

UCSF

UC San Francisco Previously Published Works

Title

Rapid Conversion of a Group-Based Yoga Trial for Diverse Older Women to Home-Based Telehealth: Lessons Learned Using Zoom to Deliver Movement-Based Interventions.

Permalink

<https://escholarship.org/uc/item/33p390pz>

Journal

Journal of Alternative and Complementary Medicine, 28(2)

Authors

Huang, Alison

Chesney, Margaret

Schembri, Michael

et al.

Publication Date

2022-02-01

DOI

10.1089/jicm.2021.0268

Peer reviewed

SHORT REPORT

Rapid Conversion of a Group-Based Yoga Trial for Diverse Older Women to Home-Based Telehealth: Lessons Learned Using Zoom to Deliver Movement-Based Interventions

Alison J. Huang, MD, MAS,¹ Margaret A. Chesney, PhD,¹ Michael Schembri, BS,² Sarah Pawlowsky, DPT,³ Francesca Nicosia, PhD,^{4,5} and Leslee L. Subak, MD⁶

Abstract

This brief report describes the rapid conversion of a randomized trial of a Hatha-based yoga program for older women with urinary incontinence to a telehealth videoconference platform during the coronavirus disease 2019 (COVID-19) pandemic. Interim results demonstrate the feasibility of recruiting and retaining participants across a wide range of ages and ethnic backgrounds, but also point to potential obstacles and safety concerns arising from telehealth-based instruction. The investigators present lessons learned about the benefits and challenges of using telehealth platforms to deliver movement-based interventions and consider strategies to promote accessible and well-tolerated telehealth-based yoga programs for older and diverse populations.

Clinical Trial Registration number: NCT03672461.

Keywords: yoga, mind-body therapies, telehealth, mHealth, integrative medicine

Introduction

INTEREST IN TELEHEALTH-BASED delivery of yoga and other complementary movement-based interventions has increased dramatically during the coronavirus disease 2019 (COVID-19) pandemic, and is likely to grow even after social distancing is no longer recommended. Digital and telecommunication platforms offer multiple benefits for teaching and disseminating yoga, including greater access to yoga in communities with a low density of yoga teachers, decreased burden associated with travel to and from brick-and-mortar yoga studios, and increased opportunities for specialized yoga instructors to disseminate their teachings.

At the same time, telehealth-based delivery of yoga presents unique challenges, particularly for Hatha yoga approaches that emphasize physical yoga postures. Yoga stu-

dents who are accustomed to digital or telecommunication platforms for other work or leisure activities may nevertheless find it challenging to learn complex physical yoga techniques by telehealth. The perceived immediacy and embodied experience of practicing yoga may also be diminished when classes are conducted using remote platforms. Furthermore, all of these challenges are likely to be greater in populations already under-represented in yoga practice, such as older adults and racial or ethnic minorities, who historically also have low rates of using digital communication technology.^{1,2}

This report discusses experiences with rapid transition of a clinical trial involving a yoga program for diverse older community-dwelling women to a videoconference-based telehealth platform during the COVID-19 pandemic. Findings highlight lessons learned about both benefits and

Departments of ¹Medicine and ²Obstetrics, Gynecology, and Reproductive Sciences, University of California, San Francisco, California, USA.

³Department of Physical Therapy, San Francisco State University, San Francisco, California, USA.

⁴Integrative Health Service, San Francisco Veterans Affairs Health Care System, San Francisco, California, USA.

⁵Institute for Health and Aging, School of Nursing, University of California, San Francisco, California, USA.

⁶Department of Obstetrics and Gynecology, Stanford University School of Medicine, Palo Alto, California, USA.

challenges of using telehealth for remote instruction in yoga and other movement-based interventions and consider strategies to promote accessible and well-tolerated telehealth-based programs for older and diverse populations.

Materials and Methods

Overview of the Lessening Incontinence with Low-impact Activity trial

The Lessening Incontinence with Low-impact Activity (LILA) trial is a randomized, multicenter trial of a group-based yoga program versus physical conditioning program for middle-aged and older women with urinary incontinence funded by the National Institutes of Health (NIH) (ClinicalTrials.gov Identifier NCT03672461). Participants are women aged ≥ 45 years who report at least daily incontinence, are willing to temporarily forgo standard clinical incontinence treatments, are not already engaged in organized yoga or physical conditioning programs, and meet minimum mobility criteria such as being able to rise from a supine to standing position without assistance.

Eligible women are recruited from multiple Northern California communities and randomized in equal ratios to either an alignment-based yoga program designed to increase awareness of the pelvic floor, improve physical conditioning, and alleviate anxiety and perceived stress,³ versus a time-equivalent low-impact physical conditioning program focused on general muscle stretching/strengthening exercises.

According to the original trial protocol approved by the University of California San Francisco institutional review board (18-26341), women randomized to the yoga intervention were asked to participate in twice weekly, 90-min group classes with 7 to 11 other participants for 12 weeks, led by instructors trained by the study's expert yoga consultants. Women randomized to the physical conditioning program participated in equivalent-time classes led by personal trainers supervised by the study's expert physical therapist consultant. Before the COVID-19 pandemic, all classes took place in brick-and-mortar studios or activity rooms reserved by the study team.

Transition to telehealth under COVID-19

In March 2020, the study team had just completed screening and randomization of its third cohort of 38 women across three study clinics when shelter-in-place orders were rapidly issued in the surrounding counties. Group intervention classes had begun less than a week before shelter orders were issued in two locations, while orders were issued shortly before the first scheduled class in a third location.

Rather than abruptly terminating intervention instruction, the investigators conferred with consultants, instructors, safety monitors, and the NIH to convert instruction to videoconference using Zoom as the telehealth platform supported their institutions. Study coordinators reached out to participants within a week to propose continuing or initiating interactive group classes by telehealth, and coach them on downloading and using the Zoom app onto personal electronic devices.

After completion of intervention instruction for this third cohort in May 2020, participants were recruited for the fourth and then fifth cohorts in September–November 2020 and March–May 2021 with the expectation of entirely telehealth-based instruction. Recruitment continued to rely on community mailings used in earlier cohorts, but ceased to involve posting of fliers in senior centers or other community locations shuttered during the pandemic.

Eligibility criteria were identical to prior cohorts, except that participants were required to have access to broadband internet and a Zoom-compatible electronic device larger than a cell phone to maximize visibility during class. Study personnel also purchased tripods for participants to position computer tablets and cameras during class. In the fourth and fifth cohorts, the study team also limited class size to six participants, given concerns about the safety of monitoring larger numbers of participants simultaneously by videoconference.

Results

Impact on recruitment, retention, and adherence

Although average participant age remained stable across all cohorts (~61–63 years) (Table 1), no participants over age 80 years enrolled in the fourth or fifth cohorts relying entirely on telehealth-based instruction, whereas women as old as 90 years enrolled in the first and second cohorts involving all in-person instruction. The proportion of participants who self-identified as being racial or ethnic minorities was similar across all cohorts (~44%–47% in the combined first two cohorts involving in-person instruction, the third cohort rapidly converted to telehealth, and the combined fourth and fifth cohorts with preplanned telehealth instruction).

Compared with 5.2% drop-out in the first-two cohorts, 15.8% participants dropped out of intervention programs in the third cohort involving rapid conversion to telehealth, including 10.5% who dropped out in the first 2 weeks due to lack of internet or electronic devices or pandemic-related issues (Table 1). Drop-out rates continued to be 10.6% on average in the fourth and fifth cohorts in which telehealth instruction was pre-planned. Among retained participants, however, adherence to intervention classes varied only modestly (Table 1). In the fourth and fifth cohorts recruited for all telehealth-based instruction, 69.5% of participants completed >90% of classes.

Impact on safety and tolerability

During all cohorts, the study team followed standardized procedures for detecting adverse events by questioning participants about any negative changes in their health at all follow-up visits and telephone calls. The proportion of participants reporting a musculoskeletal adverse event, including joint pain or strain, was similar across all cohorts (9.1% to 10.5%) (Table 1).

However, only 2.5% of participants in the first two cohorts involving in-person instruction reported an event that was judged to be “probably” or “definitely” related to interventions, compared with 10.5% in the third cohort and 7.6% in the fourth and fifth cohorts, although this difference did not reach the threshold for statistical significance ($p=0.20$). Overall, study satisfaction ranged from 93.0% to 97.2% across cohorts.

TABLE 1. PARTICIPANT CHARACTERISTICS, RETENTION, ADHERENCE, AND SAFETY BY STUDY COHORT

	<i>Cohorts 1 and 2 (with instruction conducted in person, N = 76)</i>	<i>Cohort 3 (with instruction rapidly converted to telehealth, N = 38)</i>	<i>Cohorts 4 and 5 (with instruction planned as telehealth, N = 66)</i>	<i>Test statistic^a</i>	<i>p^a</i>
Sociodemographic characteristics					
Age in years					
Mean ± SD	61.6 (±9.2)	63.4 (±8.0)	61.9 (±8.2)	$F_{(2, 179)}=0.54$	0.58
Total range	46–90	45–75	48–80		
Race^b					
White/Caucasian	52 (68.4%)	30 (78.9%)	45 (68.2%)	0.01052	0.44
Black or African American	8 (10.5%)	2 (5.3%)	4 (6.1%)	0.03733	0.59
Asian or Asian American	15 (19.7%)	6 (15.8%)	15 (22.7%)	0.02163	0.72
American Indian or Alaskan	1 (1.3%)	1 (2.6%)	0 (0.0%)	0.17927	0.69
Native Hawaiian or Pacific Islander	1 (1.3%)	1 (2.6%)	0 (0.0%)	0.17927	0.69
Other or unknown	1 (1.3%)	3 (7.9%)	3 (4.5%)	0.02718	0.18
Ethnicity					
Hispanic/Latinx	9 (11.8%)	4 (10.5%)	9 (13.6%)	0.01712	0.96
Non-Hispanic/Latinx or unknown	67 (88.1%)	34 (89.5%)	57 (86.4%)		
Educational attainment					
High school or less	3 (3.9%)	2 (5.3%)	3 (4.5%)	0.00007	0.98
Some college	8 (10.5%)	5 (13.2%)	9 (13.6%)		
College degree or more	65 (85.6%)	31 (81.6%)	54 (81.8%)		
Retention and adherence					
Participant intervention drop-out					
Completed 12-week interventions	72 (94.7%)	32 (82.2%)	59 (89.4%)	0.00979	0.16
Drop-out before 12 weeks ^c	4 (5.3%)	6 (15.8%)	7 (10.6%)		
Class attendance^d					
<80% of classes	4 (5.6%)	1 (3.1%)	4 (6.8%)	0.00116	0.69
>80% but <90%	13 (18.1%)	4 (12.5%)	14 (23.7%)		
>90% of classes	55 (76.4%)	27 (84.4%)	41 (69.5%)		
Safety and tolerability					
Adverse events^e					
Participants reporting one or more adverse events of any kind	27 (35.5%)	14 (36.8%)	26 (39.4%)	0.01840	0.90
Participants reporting one or more musculoskeletal events ^f	7 (9.2%)	4 (10.5%)	6 (9.1%)	0.05203	1.0
Participants reporting events at least “probably” related to interventions ^g	2 (2.6%)	4 (10.5%)	5 (7.6%)	0.01595	0.20
Participants reporting events at least “moderate” in severity ^h	3 (11.1)	5 (35.7)	8 (33.3)	0.00740	0.12
Overall study satisfactionⁱ					
Very or moderately unsatisfied, or neither satisfied nor unsatisfied	2 (2.8%)	2 (6.9%)	4 (7.0%)	0.05095	0.55
Very or moderately satisfied	70 (97.2%)	27 (93.1%)	53 (93.0%)		

Data are presented as mean (±standard deviation) or number (percentage).

^ap-values are calculated using ANOVA or Fisher’s exact tests, as appropriate, and corresponding F-statistics or Fisher’s exact probabilities are presented.

^bFor race, percentages may not add up to 100%, as some multiracial participants reported more than one race and were included in more than one race-specific category in this table.

^cParticipants were considered to have dropped out of intervention programs if they notified study staff that they were dropping out or if they ceased to attend study classes without explanation (lost to follow-up).

^dCalculated among those who completed the 12-week intervention series.

^eAssessed by asking participants a standardized question (“Have there been any negative changes in your health?”) at each follow-up visit or telephone call after baseline and documenting any reported changes as adverse events. No changes to adverse event procedures were made across study cohorts, although in-person follow-up visits in cohorts 3, 4, and 5 were converted to videoconference-based visits to minimize risk of COVID-19 transmission.

^fIncludes events that were considered unlikely to be related to interventions.

^gSpecific events that were judged to be at least “probably” related to interventions included: Back Pain, Knee Injury, Back Pain, Hip Arthrosis, Knee Swelling, Muscle Soreness, Neck Pain, Leg Pain, Muscle Strain, Localized Numbness, Pain in Ankle, Shoulder Pain, Lumbar Pain, and Shoulder Pain.

^hDefined by the National Institutes of Health’s Common Terminology Criteria for Adverse Events system as at least moderate symptoms that interfere with instrumental activities of daily living (shopping, transportation, household tasks). These events included: Atrial Fibrillation, Back Pain, Knee Injury, Back Pain, Back Surgery, Bronchitis, Coronavirus Infection, Detached Retina, Epigastric Pain, Fall, Hip Arthrosis, High Grade B-Cell Lymphoma Burkitt-Like Lymphoma, Muscle Soreness, Leg Fracture, Rotator Cuff Injury, Shingles, Shoulder Pain, and Shoulder Replacement.

ⁱAssessed by asking participants, “Overall, how satisfied are you with the way the study was conducted?” at the 12-week (end-of-intervention) visit.

ANOVA, analysis of variance; COVID-19, coronavirus disease 2019.

TABLE 2. PERCEIVED ADVANTAGES AND DISADVANTAGES OF TELEHEALTH-BASED INSTRUCTION REPORTED BY PARTICIPANTS AND INSTRUCTORS

<i>Advantage</i>	<i>Example</i>
Decreased burden on participants to travel back and forth to brick-and-mortar studios	Participants were able to participate in telehealth classes scheduled immediately after the workday (e.g., 5 pm) rather than needing buffering time to get to class.
Greater availability of instructors to lead classes by remote telehealth	An instructor moving out of state during the study period was able to continue teaching classes by Zoom; another recovering from childbirth was able to teach class while remaining close to her infant at home.
<i>Disadvantage</i>	<i>Example</i>
Potential shortcomings of students' home environments for practicing yoga during telehealth classes	Some participants were observed to be practicing yoga in small closet-like spaces in their homes in which they could not stretch out on the floor or extend their arms, or in cluttered rooms suggesting challenges with hoarding or home maintenance.
Challenges maintaining privacy when students participate in classes at home by telehealth	Relatives or roommates of participants were occasionally observed to wander into view of the camera or interject uninvited comments during class.
Problems with videoconference technology disrupting class instruction	Participants encountered challenges activating their microphone and using "mute" functions in Zoom to minimize background noise but still make themselves heard when needed during class.
Difficulty observing students' alignment or form when practicing yoga over a two-dimensional videoconference interface	Some participants had difficulty positioning their web-based cameras to allow their instructors to observe their full-body alignment during the practice of postures or exercises during class.
Challenges maintaining attention and engagement when students participate at home by telehealth	Participants were sometimes observed to take telephone calls or engage in outside activities in the middle of their Zoom classes that would not have been possible in an in-person class.
Fewer opportunities for positive social interactions or bonding between students	A participant who was hoping that study classes would provide an opportunity to make friends expressed disappointment that it was not easy to establish a rapport or make follow-up social plans with other participants after Zoom class.

Perceived advantages and disadvantages

Based on input from class instructors during quality monitoring meetings as well as participant feedback from exit interviews, the study team identified multiple perceived advantages and disadvantages of telehealth intervention delivery (Table 2). Advantages included increased convenience and accessibility when classes did not require travel to physical studios.

However, participants and instructors struggled with technical challenges with using digital communication platforms during class. They also described barriers to establishing appropriate, distraction-free environments during telehealth classes, with participants often being interrupted by other household residents or struggling to maintain attention during classes (Table 2). Opportunities for participants and instructors to develop interpersonal rapport and provide mutual support were also decreased.

Discussion

Few studies to date have examined the feasibility, tolerability, or efficacy of yoga or other movement-based interventions delivered by telehealth, particularly for more vulnerable populations.⁴⁻⁹ The LILA trial's experience with rapid conversion of a trial of a group-based yoga or physical conditioning interventions to a Zoom-based platform highlights both the benefits and challenges of live telehealth delivery. On the one hand, findings demonstrate the feasi-

bility of recruiting diverse older women into telehealth-based programs, including some who could not have traveled twice weekly to in-person classes. A surprising but encouraging finding was that average age and enrollment of racial or ethnic minority participants did not decrease substantially after telehealth conversion.

However, the trend toward modestly decreased retention suggests challenges in maintaining engagement and satisfaction in telehealth instruction. Aside from limiting class size, study personnel were obliged to provide individual coaching to participants on positioning cameras, microphones, and lighting before the start of classes, which decreased (but did not completely eliminate) technological difficulties during class. Instructors required new, specific training on techniques for teaching by telehealth, in addition to previous training on core intervention content. Some also found it necessary to supplement group instruction with brief videoconference "office hours" for selected participants reporting difficulty observing intervention techniques during classes.

Furthermore, the early trend toward more intervention-related adverse events in cohorts receiving primarily telehealth-based instruction raises potential safety and tolerability issues. These early findings highlight the need for careful monitoring of rates of injury or other side effects of telehealth-based yoga instruction, particularly for older adults. Given that intervention efficacy may also differ when delivered remotely, future analyses from the main trial will need to

explore differences in the primary efficacy outcomes by mode of delivery. Overall, these experiences highlight both the potential promise and challenges of telehealth delivery.

Authors' Contributions

Dr. A.J.H. made substantial contributions to the conception and design of the work; the acquisition and interpretation of data; drafting and revising the work critically for important intellectual content; and final approval of the version to be published. Dr. M.A.C. made substantial contributions to the conception and design of the work and interpretation of data; revising the work critically for important intellectual content; and final approval of the version to be published. Mr. M.S. made substantial contributions to the analysis and interpretation of data; revising the work critically for important intellectual content; and final approval of the version to be published. Drs. S.P. and F.N. made substantial contributions to interpretation of data; revising the work critically for important intellectual content; and final approval of the version to be published. Dr. L.L.S. made substantial contributions to the acquisition and interpretation of data; revising the work critically for important intellectual content; and final approval of the version to be published.

In addition, all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Acknowledgments

The authors gratefully acknowledge the contributions of Ms. Leslie Howard as the lead expert yoga consultant for this study, who developed the content of the study yoga program and evaluated participants' ability to perform the study yoga postures and techniques in collaboration with the other members of the research team.

They also gratefully acknowledge the efforts of Ms. Traci Plaut, Sarah Chatfield, Kathryn Batham, Ann Chang, and Lisa Abinanti in overseeing participant recruitment and follow-up, data collection, data cleaning, and data management for this research, as study personnel employed by the University of California San Francisco or Stanford University.

Author Disclosure Statement

No authors report any potential conflicts of interest related to this work.

Funding Information

This work was supported by grants R01DK116712 and K24DK080775 from the National Institute of Diabetes and

Digestive and Kidney Diseases; grant K24AG068601 from the National Institute on Aging; grant R34AT010356 from the National Center for Complementary and Integrative Health; and supplemental grant R01DK116712-04S1 from the National Institutes of Health Office of Research on Women's Health.

References

1. Clarke TC BP, Black LI, Stussman BJ, Nahin RL. Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and older. In: NCHS, ed. Hyattsville, MD: National Center for Health Statistics, 2018.
2. Cramer H, Ward L, Steel A, et al. Prevalence, patterns, and predictors of yoga use: Results of a U.S. Nationally Representative Survey. *Am J Prev Med* 2016;50:230–235.
3. Huang AJ, Chesney M, Lisha N, et al. A group-based yoga program for urinary incontinence in ambulatory women: Feasibility, tolerability, and change in incontinence frequency over 3 months in a single-center randomized trial. *Am J Obstet Gynecol* 2019;220:87.e81–87.e13.
4. Mathersul DC, Mahoney LA, Bayley PJ. Tele-yoga for chronic pain: Current status and future directions. *Glob Adv Health Med* 2018;7:2164956118766011.
5. Brosnan P, Nauphal M, Tompson MC. Acceptability and feasibility of the online delivery of hatha yoga: A systematic review of the literature. *Complement Ther Med* 2021;60:102742.
6. Huberty J, Eckert R, Dueck A, et al. Online yoga in myeloproliferative neoplasm patients: Results of a randomized pilot trial to inform future research. *BMC Complement Alter Med* 2019;19:121.
7. Huberty J, Sullivan M, Green J, et al. Online yoga to reduce post traumatic stress in women who have experienced stillbirth: A randomized control feasibility trial. *BMC Complement Med Ther* 2020;20:173.
8. Schulz-Heik RJ, Meyer H, Mahoney L, et al. Results from a clinical yoga program for veterans: Yoga via telehealth provides comparable satisfaction and health improvements to in-person yoga. *BMC Complement Alter Med* 2017;17:198.
9. Selman L, McDermott K, Donesky D, et al. Appropriateness and acceptability of a Tele-Yoga intervention for people with heart failure and chronic obstructive pulmonary disease: Qualitative findings from a controlled pilot study. *BMC Complement Alter Med* 2015;15:21.

Address correspondence to:
 Alison J. Huang, MD, MAS
 Department of Medicine
 University of California
 1545 Divisadero Street
 San Francisco, CA 94115
 USA

E-mail: alison.huang@ucsf.edu