Doing Research: A Tutorial for Yoga Teachers

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Abstract

This article describes a Yoga teacher's experience in conceiving, designing, and implementing a research project. The study examined the effects of brief Yoga training on symptoms of psychological distress in individuals recovering from heart disease. A quasi-experimental design with pre-test, post-test, and non-equivalent groups was used. Seventeen cardiac rehabilitation outpatients (mean age: 65, age range: 53–81) in three hospital programs received six weeks of Yoga training. The Yoga intervention consisted of modified Yoga postures practiced dynamically and integrated with conscious breathing. Each session ended with several minutes of regulated breathing practiced in a resting position. Emphasis throughout the six weeks was on cultivating a relatively long, smooth exhalation. Participants in the Yoga classes made significant improvements in their scores on Anxiety, Somatization, Tension, Depression, and the global measures, General Severity Index and Mood Disturbance. Somatization was the only variable in which the comparison group scored as high as or higher on the pretests than did the treatment group. The comparison group showed little change in Somatization at the end of the study, whereas the treatment group's differences were statistically significant ($p < .01$). Participants reported a number of benefits on an open-ended questionnaire at the end of the six weeks. At three-months follow-up, 12 of 15 respondents were maintaining at-home practice. The author discusses issues confronted by Yoga teachers attempting to measure and document the effects of their teaching. Consideration is given to other methods of inquiry appropriate for examining the processes as well as the outcomes of a Yoga intervention.

Conception of the Research Project

After several years teaching Yoga, I began to think about the possibility of "proving," or at least documenting, the therapeutic effects of Yoga practice that many of my students experienced. Students that I taught privately as well as those in small group classes had alleviated back pain, gotten rid of chronic headaches, overcome insomnia, and found relief from allergies and asthma. They claimed to feel happier, less stressed, more in control of their lives. Why, I wondered, does not everyone, the mainstream medical community in particular, recognize Yoga's potential to relieve suffering and promote health? I knew that research was the key to such recognition and acceptance, although I knew nothing about doing research. I decided to begin a graduate program at a nearby university, motivated in part by my desire to learn something about designing and conducting research.

I chose recreational therapy as my field, knowing only that these therapists used recreation to help their patients improve functioning and quality of life. They were the members of the treatment team particularly concerned with their patients' ability to enjoy leisure—the freely chosen, intrinsically rewarding pursuits that enrich a person's life. Recreational therapists claimed to work with the body, mind, and spirit. As a Yoga teacher,

I felt at home with this holistic approach to health and healing.

My masters' thesis was a study on breathing—comparing the effects of two breathing ratios on self-reported symptoms of anxiety and psychological distress. I did a series of private lessons for 14 individuals who described themselves as "under stress," teaching all of them simple movement integrated with conscious breathing. Each session ended with seated or lying breathing. Half the group learned to extend their exhalations to twice the length of their inhalations; the other half practiced relaxed breathing without attempting to extend exhalation. Six weeks later, all the participants in both groups had a significant drop in their scores on anxiety and psychological distress. My hypothesis that there would be a difference in the two groups was not supported. I had succeeded as their Yoga therapist, but I had a great deal more to learn about doing research.

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Two years into my doctoral study, I was asked to teach a Yoga class in a cardiac rehabilitation program at a hospital in a neighboring town. The director had been exposed to Yoga through the Dean Ornish Heart Disease Reversal Program in San Francisco. At her request, I taught one six-week series of classes for outpatients in cardiac rehabilitation. A few months later, trying to determine the research question for my dissertation, I looked further into the Ornish program as described in Bill Moyers's *Healing and the Mind.* The apparent metamorphoses made by Dr. Ornish's patients fascinated me. Almost overnight, these men and women changed from the high-fat American diet and sedentary, high-stress lifestyles to a strict vegetarian diet, regular exercise, and Yoga. Passionately, I wanted to know what that experience was like.

I learned that a hospital in another neighboring city was actually trying to implement the Ornish program. Many of their cardiac rehabilitation patients had adopted the Ornish diet. They faithfully participated in the rehabilitation exercises and a moderate but consistent walking regimen. They were given stress management and relaxation training, including a Yoga component led by various members of the rehabilitation staff. A Yoga class for the general public was available to them at the hospital fitness center. I was not interested in teaching Yoga in this hospital, but I was very interested in hearing the stories of the men and women who had adopted these drastic lifestyle changes and were thriving on it.

I approached the director of cardiac rehabilitation in this relatively large southeastern hospital. I told him I wanted to do my dissertation research—a naturalistic study based on interviews—on the experience of making and maintaining lifestyle change after a cardiac event. The director was an exercise physiologist; a qualitative study based on what individuals would tell me in private interviews was, to him, not research. He replied, "What will you have when you finish, a poem?"

My committee chair at the university helped me convince the director that something could be learned about changing health behaviors by listening to the people who had done it. Permission in hand, I applied for and received a small grant to fund the research. The project involved two in-depth, tape-recorded interviews with each of nine individuals who had adopted and maintained the Reversal Program for from two to four years. I spent a year analyzing the hundreds of pages of transcripts and writing my interpretation of these individuals' experiences. I gained a profound appreciation for the challenges they had met, their insights into their own processes of change, and the growth that was apparent in each of them. No quantitative, experimental study could have revealed what I learned from this research.[1]

I asked how they experienced their exposure to Yoga in their relaxation training . . . No one gave me a positive response.

One of the themes emerging from the interview data was the new attention given by these individuals to the stress in their lives. They attempted to deal with stress in various ways, but primarily through exercise. Yet several of them described not having succeeded in handling stress nearly as well as they had succeeded in the other areas of the Reversal Program. I asked how they experienced their exposure to Yoga in their relaxation training. (None of them knew that I was a Yoga teacher.) No one gave me a positive response. Some of them

laughed and described how embarrassed they felt trying to sit on the floor and chant *om*. One interviewee, a Southern Baptist minister, had encouraged the director to eliminate the Yoga component, and he provided some Christian-based meditations for subsequent groups. Another spoke of how wary the program staff had become about introducing Yoga, yet they wanted to remain faithful to the Ornish program. He said, "They spend more time telling you that God won't get you for doing Yoga than they do doing Yoga." Only one of my study participants had enrolled in the Yoga classes offered at the hospital fitness center. He said, "It probably helped some, but I just didn't continue doing it after the class was over."

I completed my doctoral program, moved to a neighboring state, and took a faculty position in the recreational therapy curriculum at a small state university. It was time for another research project. I wanted to again teach Yoga in a cardiac rehabilitation program. I believed my students would not only learn to relax and moderate their response to stress, they would participate in the classes without embarrassment or frustration. Although I had this rather loose hypothesis, the study would be exploratory for me in another sense. My training in the Viniyoga tradition strongly emphasizes one-to-one teaching, particularly for purposes of therapy. My own experience certainly supported the soundness of individual teaching. This study would involve a group format for people with heart disease. What could I expect to achieve?

Laying the Ground Work

I wrote a proposal for a small grant given by my university for summer research. The grant proposal required that I review research-based literature that would indicate a need for this particular study. I updated my collection of journal articles on stress management and relaxation training in cardiac rehabilitation. Several articles dating back to the 1980s supported the efficacy of conscious regulation of breathing in reducing psychological and somatic arousal in both clinical and non-clinical populations.[2-4] More recent studies reported that breathing techniques derived from Yoga have been effective in modifying respiratory physiology and reducing the frequency of functional cardiac symptoms.[5-7] My enthusiasm for the project grew, and I decided I would proceed, with or without funding.

The next step was gaining the approval of the university's Institutional Review Board (IRB), also known as Protection of Human Subjects. Following IRB guidelines, I submitted a document including a statement of purpose and a description of procedures I would use in the study. I described in detail how I would recruit the subjects, obtain their informed consent before beginning the study, collect data, and maintain confidentiality. The document required me to identify possible risks and potential benefits to the subjects, and to verify that I had permission to conduct the research at the chosen sites.

I wanted at least 30 subjects for my study, including a treatment and a comparison group, in order to do a meaningful statistical analysis of the results. I chose three sites where I believed I could easily "gain entry" because of previous contacts. One of these was the hospital, now out-of-state for me, where I taught cardiac rehabilitation outpatients a few years earlier. One was a hospital where I taught Yoga in a community wellness program several years before, and the other was the regional medical center in the county where I now live. I was willing to do considerable driving to get to the sites because I was already familiar with these facilities and some of the staff.

I made the contacts first by letter, then by telephone, and at the local site by personal visit. Each of the program directors was pleased by my request and proceeded to seek the approval of their unit directors. Only one of the three hospitals required me to submit a document for its own Institutional Review Board and to attend the board's monthly meeting to make my request in person.

Permission was granted without difficulty at all three hospitals. By this time, I was fairly clear about my research questions. (1) Would the Yoga training reduce symptoms of psychological distress in individuals recovering from heart disease? (2) Would the Yoga training be perceived positively by the participants in the study? (3) Would the participants practice the Yoga techniques at home and continue practicing after the study ends? I now had to set up a schedule at each of the sites, choose and order standardized measurement instruments, and prepare the materials referred to below in the Methods section.

Methods

The Design

The design of this study was quasi-experimental, that is, pre-test, post-test with a non-equivalent comparison group. A true experiment that could show a causal relationship between intervention and results would require random assignment to the two groups. In this study, random

assignment was not feasible logistically or ethically. The necessity for scheduling the classes during my summer break did not allow me to offer a later series of classes for individuals who might want to be in the classes but would be assigned to the control group. Therefore, no individual who volunteered for the Yoga training was excluded from the treatment group. The two groups were self-selected.

The Sample

The directors of cardiac rehabilitation at each of the three sites solicited participants for the study by distributing information sheets in their respective outpatient programs. Twenty-seven individuals volunteered to be in the treatment groups. Ten either dropped out or were not present at the last class for the post-tests and thus were not included in the analysis. Eleven women and six men (mean age: 65, age range: 53–81) completed the Yoga classes. Seventeen cardiac rehabilitation outpatients (2 women, 15 men, mean age: 61, age range: 50–76) who did not volunteer for the Yoga classes served as the comparison group. Thus, 34 individuals made up this convenience sample. All were exercising approximately three times a week in their respective cardiac rehabilitation programs. All participants signed and received a copy of the consent form giving the details of the study and assuring confidentiality.

The Yoga Training

The hour-long classes were held once a week for six weeks in each of the three locations. The theoretical basis for the Yoga intervention was the close relationship that exists between the activity of the mind and the experience of stress. The Yoga practices would give the participants a practical, reliable means to still their minds. The primary tool for reducing agitation in the mind would be the practice of conscious breathing in both movement and in a resting position. The content of these six weeks of classes aimed to help the participants learn to regulate and attend to their breathing and to be able to sustain a conscious breathing pattern for several minutes.

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The desired breathing pattern would stimulate the parasympathetic nervous system, resulting in the relaxation response, and would be comfortable and acceptable to the participants. The breathing pattern I wanted them to learn consisted of an easy inhalation, a longer exhalation that was even and smooth, and a brief, effortless pause after exhalation. I believed the actual length of each of these components of the breathing cycle should not be programmed in advance. Considerable variation could exist among individuals while retaining the desired relationship between the parts of the breath.

Both casual and focused observation alerted me to these individuals' obstacles to healthy, relaxed breathing. I observed upper chest breathers whose abdominal muscles gave little or no support to their breathing. Most of the participants were quite rigid in their trunks, inhibiting expansion in their lungs. Existing breathing patterns were shallow and irregular. Tension in the neck and shoulders was clearly evident. I designed the practices to reduce some of these structural impediments to good breathing. The practices consisted of simple postures that would, through slow repeated movement, gently extend and flex the spine, relieve muscular tension in the trunk and neck, and encourage awareness of the abdominal muscles that should initiate exhalation. I gave minimal instructions on the mechanics of breathing, relying instead on the movement in the postures, coordinated with exhalation and inhalation.

Each participant filled out a questionnaire before the first class began in order to alert me to existing pain or problems that might influence their Yoga practice. I talked individually with each of them to further clarify this information. Predominant physical complaints were pain (typically arthritis) in the neck, shoulders, upper back, lower back, knees, ankles, and wrists; shortness of breath; difficulty sleeping; and hypertension. This assessment information supported my decision to emphasize exhalation in the postures and in the breathing period at the end of each class.[8]

During the classes, I demonstrated each posture, deliberately avoiding excessive verbal instruction. Then I led the participants through the movement and breathing until they appeared able to perform the movements independently. As they practiced repetitions of the posture, I moved about the room, suggesting various individual modifications. For example, I encouraged some to bend their arms more when straighter arms would inhibit movement in the spine and create more tension in the neck. Individuals with

knee problems performed a seated forward bend from a chair rather than a kneeling forward bend on the floor. In all postures, I emphasized moving only within the range of comfort and ease of breathing.

Several minutes of lying on the floor to regulate relaxed breathing followed the practice of postures in each session. I knew from earlier experience in teaching breathing in various clinical settings that this training is best given slowly and delicately. Too many directions to follow and too much effort to "breathe deeply" can result in increased arousal rather than the desired state of relaxation. My instructions began with simple awareness of the breath (hands placed on the lower abdomen) in the first session and progressed in small increments over the remaining five weeks. In the second session I instructed them simply to breathe out a little more slowly than they normally would do. In subsequent sessions, the progression moved to feeling the abdomen contract during exhalation, to exhaling longer than inhaling, to allowing an effortless pause after exhaling, and, finally, to maintaining their comfortable breathing pattern for a given number of breaths. I gave no directions on how to inhale other than to let the inhalation take care of itself after the slow abdominal exhalation.

The selection of postures and their modifications varied among the three groups depending on the individuals present in the class. Material in each class built on the learning from the previous class in a step-by-step manner. Although I had a general idea of what I would teach in each class, I did not have a planned sequence of postures before the class began. At the end of each class, I quickly drew stick figures illustrating the postures done in that session, had them copied on a nearby copy machine, and distributed the sheets for the participants' at-home practice.

Data Collection

I chose two self-report instruments, the Profile of Mood States[9] and the Brief Symptom Inventory,[10] to measure psychological distress at the beginning and end of the study. Each instrument includes a number of subscales as well as a global measure of symptoms or mood disturbance. The Profile of Mood States contains 65 items, each consisting of one word to describe a feeling (for example, "confused"). The participant is asked to rate on a 5-point scale the extent to which he or she has experienced that feeling during the past week. The Brief Symptom Inventory contains 53 items consisting of phrases that indicate distress (for example, "trouble concentrating"), also rated on a 5-point scale and referring to the past seven days. Both instruments have been used extensively in studies of behavioral interventions to alleviate symptoms of stress. Reliability and validity of both instruments are well established. Each test required about 10 minutes to complete.

I used individual Attitude-Compliance Check Sheets (Figure 1) at the beginning of each class to monitor frequency of at-home practice as well as the participant's feelings about the practice. I monitored breathing rate during the breathing practice at the end of the last four classes by having each participant count the duration of exhalation and inhalation with the aid of a metronome and recording these figures.

At the end of the last class, participants used an open-ended questionnaire (Figure 2) to give subjective and evaluative information regarding the Yoga training. I mailed a follow-up questionnaire (Figure 3) to each participant three months later to determine adherence to the practice after the class ended.

Analysis of Data

Four sets of numerical data were collected for each of the 34 participants in my study. These were the pre-test and post-test scores on the two standardized measurement instruments. Each of these instruments had a number of subscales in addition to its global measure. A college student volunteered to help me score the 136 tests. I entered the scores into a database in an Excel spreadsheet program.

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Essentially, two questions needed to be answered in the analysis of this data. First, was there a difference in scores from pretest to posttest—greater than what might occur by chance—in the group of cardiac rehabilitation outpatients who received the Yoga training? Second, if such a difference existed, could it be attributed to the Yoga training and not just to the passage of time or to participation in the regular cardiac rehabilitation program or some other factor?

Seven psychological variables on the two measurement instruments were of interest to me. Those were

Attitude-Compliance Check Sheet

During the past week, I was able to practice: Subject No. _____
(Check one) Session No. _____

Every day _____
Almost every day _____
About half the time _____
Less than 3 times _____
Not at all _____

In general, my feelings while doing the practice are:
(Check one or more)

The exercises hurt _____
It is difficult to keep my mind on what I am doing _____
Im pretty neutral about it _____
It feels good _____
It feels wonderful _____
I feel deeply relaxed by the time I finish _____

Figure 1

Thank you for participating in this study! Your answers to these questions will add to our information about the usefulness of yoga in a cardiac rehabilitation program. Please read all the questions before answering any. You do not need to put your name on this page.

1. In this six weeks class we have attempted to learn and practice yoga techniques to improve breathing skills and promote relaxation. What has motivated you to stay with the class?
2. In what way, or ways, have these techniques helped you, if any?
3. Since beginning this class, have you deliberately used breathing for a particular purpose at times other than while doing the practice? If so, please elaborate.
4. Do you think you will continue to practice now that the class has ended?
5. What suggestions do you have for making a class such as this more effective?

Figure 2

Dear _____

Three months have passed since our last class in the study of the effects of yoga training on symptoms of stress. The data obtained from those classes are certainly helpful to me, and now I am asking you for one last piece of information.

A big issue in any behavioral treatment intervention is whether or not the person will or can stay with the regimen. This information will help me determine the practicality and usefulness of six weeks of yoga classes in a rehab program. Please respond to the items below and return to me in the enclosed envelope. Again, I appreciate your contribution to this research, and I wish you all the best.

1. Since the yoga class ended, I have practiced some of the postures and breathing:
   ___ nearly every day
   ___ several times a week
   ___ about once a week
   ___ not at all
2. I usually spend about _____ minutes with my practice.
3. Any comments to add to the researchers understanding of this issue:

Figure 3

Anxiety, Somatization, Tension, Depression, Anger, the Global Severity Index on the Brief Symptom Inventory, and the Total Mood Disturbance on the Profile of Mood States. The mean scores on each of these variables were clearly lower on the posttests than on the pretests for the Yoga training group. But a statistical "test of significance" was necessary to determine if differences of this size could likely have occurred by chance. I used a "paired t-test," a relatively straightforward procedure involving a series of mathematical formulas to arrive at a t value for the mean difference in each variable. Each t value was then applied to a t distribution table found in the appendix of every statistics text. The table leads to a "probability" value, which is the clue to whether or not these differences are significant in the statistical sense of the term.

The second question to be answered was, could the differences in scores be attributed to the Yoga training? This issue could be addressed only by examining scores in the comparison group and again using a statistical test to determine significant differences between the two groups. Immediately the problem with self-selected groups rather than random assignment became apparent. The comparison group's pre-test scores on all subscales except Somatization were considerably lower than the pre-test scores in the treatment group. Figuratively speaking, the two groups were not on a level playing field, precluding meaningful comparison of any variable except Somatization.

Consulting with an experienced researcher and statistician, I decided to control for the initial differences between groups by doing the between group analysis on the individual difference scores themselves. Using the pre-test, post-test differ-

Results of Paired t-tests on Psychological Variables

Brief Symptom Inventory

	Treatment Group (n=17)					Comparison Group (n=17)				
	Pre-test		Post-test			Pre-test		Post-test		
	M	SD	M	SD	t	M	SD	M	SD	t
Anxiety	0.78	0.46	0.35	0.28	4.96**	0.46	0.31	0.27	0.20	0.28
Somatization	0.65	0.48	0.37	0.39	3.58**	0.68	0.57	0.64	0.69	0.42
GSI	0.63	0.33	0.39	0.22	3.98**	0.44	0.28	0.32	0.19	2.43**

Profile of Mood States

	Treatment Group (n=17)					Comparison Group (n=17)				
	Pre-test		Post-test			Pre-test		Post-test		
	M	SD	M	SD	t	M	SD	M	SD	t
Tension	9.29	4.35	6.82	3.16	3.14**	7.58	5.46	6.70	5.06	1.00
Depression	8.76	8.79	4.94	5.36	2.06*	5.76	6.97	5.23	7.50	0.75
Anger	5.76	6.98	3.35	3.90	1.38	2.76	4.10	2.70	3.75	0.08
TMD	21.47	19.80	7.94	15.18	2.60**	11.76	22.46	7.82	21.69	2.64**

*p ≤ .05. **p ≤ .01. One-tailed.
GSI: Global Severity Index
TMD: Total Mood Disturbance

Table 1

ences for each subject in the two groups, I used an "independent t-test" to determine if differences between the treatment and comparison groups were significant. The independent t-test, appropriate for two non-related groups, works much the same as the paired t-test used to compare sets of scores from the same group of individuals. The mathematical formulas used in the two tests, however, are different.

Results

With the exception of Anger, all seven variables showed a difference from pretest to posttest in the Yoga training group at the .05 or .01 level of significance. In common terms, this means that there was only a 5% or 1% probability that these differences would have occurred simply by chance. In the language of research, these differences were "significant." In the comparison group, only the global measures, Global Severity Index and Total Mood Disturbance, were significantly different from pretest to posttest. Results of the paired t-tests are shown in Table 1.

The between group analysis showed that the Yoga training group's individual changes were significantly (p = .05 or .01) greater than those of the comparison group on all seven variables (Table 2). An evaluation of this comparison, however, must take into account that the treatment group's initial scores indicated more serious problems in psychological distress and mood disturbance, with the exception of the Somatization subscale.

Breathing rate during the controlled breathing period at the end of each class, as determined by participants counting seconds with a metronome, lowered for all but one of the participants in the treatment group over the course of the six weeks. At the end of the last session, the mean breathing rate was 5 respirations per minute. The "normal" respiration rate is 12–16 breaths per minute.[11] The participants appeared comfortable in maintaining their reduced breathing rate during the several minutes of breathing practice.

The predominant frequency of at-home practice, as indicated on the weekly Attitude-Compliance Check Sheet, was between "about half the time" and "almost every day." The predominant indicators of participants' feelings while doing the practice were "It feels good" and "I feel deeply relaxed at the end of the practice." No participants indicated discomfort doing the practice.

Participants in the treatment group noted the benefits they perceived from the Yoga practice in the open-ended questionnaire given at the last training session. All stated that the practice was enjoyable and made them feel more relaxed. Other comments contributed by the participants were that they were able to handle stress better, had improved sleep, were better able to stay focused and clear the mind, were less prone to anger, felt less tension in the low back and neck, felt more at peace, were more health conscious, and "learned so much about my body."

Almost all participants described using the breathing tech-

Results of Independent t-tests on Differences in Pre-test, Post-test Scores on Psychological Variables

	Brief Symptom Inventory				
	Treatment Group		Comparison Group		
	M	SD	M	SD	t values
Anxiety	0.43	0.34	0.18	0.25	3.36**
Somatization	0.27	0.31	0.03	0.34	2.96**
GSI	0.23	0.24	0.11	0.18	2.39*
	Profile of Mood Sates				
	Treatment Group		Comparison Group		
	M	SD	M	SD	t values
Tension	2.52	3.22	0.88	3.49	2.51**
Depression	3.82	7.40	0.47	2.64	2.91**
Anger	2.29	6.65	0.06	2.88	1.70*
TMD	13.76	21.16	6.82	10.33	1.84*

*p ≤ .05. **p ≤ .01. One-tailed. n = 34.
GSI: Global Severity Index
TMD: Total Mood Disturbance

Table 2

niques at times other than during their Yoga practice. These times were when they felt tense or stressed during the day, when they had difficulty sleeping at night, and when they needed to calm down and stop worrying. All participants responded positively to the question: "Do you think you will continue to practice Yoga now that the class has ended?"

The follow-up questionnaire was mailed to all 17 participants in the treatment group three months after the classes ended. Fifteen returned the survey. Two reported that they practice Yoga nearly every day, seven reported practicing several times a week, three reported practicing once or twice a week, and three reported not practicing at all. Average practice time noted was 25 minutes.

Discussion

The results of this study indicate that selected Yoga interventions were effective in ameliorating stress in these individuals in outpatient cardiac rehabilitation programs. The Yoga training group in this study had significantly lower scores in symptoms of psychological distress from pretest to posttest. All participants in the study were involved in outpatient cardiac rehabilitation programs that included aerobic exercise approximately three times a week. The assumption could be made that aerobic exercise alone could have resulted in the psychological changes observed in this study. An earlier study[12] found that exercise training had a positive psychic effect on some, but not all, cardiac patients. These researchers demonstrated that breathing and relaxation training enhanced the psychic benefit of rehabilitation. Other evidence[13] exists that relaxation training leads to more positive perceptions of the treatment environment, less hopelessness, and higher well-being in cardiac rehabilitation patients.

Limitations in the design of the study preclude showing a definitive causal relationship between the Yoga intervention and the improved scores in most of the psychological variables. The comparison group had substantially lower pre-test scores than did the treatment group on all but one of the variables. The Somatization subscale of the Brief Symptom Inventory was the only measure in which the comparison group scored as high as or higher than the treatment group on pre-test scores. The Somatization dimension reflects distress arising from perceptions of bodily dysfunction such as dizziness, pains in the chest, trouble getting your breath, and numbness or tingling in parts of the body. While the comparison group showed little change in Somatization scores, the treatment group showed significant

Almost all participants described using the breathing techniques at times other than during their Yoga practice.

improvement ($p < .01$). This lessening of respiratory complaints and other bodily sensations can logically and statistically be attributed to the gentle stretching and slow, regulated breathing in the Yoga exercises.

Based on findings in my dissertation study that revealed some cardiac rehabilitation patients' negative responses to the cultural implications of their Yoga training, I wanted to determine patient acceptance of this Yoga intervention. Subjective response to these classes was decidedly positive. It is important to note that in teaching the classes, I avoided any culturally unfamiliar practices such as esoteric hand positions, alternate nostril breathing, chanting, and attempts to sit in the lotus position. It was important for me to respect the participants' cultural background as well as to respect their age and physical limitations.

It is important to note that in teaching the classes, I avoided any culturally unfamiliar practices.

An item on the open-ended questionnaire administered at the last class meeting asked, "What motivated you to 'stay with' the class?" In addition to naming benefits perceived, several participants identified "enjoyment" and "finding the class interesting." Another frequent response was a reference to "the instructor's expertise and helpfulness." I believe this perception resulted in part, at least, from my interacting with each person in the group in each class. Throughout the sessions, as unobtrusively as possible, I modified postures for individuals, suggested alternate postures if needed, gave encouragement, and checked for any signs of discomfort or straining. I believe the participants could sense my genuine concern for their well-being. Moreover, I believe the confidence with which I was able to teach them instilled a trust that enhanced their willingness to learn and practice these techniques. That confidence came from both training and experience in teaching.

Patients' adherence or lack of adherence to prescribed therapeutic regimens, including the maintenance of new health behaviors, is an ongoing issue of concern in health care. In this study, the weekly Attitude-Compliance Check Sheets indicated that, on average, participants did their Yoga practice at home three or four times a week. The follow-up questionnaire three months after the classes ended revealed less frequent practice but, nevertheless, only three out of 15 respondents reported abandoning the practice altogether. This level of adherence indicates that the stretching and breathing techniques constituting the Yoga practice were self-reinforcing and thus supported their continued utilization as a coping tool. The stick figures given at the end of each class also may have contributed to participants' at-home practice.

Determining the feasibility of a group training format versus individual instruction requires examining more than group outcome measures. Just as important to me as a teacher are individual scores that deviated from the mean, as well as individual performance observed in the classes. It was clear to me that some participants would have benefited by more individual attention than a group class affords. Some students simply catch on more slowly than others or need more personal attention than is possible in a group. For instance, an individual in the largest of the three groups had a hearing impairment and could not hear me as I moved around the room or while he was lying on the floor. Although this participant did regular at-home practice, his breathing rate did not change over the course of the six weeks. Neither of his global scores on the two measurement instruments improved from pretest to posttest. I was aware of other participants for whom individual teaching would be important. Fewer or different postures would have been more suitable for them. Some individuals needed more time to become familiar with the movements before I introduced breathing in the postures.

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How much difference a one-to-one teaching situation would have made in the reduction of these individuals' psychological distress and mood disturbance as measured in this study is only speculation. Even though I felt a good rapport with individuals in the groups, I believe real therapy requires a more personal relationship between student and teacher than can be developed in a group. Nevertheless, judging by the participants' subjective responses to the Yoga intervention, as well as scores on the measurement instruments, the group class yielded desirable outcomes. These results cannot

be generalized to a larger population of outpatients in cardiac rehabilitation, however, because of the self-selection of the two groups.

This study was limited to six hour-long training sessions. Several participants stated that the classes should have been longer, both in duration and in the number of sessions. One participant specifically stated that six weeks was not long enough for her to "get used to it." My summer schedule did not allow a longer series of classes; this was one of the compromises in doing the research project.

I used the one-hour class time exclusively for teaching and having participants practice the techniques. Little time was available for discussion or socializing either among members of the group or between the group and me. Allowing time for discussion and socializing would add the element of social support and could confound the results of the study. In a normal group class, social support and development of community may have substantial positive effects.[14]

Recommendations for Yoga Teachers

Yoga teachers interested in measuring the efficacy of their interventions to reduce symptoms of stress in individuals in a health care setting would do well to screen participants for the need to receive this training. Individuals whose scores on stress-related psychological variables are in the normal, non-clinical range may not have the scope for improvement that is necessary to achieve statistically significant results. Recreational therapists, as well as practitioners in other disciplines in allied health, are increasingly pressured to restrict treatment to areas where measured improvement can be expected. Measured improvement translates to an earlier discharge from medical services and thus a smaller piece of the managed care dollar.

A variety of self-report measurement instruments are available to researchers studying the effects of relaxation training. A good university library has reference books describing psychological measurement instruments with citations of published studies using those instruments. Examining certain physiological indicators of an aroused or relaxed state may also be feasible in studies of the effects of Yoga practice. Yoga teachers interested in producing "scientific" evidence of the results of their teaching should consult with health professionals who have experience with measurement and the research process. A consultant with a personal interest in Yoga as a health practice could become a valuable partner in research.

At the time that I designed this study, no other Yoga teachers in the area shared my Viniyoga background. I knew of no faculty member on my small, rural campus who knew or cared much about any tradition of Yoga. Neither did I imagine at the beginning of the project how much work and time it would require. Another professional's ideas for the methodology of the study, as well as energy for completing it, would have been a great asset.

Conclusion

Yoga is rich in anecdotal evidence of both successes and ill-chosen approaches to therapy. If Yoga techniques are to be utilized in contemporary health care settings, clearly the need exists for studies to determine the efficacy and safety of Yoga interventions. This study attempted to single out quantifiable effects of brief Yoga training for a group of outpatients in cardiac rehabilitation. The findings of the study will support my efforts to teach recreational therapists to do appropriate, breathing-based relaxation training in clinical practice.[15]

The current popularity of Yoga in this country, and the attention it is receiving as a "mind-body" therapy, have facilitated its entrance into the toolbox of an assortment of well-meaning health care practitioners. Traditional yogic breathing techniques, naively and indiscriminately borrowed from a different time and place, are not uncommon in relaxation training in various health care settings. But standard techniques chosen without regard for individual circumstances are ineffective at best and risky at worst. A sound body of research that explores the processes of Yoga therapy as well as its outcomes is needed.

If Yoga techniques are to be utilized in contemporary health care settings, clearly the need exists for studies to determine the efficacy and safety of Yoga interventions.

Yoga is, by its nature, an integrated approach to health and healing.

Controlled clinical trials that reduce the system to its supposedly separate parts are not the ideal methodology for understanding the processes or the effects of Yoga. Other methods may serve the Yoga researcher far better in terms of understanding the idiosyncratic and

developmental dynamics of Yoga therapy. The case study design can provide both a model and a means of disciplined inquiry.[16] Qualitative methods in general are highly appropriate for studying processes that typically vary for different people, that are fluid and dynamic, and that take into account participants' perceptions.[17] The conventional, quantitative methods of research no longer have exclusive domain in scientific inquiry.

One of the strengths of a Yoga practice as learned by participants in this study is that it gives people a means to gain personal mastery and control over their reactions to stressful circumstances.

One of the strengths of a Yoga practice as learned by participants in this study is that it gives people a means to gain personal mastery and control over their reactions to stressful circumstances in their lives. Once they learn the techniques, they can practice them whenever they choose, without special equipment or the intervention of a specialist. This empowerment in maintaining one's own well-being is consonant with current visions of health promotion and wellness in the medical field. Rather than bemoaning the difficulties of doing research within the medical paradigm, we could use our research efforts to elucidate what we do best—helping people become independent in their processes of healing and maintaining health.

Endnotes

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