a promising intervention to manage FoF and improve balance, thereby reducing fall risk for older adults. Rehabilitation therapists may wish to explore yoga as a modality for balance and falls programming; however, future research is needed to confirm the use of yoga in such programming.

Key Words: Accidental falls; Postural balance; Rehabilitation; Yoga.

FEAR OF FALLING, defined as a disabling symptom of impaired mobility among frail older people, is common in community-dwelling older adults. It has been associated with depression, functional limitations, and gait impairments.[1] FoF has been identified as one of the greatest fears experienced by the elderly,[2] occurring in 40% to 73% of those with and 20% to 46% without a recent fall.[2-6] At least 30% of those over the age of 65 and 50% over age 80 report a fall annually.[6] Older adults who fall often develop FoF, which in turn is considered a risk factor for future falls.[7] The development of FoF is not, however, always related to a recent fall or instability.

Delbaere et al[8] discussed the "vicious cycle" of FoF: those with FoF exhibit decreased activity and participation in their environment, leading to further decreases in strength and balance, thus placing them at greater risk for falls and increased FoF. Rehabilitation therapists have identified FoF as the most common reason people do not return to premorbid activities after a stroke.[9] Development of FoF has been associated with worsening in performance of activities of daily living, mobility, mood, life satisfaction, and general health.[10,11] Further, it has been shown to limit participation within roles and diminish social functioning, self-efficacy, and quality of life.[12,13]

Research into causes for the development of FoF is limited but has demonstrated that FoF is related not only to physical characteristics and falls but also to emotional and cognitive factors.[14-16] This complexity makes FoF interventions difficult to develop and assess. A review of interventions to reduce FoF indicated only 3 effective interventions primarily aimed at fear; others focused on fall prevention.[17] Exercise interventions aimed at fall prevention had a modest effect overall. In one of the most successful fall prevention program studies, Wolf et al[18] demonstrated decreased FoF, increased core and lower extremity strength, and decreased fall rates with a modified Tai Chi program.

Hatha yoga (like Tai Chi), is an Eastern medicine that may have potential for improving the lives of older adults. Hatha yoga uses a combination of postures, breathing, and meditation. Complementary and alternative therapies, such as yoga, are theorized to be more therapeutic than traditional exercise because of the mind-body component.[19-23] This is because of the active engagement between the mind and the body; in yoga, the mind is encouraged to focus specifically on what is occurring in the body and where the body is in space, increasing both awareness and proprioception. Its practice has been associated with increased muscle strength and endurance, flexibility, and cardiopulmonary endurance.[24,25] Yoga requires the stretching of major muscle groups to improve physical strength and flexibility. In a recent study of young adults (mean age, 29), balance improved by 228% for the experimental group, while

List of Abbreviations

BBS	Berg Balance Scale
FoF	fear of falling
LB	lower body
UB	upper body

From the Veterans Affairs Health Services Research and Development, Center of Excellence on Implementing Evidence-Based Practice, and the Health Services Research and Development Stroke Quality Enhancement Research Initiative, Richard L. Roudebush Veterans Affairs Medical Center, Indianapolis (Schmid); the Department of Occupational Therapy, Indiana University School of Rehabilitation Science, Indianapolis (Schmid); the Indiana University Center for Aging Research, Indianapolis (Schmid); the Department of Recreation, Park, and Tourism Studies, Indiana University, Bloomington, (Van Puymbroeck); and the Department of Kinesiology, Indiana University, Bloomington (Koceja), IN.

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Reprint requests to Arlene A. Schmid, PhD, OTR, Center of Excellence on Implementing Evidence-Based Practice, Richard L. Roudebush Veterans Affairs Medical Center, HSR&D Mail Code 11H, 1481 W 10th St, Indianapolis, IN, 46202, e-mail: *Arlene.schmid@va.gov*.

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the control group did not change.[26] Furthermore, mobility and gait speed improved in breast cancer survivors after a 7-week yoga program.[27] It is possible, then, that Hatha yoga, with its gentle movements, can address known fall risk factors (poor balance, impaired mobility, reduced strength and flexibility) and focus on increased awareness and proprioception, resulting in decreased FoF and improved balance in older adults. Hatha yoga is considered the foundation of all other yoga practices; therefore, we refer to Hatha yoga in this intervention simply as "yoga" throughout the rest of the text.

Previous studies have demonstrated a relationship between yoga and falls and yoga and balance[26,28-30]; however, none have focused on FoF as the variable of primary interest. Our objective was to determine whether FoF and balance improved after the yoga intervention.

METHODS

Design

We completed a 12-week, single-arm pilot study of a yoga intervention with pre and post measurements of FoF, balance, and flexibility.

Participants

All study participants were older adults who lived independently or were employees at a retirement community in a medium-sized university town in the Midwest. The retirement community has a relationship with the local university, and residents often participate in research. Four of the participants were employees who met inclusion criteria. We recruited through approved flyers and a recruitment talk. One researcher (M.V.P.) went to the retirement community and talked about the research, giving a yoga-focused talk about the study and the accompanying expectations.

We planned to include 15 participants in this pilot study. We have conducted previous postural stability studies in older adults in our motor control laboratory. From these studies (8-wk intervention studies) an effect size (Cohen's *d* statistic) of .56 has been obtained. Given a pre-posttest measurement schedule and the dependent groups *t* statistic with a correlation between measurements estimated at .50, the sample size needed was 11 subjects. To account for typical attrition based on prior studies, we oversampled by 40%, resulting in a final sample size of 15.

Inclusion and exclusion criteria. To be eligible for the study, all participants endorsed an FoF during the past year. Inclusion criteria were older than 65; at least a minimal level of physical fitness, determined with the Physical Activity Readiness Questionnaire[31]; and willingness to give written informed consent.

We did not screen for any preexisting conditions. All screening, including the Physical Activity Readiness Questionnaire, was completed by trained research personnel. The Physical Activity Readiness Questionnaire is a 7-item self-administered tool used to evaluate activity readiness prior to low to moderate intensity programming. It is used to identify symptoms associated with heart disease and musculoskeletal issues that may require a physician evaluation or changes to the activity programming. Those unwilling or unable to commit to the 12-week intervention or who were already in another active research study were excluded from the study. Human subjects approval was received from the local university institutional review board.

Intervention

A registered yoga instructor led the 75-minute yoga intervention classes twice a week for 12 weeks. The intervention was taught to be progressively challenging over the 12 weeks, and each session built on tasks introduced during prior sessions. The yoga intervention was focused on balance and postures as well as improving confidence in movement. See appendix 1 for further details of the intervention.

All participants were in the same yoga class, and all sessions were completed in a large open recreation room at the retirement facility. Study participants were encouraged to discuss complications or issues with the yoga instructor to allow for appropriate modifications. Most yoga postures were completed while sitting in a chair or standing using the chair as a base of support. All participants were issued a yoga mat, block (common yoga prop), and resistance band, which were incorporated into the classes. The yoga intervention protocol is accessible by contacting the authors.

Assessments

The trained study research assistant and investigators (A.S., M.V.P.) completed all assessments. All assessments were completed at the Indiana University School of Health, Physical Education, and Recreation. Through an agreement with the university and the retirement community, all participants received free transportation to the university campus to complete study assessments at baseline, 6 weeks, and 12 weeks.

Demographics. We collected demographics data for each study participant at baseline, including age, sex, education level, race, and ethnicity.

Primary outcomes

Fear of falling. We assessed FoF 2 ways. First, we asked the single yes/no question, "In general, are you worried or afraid you might fall?" (The question was asked 3 times, each time followed by "at home," "out of the home," or "in the community.") Only those who answered "yes" to being afraid to fall in at least 1 setting were included in the study. A single question regarding FoF has been found to have high test-retest reliability and high concurrent validity with continuous measures of FoF.[32,33]

Second, we used the Illinois FoF Measure, which has been demonstrated to be a reliable and valid measure of FoF in the elderly population.[34] The Illinois Measure is a 16-item questionnaire which, for example, asks participants, "How worried about falling would you be if you were to . . .?" Answers included "very worried," "moderately worried," "not at all worried." Items assessed FoF with progressively more challenging tasks including picking something off the floor, walking around the house, sweeping the floor, walking in a crowded mall, carrying bundles up poorly lit stairs, and getting into and out of a car. Potential scores ranged from 16 to 48.

Balance. We used the BBS, a commonly used and clinically relevant assessment tool, to measure changes in balance control related to functional performance.[35] Fourteen items are included, and scoring ranges from 0 to 56; higher scores indicating better balance. The BBS has been highly correlated with fall risk; those who score less than 36 points are considered to be at risk for falls.[36] We delineated the BBS items to differentiate between static and dynamic balance. We included 8 items as dynamic balance: transfers, reaching forward with an outstretched hand, retrieving objects from the floor, trying to look behind, turning 360°, stepping up and down on a stool, standing with 1 foot in front (tandem standing), and standing on 1 foot.

Secondary outcomes

Falls. We asked each participant about previous falls. They were asked whether they had a history of a fall at baseline and 12 weeks. Falls were defined as events that caused them to land on the ground.

Table 1: Study Participant Characteristics

Characteristic	N=14
Age, y	78.36±8.75
Race, white	14 (100)
Education, any college	13 (92)
Marital status, married	8 (57)
Self-rated health, good or better	12 (86)
Use an assistive device for ambulation	2 (14)

NOTE: Values are mean ± SD or n (%).

UB and LB flexibility. UB and LB flexibility assessments were from the Senior Functional Fitness Test Manual.[37] Two repetitions were performed for each, with the best score included for the analysis.

Chair sit and reach LB test. For the chair sit and reach test, participants sat in a chair and extended 1 leg. They then bent forward and tried to touch their toes, or beyond if possible. Scores were centimeters proximal to toes (negative score), or distal beyond toes (positive score).

Back scratch UB test. For the back scratch test, participants stood and placed 1 hand over the same shoulder, palm down and fingers extended, reaching down the middle of the back as far as possible. Participants placed the other arm around the back of the waist with palm up, reaching up the middle of the back as far as possible, trying to touch or overlap the extended middle fingers of both hands. Measurement is the amount of distance of overlap or underlap between fingers of both hands.

Statistical Analysis

Because this was a pilot study, we only included data for those who completed the intervention and the assessments. We used proportions and means to describe the sample. We used paired *t* tests (or Wilcoxon for nonnormal data) and chi-square comparisons between baseline and 12-week assessments scores.

We completed a post hoc analysis to explore differences between participants with and without a history of a fall prior to or during the intervention. We used a Mann-Whitney *U* to compare pre- and postintervention FoF, balance, and flexibility stratified by history of fall prior to or during the intervention time period.

All analyses were completed with SPSS (version 15.0).[a] In order to account for clinician significance and our sample size, we also completed percentage change calculations for all primary and secondary variables (time 1−time 2/time 1×100) in order to determine trends in the data.[25,38]

RESULTS

Recruitment efforts yielded 22 persons who initially expressed interested in participating in the study, 6 of whom were unable to enroll: 5 because of schedule and time commitments and 1 because of not feeling physically fit enough to engage in the intervention. Two potential participants were excluded: 1 because of a doctor's recommendation against participation and 1 because of a fall and hip fracture prior to commencement of the study. Fifteen participants were enrolled.

The baseline characteristics of the 14 participants who completed the 12-week yoga intervention are shown in table 1. The mean age was 78.4±8.75; all participants were white. All but 2 rated their health as good or better. Two participants used a device for walking at baseline.

One participant did not complete the intervention because of a recent diagnosis of cancer (94% completion rate). No adverse events occurred during the yoga classes. One participant reported sustaining a fall between the 6- and 12-week assessment period.

Results of Primary Analyses

We found a modest decrease (6%) that was not statistically significant (P=.137) in FoF with the Illinois FoF score from baseline to 12 weeks (table 2). Total BBS and dynamic balance scoring did not significantly change from baseline to 12 weeks, but static balance scoring increased significantly between baseline and postintervention (26.64±2.24 vs 27.64±.74, P=.045). No significant changes were seen between baseline and 6 weeks or 6 and 12 weeks (data not shown).

While UB flexibility did not change significantly, there was a 34% increase (P=.29) in LB flexibility over the 12-week intervention.

Results of Exploratory Analysis

We compared outcomes based on prior history of 1 or more falls. The Mann-Whitney *U* test was used to compare pre- and postintervention FoF, balance, and flexibility of participants with and without a fall prior to or during the intervention time. Five people with a fall were included. We compared data from those with and without a fall with Mann-Whitney *U* tests and found significant differences in their baseline dynamic balance (P=.037), LB flexibility (P<.05), and UB flexibility (P<.05) at time 1. We also found that at time 2, nonfallers had significantly better UB flexibility than fallers (P<.05). Additionally, using a Wilcoxon analysis, we compared pre- and postintervention scores for only those with a fall; LB flexibility significantly increased over the time of the 12-week trial (11.07±9.40 to −7.57±12.19, P=.043). Although not significant, fallers demonstrated a 30% increase in LB flexibility, 7% increase in UB flexibility, and 8% decrease in FoF by 12 weeks.

DISCUSSION

In this population of older adults living and working in a retirement community, we found improvement, but no statistically significant change in FoF, and mixed results for balance.

Table 2: Comparison of Variables Pre- and Post Yoga Intervention (N=14)

Variable	Preintervention	Postintervention	*P*	% Change $T_1-T_2/T_1\times100$
FoF	36.76±6.09	34.69±7.9	.137	↓6%
BBS total score	49.86±5.66	50.64±4.80	.280	↑2%
BBS static score	26.64±2.24	27.64±0.74	.045	↑4%
BBS dynamic score	23.21±3.89	23±4.51	.732	No change
UB flexibility	−11.71±9.30	−11.61±8.51	.94	↑1%
LB flexibility	−3.96±9.70	−2.62±10.13	.29	↑34%

NOTE: Values are mean ± SD unless otherwise noted.
Abbreviations: ↑, increase; ↓, decrease.

There was a large percentage change in LB flexibility. We report the percentage change as an indicator of important clinical change; statistical significance demonstrated trends but not significance, which may be related to both the small sample and outliers in the data.

To our knowledge, this is the first study to examine the effect of yoga on FoF. Overall, we found positive changes in FoF, static balance, and LB flexibility, although only the change for static balance was statistically significant. There are only a few other studies that have examined a physical activity intervention to decrease FoF. Zijlstra et al[17] recently completed a review of interventions to manage FoF and found only 3 successful studies with the primary aim of reducing FoF.[39-41] Two studies aimed at FoF were multifactorial interventions that included physical activity, and 1 was Tai Chi exercise. Another 8 interventions were found to decrease FoF, but the primary outcome for these trials was fall prevention. One of these 8 was the study by Wolf et al[18] that used Tai Chi as a mechanism to prevent falls but also found a decrease in FoF.

It is well-documented that flexibility decreases approximately 15% per decade in both men and women after 20 years of age.[42] Particularly hamstring and lower back flexibility (as measured with the sit and reach test) declines about 2.5 centimeters per decade in both men and women.[43] In a recent yoga study with young adults, a 9.8% increase in LB flexibility was reported after 8 weeks (3 times a week) of yoga exercises.[44] With respect to older adults, 6- to 10-week stretching interventions (similar, but not identical, to yoga exercises) in the elderly (mean age=71.8y) resulted in 25% increases in LB flexibility,[45] similar to the 34% improvement found in this study. Further, Tai Chi intervention with the elderly (50–78y) has also been shown to increase flexibility scores by 21%.[46] Taken together, we surmise that given the greatest improvement (34%) in this study in LB flexibility after yoga intervention, perhaps this improvement in flexibility accounts for the improvements in balance scores. However, as the exact mechanism (eg, neural vs muscle) for improvements in flexibility are still debated, caution is warranted in this interpretation.

Additionally, our exploratory analysis found that those with a prior fall demonstrated decreased preintervention dynamic balance and UB and LB flexibility compared with those without a fall. While we know that many older adults with FoF have not sustained a fall, it is possible that different interventions need to be used for those with and without a prior fall. Perhaps future interventions need to be tailored based on each person's falls history.

Study Limitations

There are several limitations to this study. First, because this was a pilot study, we have limited our ability to find relationships between variables; thus, we did not have adequate power to detect modest but potentially important improvement in our outcomes. In post hoc power analyses, we determined that 15 subjects would have provided sufficient power to find statistically significant differences in FoF.

Second, study participants themselves were a limitation. They were a generally healthy, white, and relatively well-off and well-educated population. We also did not screen for preexisting conditions. Study participants lived within the campus where the intervention took place. They all knew each other, eliminating potential social barriers, and did not need to worry about transportation or inclement weather. Many of the study participants would be considered active older adults who participated in classes, outings, and community engagement. Additionally, participants received free and convenient transportation for research assessments. For these reasons, our findings may not generalize to other populations.

Third, while in order to be in the study everyone endorsed an FoF by a yes/no question, the Illinois FoF assessment indicated relatively mild FoF at baseline (mean, 37; range, 16–48). Likewise, the average preintervention BBS was 49.86 (range, 0–56), and it has been estimated that those with a 36 or less have near a 100% fall risk[36]; thus, our participants had relatively unchallenged balance and were not at great risk of falling. Overall, our study participants did not have much room for improvement on our outcome scales.

Fourth, we used a self-report for a falls history. Because of recall bias, we cannot be sure that all falls during the 12-week intervention were reported, and we do not know how people identified a fall. Falls may have been forgotten over the 12-week period or, even though we defined a fall as landing on the ground, someone may have slipped or tripped or landed back on a chair when trying to stand and considered that a fall.

Finally, we completed assessments at baseline (preintervention), at 6 weeks, and at 12 weeks. We found no changes on any variables at 6 weeks. Therefore, changes likely occurred between 6 and 12 weeks, but we are not able to speculate on the true timing of such changes. A shorter intervention period may be possible with this study population. It may have been beneficial to have another assessment period for key variables, perhaps at 8 weeks.

Future Research

We completed this pilot study to support a future randomized controlled trial focused on the use of yoga to manage FoF.

Assessments

Our participants identified themselves as people who were fearful of falling; however, the FoF and balance measures we chose proved to have ceiling effects. Thus, in our future work we will choose other more challenging balance and FoF measures. We will likely use the Fullerton Advanced Balance Scale because it measures change in balance in higher-functioning older adults and is considered appropriate for those residing in the community.[47] Likewise, we will identify a more sensitive measure of FoF but will consider Tinetti's[48] Falls Efficacy Scale. We will, however, be able to use data from the Illinois FoF Measure for our future power calculations.

We included a falls history in this pilot; however, it is based on simple recall over a 12-week period, and we realize a great risk of inaccuracy. We have identified a need to include a daily falls calendar for study participants to track any falls or trips during the intervention or follow-up phase of a clinical trial.

We are interested in focusing primarily on FoF rather than fall prevention or balance, because FoF has been so negatively associated with decreased social engagement, quality of life, and life satisfaction.[49] We have recently found FoF to be related to anxiety over balance or a prior fall in the stroke population.[16] It is likely that yoga is an alternative intervention that can address the fear as well as anxiety. Thus, we will include a specific measure of both anxiety and depression in the upcoming clinical trial. We will also collect additional data on preexisting conditions, because there is literature to support benefits for diagnoses such as depression, hypertension, diabetes, et cetera.

Intervention

While we developed a weekly yoga protocol, it is likely that it could have been developed to be more challenging over the 12-week intervention. Thus, while we will continue to develop and use a standardized protocol, we realize the need to be able to tailor the intervention to each person. Thus, we will develop the protocol to encourage more standing and more floor pos-

tures to further challenge balance. We may also focus the yoga intervention on dynamic balance, since it has recently been related to FoF.[50]

Of note, we completed this intervention study during January through April in the Midwest. It is likely that FoF could have been impacted by the winter variables of ice and snow. FoF may naturally ebb and flow with the seasons, and we were not able to control for that in this pilot study. In future trials we will need to stagger the intervention throughout the year to eliminate or statistically control for the impact of such seasonal variables on FoF.

CONCLUSIONS

We conclude that yoga is a plausible intervention to positively impact both FoF and balance in older adults. We are encouraged to pursue further yoga therapy research, although we will change inclusion criteria to include those with more severe FoF and balance issues and likely move into diagnostic populations with more balance and FoF issues (stroke, Parkinson, multiple sclerosis). Rehabilitation therapists may be interested in exploring yoga as a modality to be used in balance and fall prevention programming.

APPENDIX 1: POSTURES AND BREATHING USED IN THE 12-WEEK YOGA AND FOF INTERVENTION, DEVELOPED BY WENDY GLECKLER, A REGISTERED YOGA THERAPIST

- Each class began with breathing.
- The first 4 to 6 weeks were the introduction to the class and to yoga.
- The classes built on previously learned postures and breathing.
- The classes progressed and became more challenging over time.
- The classes were held with participants primarily seated, with a few standing postures, then seated again to rest and breathe.
- The classes focused on building strength in arms/legs/feet to help get up from a fall.
- The classes emphasized breathing throughout all postures.

Each class included postures and breathing. The following chart includes a general description of each session, new items as they were added, and a brief description of many of the posture and breathing exercises.

Session Number	Yoga Posture and Breathing Weekly Progression
1	Breathing *(same breathing completed at beginning of all sessions)*
	Gentle neck stretches, movement of fingers, wrists, elbows, shoulders, toes, ankles, knees *(same stretches completed in all sessions)*
	To increase range of motion and lubricate joints
	Forward bend
	Hinge at hip to fold forward with straight spine
	Legs may be wide or hip distance apart
	Tadasana (mountain pose) in chair
	Straight spine, knees over ankles, feet parallel, hands on thighs, sit tall
	Very gentle spine twist
	Anjali mudra (prayer position)
	Press hands together to increase arm and chest strength, shoulders down and back
	One hand on top of other and press; switch hands to increase UB strength
	Relaxation and breathing *(repeated at the completion of each session)*
	Namaste *(repeated at the completion of each session)*
	Hands, wrist flexibility
2	Vrksasana (tree pose) in chair
	Standing balance on 1 leg
	Other leg bends at knee, and foot is placed on standing knee area
	Can use chair or not (chair in front of student)
	Standing mountain pose
	Feet planted parallel about hip-bone width apart on floor, kneecaps lifted, quads engaged, belly lightly firmed, shoulders away from ears; extend up through crown of head
	Firms all muscles and improves posture
	Guided relaxation to end
3	Seated mountain pose
	Seated—raise leg and "pump" knee
	Extend 1 arm up to lengthen side body, shoulder away from ear
	Standing mountain pose (or seated, for those not comfortable standing)
	Press feet into floor to engage quads
	Hands pressing together in different positions
	Demonstration of how to get up from a fall
	Explanation of how not leaning on back of chair increases core strength
	Talked about how to use breath to relax
	Tree pose seated and standing
	Standing balance on 1 foot
	Talked about pressing into 3 (or 4) comers of feet for stability
	Gentle spine twist in chair
	Experimentation with resistance bands
	Guided relaxation and shoulder massage to release muscles
4	Virabhardrasana (warrior I)
	Standing
	With chair, 1 arm extended up
	Drop tailbone before bending knee
	Utkatasana (chair pose)
	Standing
	Demonstration of pavanamuktasana (wind-removing pose)
	Knee to chest in bed to stretch back and improve digestion
	Discussion about cautions of spine twist
	Possibility of vertebral fracture as age increases
	Shoulder rotation
	Palms up until arms parallel to floor, then palms down to protect rotator cuff
	Relaxation at end
	Quick shoulder massage at end of class
5	Seated and standing
	Mountain pose with arms raised
	Tree pose
	Standing chair pose
	Warrior I pose
	Separate leg forward bend
	(Hinge at hip joints) hands on chair in front of each student

One hand on top of other and press; switch hands to increase UB strength
Stand on 1 leg

6 Increased focus on breathing and relaxation throughout class
Seated—easy twist
Cactus arms—open, then forearms together
Standing and seated
Mountain pose
Tree pose
Standing
Parsvottanasana (pyramid pose)
Warrior I pose
Padottanasana (forward bend)
Seated
Tree pose
Forward bend

7 Breathing, breathe into belly or 3-part belly breath; extend exhale, release tension by exhaling through mouth
Arm stretching
Arms at side, raise arms and lower—like flying
Extend arm up , keep shoulder down to lengthen side, both arms
Seated and standing mountain pose
Seated leg lift, toe and ankle movement, leg extension
Increase quad strength and core with straight spine
Standing
Warrior I pose—drop tailbone before bending knee, can pulse bent leg
Pyramid pose
Standing lift leg, modification ball of foot on floor
Demonstration of how to get up from a fall

8 Relaxed breathing
Seated—hold hands under knee, lift and pump leg
Seated and standing mountain pose and tree
Seated baddha konasana (crossed-leg gentle spine twist)
Ankle to knee, gently press/stroke from hip to knee to help release hip joint, maybe
Repeat other side
Standing
Warrior I pose
Forward bend pose
Sit and breathe; relaxation; emphasize exhale for relaxation

9 Addition of yoga blocks and resistance bands
Demonstration of wind-removing pose
In bed in morning before getting up
Mountain pose
With blocks and resistance bands

10 Breathing
Introduction of alternate nostril breathing—relaxing and balances brain
Shitali (cooling breath)—improves memory
Standing
Mountain pose
Tree pose
Used resistance bands to strengthen quads, increase range of motion of knee, worked biceps, deltoids, and triceps
One hand on top of other and press; switch hands to increase UB strength

11 Standing
Pyramid pose
Forward bend pose
Tree pose
Mountain pose
Resistance bands UB and LB, extend leg to work quads with support of band

12 Heel drops to increase bone strength and growth
Standing
Modified warrior III pose
Mountain pose
Tree pose
Chair pose with resistance bands wrapped around legs and opened knees to strengthen adductors
Mountain pose with and without block to compare muscle activation with block
Standing stand lift
Foot and knee balance
Seated
Crossed-leg gentle spine twist
Seated pyramid
Seated gentle spine twist
Standing stretch, clasped hands behind back and lifted away from back to open chest and shoulders

13 Focus on resistance bands exercises for strength

14 Seated mountain pose and crossed-leg gentle spine twist
Standing postures with and without block
Warrior I
Mountain pose
Forward bend
Pyramid
Seated
Block between legs, squeeze to strengthen adductors
Easy spine twist
Internal and external rotation of hip joint
Cactus arms, I=open, E=forearms together

15 Standing postures
Mountain pose
Tree pose
Stand on 1 foot and knee out to side
Warrior I pose
Chair pose
Pyramid pose
Seated
Easy spine twist
Crossed-leg gentle spine twist
Cactus arms and breathe
Block between legs and squeeze
Mountain pose

16 Brahmari breath (bee's breath, humming breath)
To loosen head and chest congestion, helps focus
Seated
Mountain pose
Tree pose
Crossed-leg gentle spine twist
Standing
Mountain pose

	One hand on top of other and press; switch hands to increase UB strength
	Tree pose
	Lift leg forward, extended hand, big toe toward the ceiling
	Warrior I pose
	Chair pose
	Pyramid pose
	Forward bend
	Seated
	Seated gentle spine twist
	Relaxation
17	Breathing
	Alternate nostril breathing
	Seated
	Mountain pose
	Spinal twist
	Crossed-leg gentle spine twist
	Standing
	Warrior I pose
	Pyramid pose
	Mountain pose
	Standing with and without block
	Tree pose
	Pyramid pose
	Mountain pose
18	Seated
	Eagle pose in chair—legs crossed and arms crossed over each other, then opposite side
19	Standing
	Chair pose
	Eagle pose
	Warrior I pose
	Warrior II pose
	Pyramid pose
	Seated
	Spinal twist
	Heel drops
20	Seated
	Mountain pose
	Tree pose
	Crossed-leg gentle spine twist
	Eagle arms
	One hand on top of other and press; switch hands to increase UB strength
	Standing
	Mountain pose with and without block
	Tree pose
	Forward bend
	Pyramid pose
	Warrior I pose
	Eagle legs
21	Standing
	Mountain pose
	Warrior I pose
	Tree pose
	Forward bend
	Pyramid pose
	Yogic squat
	Seated
	Eagle arms
	Mountain pose
	Tree pose
	Crossed-leg gentle spine twist
22	Breathing
	Alternate nostril breathing
	Brahmari breath
	Standing tree
	Mountain pose
	Forward bend
	Yogic squat
	Eagle legs
	Resistance bands under foot, for leg movements
23	Breathing
	Alternate nostril
	Standing
	Chair pose
	Seated
	Chair pose
	Heel drops
24	Review of all poses with a faster pace
	Demonstrations of using the block at the wall for wall push-ups
	Question and answer session
	Answered questions

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