

Group Yoga Therapy Impacts Mood States of Adolescents in a Psychiatric Hospital Setting

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Abstract

Objective: Managing acutely ill adolescents on a psychiatric unit is a delicate art, and while medication changes are often seen as a primary intervention, teaching youth other skill sets to identify and manage their strong emotions can be a powerful addition to care. Although Yoga is shown to be beneficial in mood regulation in adults, there are few quantitative studies documenting this effect in youth. The goal of this retrospective study is to examine whether yoga affects mood states of adolescents in a psychiatric hospital setting.

Method: Participants included 480 predominately white (72%), female (70%), non-Hispanic (79%) youth (15.4 ± 1.8 years) who attended yoga groups between August 2010 and March 2013 while a patient in an intensive psychiatric program. Participants completed the Fast Assessment of Children's Emotions (FACE) before and after a yoga group.

Results: Based on a binary outcome model of "change" or "no change," the probability of a change in total mood score was high (probability of change .74 (95% CI: 0.70, 0.78). There were no significant associations between age, gender, or other demographics and changes in mood scores. Yoga interventions were classified as primarily energizing, relaxing, balanced or mindful. Energizing interventions were least likely to change self-reported sadness, and relaxing interventions were least likely to change self-reported energy.

Conclusion: This preliminary research documents that group yoga therapy can be integrated into a children's psychiatric hospital setting, and has an immediate impact on mood states of youth with serious mental illness.

Keywords: Yoga; Adolescent; Mental disorders; Emotions; Inpatient

Introduction

With decreased funding for staff, and increased regulatory requirements to prevent seclusions and restraints, psychiatric inpatient units for youth have struggled to maintain a safe and therapeutic environment [1,2]. With the goal of offering youth alternative strategies for processing or modulating their emotional states, as well as to expose them to normative coping skills that they may choose to continue following an inpatient hospitalization, the psychiatric inpatient units at a large children's hospital approached this dilemma by integrating a number of complementary and alternative medicine approaches into their milieu therapy [3], including yoga therapy. In this hospital, a registered children's yoga teacher, who also had Licensed Professional Counselor status through the State of Colorado, offered 60-90 min group yoga therapy sessions weekly to all patients in the adolescent inpatient unit, the adolescent day treatment program, and the eating disorders program beginning in 2005. Milieu staff could choose to continue to offer videotaped yoga sessions to youth during other less structured times on the units as well.

Yoga does not only offer physical exercises, but is a systematized method of helping an individual develop right attitudes, mindfulness, and a sense of calm [4]. In a meta-analysis, Ross and Thomas [5] reviewed 81 studies and found "a growing body of evidence supports the belief that yoga benefits physical and mental health via down-regulation of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS)." Evans et al. [6] note that while a lot of studies document yoga's efficacy for healthy individuals, we are still learning how yoga can be used therapeutically for individuals suffering pain or illness. This kind of yoga customized for individual needs and limitations is called yoga therapy, and is defined by the International

Association of Yoga Therapists (<http://www.iayt.org/>) as "the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of Yoga." Several recent studies of outpatient adults with major depression documented that yoga therapy substantially and significantly reduced depression scores on standardized measures [7-9]. We chose to include yoga therapy for acutely ill teens with psychiatric disorders in the hopes that it would provide them with strategies to calm themselves, develop increased self-efficacy, and improved affect.

While it is difficult to study the impact of a single intervention in the midst of a multi-interventional therapeutic milieu, we hypothesized that one of the ways in which yoga therapy may mediate improvement in psychiatric symptoms would be to have an impact on the acute mood states of the child. While many youth requiring psychiatric hospitalization have high levels of anger, sadness or anxiety, some also suffer from being cut off from their emotions. These youth often have psychosomatic disorders such as anorexia nervosa, but may also suffer from psychosis or dissociative disorders. Inducing an acute change in a mood state may be helpful in both teaching teens that yoga could

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help them modulate a mood state, e.g. sadness, as well as help them get in touch with underlying emotions and start to process them. This approach of looking at immediate changes in mood following a relatively short intervention has been studied in adults with multiple sclerosis to develop complementary approaches to their treatment [10].

Beginning in 2010, adolescent mood states were assessed in a standardized manner before and after each of the formal Yoga Therapy sessions as part of program evaluation. The primary aim of this retrospective chart review study was to examine changes in mood states of adolescents who participated in yoga therapy (YT) as a brief therapeutic intervention during a psychiatric hospitalization. The secondary aim was to examine whether particular patients benefitted more from the group yoga therapy intervention than others. The final aim was to understand if specific yoga therapy approaches led to differential changes in mood states.

Methods

This study received institutional approval from the Colorado Multiple Institutional Review Board as a retrospective, de-identified chart review study. Initial data was collected as part of program evaluations.

Participants

Participants consist of 480 children and adolescents, ages 9-20 years, who were patients on one of three psychiatric units in a large children's hospital, participated in at least one group YT session between August 2010 and March 2013, and completed a standardized mood assessment before and after the YT group.

Protocol

As part of standard psychiatric care in this children's hospital, group YT (60-90 min in duration) was provided to patients on each of three units: Adolescent Day Treatment (ADT), Adolescent Psychiatric Inpatient Unit (APU) and Eating Disorders Unit (EDU). As part of program evaluation, patients completed a standardized mood measure before and after each YT group, responding to the prompts: "How do you feel right now?" and "How did you feel during group?"

While all of the patients required higher levels of care than outpatient, the composition of the units was slightly different. Adolescents on the inpatient unit (APU) were assessed to be a risk to themselves, a risk to others, or gravely disabled. On this locked unit, many patients presented with recent suicide attempts and/or self-harm, acute anxiety symptoms, active psychotic processes, personality disorders, and social-adaptation issues that have serious psychosocial effects. This unit has an average length of stay of about seven days. The Psychiatric Day Treatment (PDT) unit serves a similar population to the inpatient unit, but these patients tend to be less acute in their presentation, and length of stay varies from 7-15 days for most patients. A patient on the eating disorder unit (EDU) might be working on a number of goals: re-feeding, increasing parental control over meals, and patients' intrapsychic process of dis-identifying from their eating-disordered "voice." This unit encompassed both inpatient and day treatment patients. Total length of stay averages 17 days.

During the time of this retrospective study, a total of 277 group YT sessions were offered, with an average of 3.1 patients in each group who were able to fill out the mood measure before and after the group. The range in number of groups attended by any individual patient was 1-19, with 57.4% of patients attending 1 group, 23.6% attending 2 groups and 19.0% attending 3 or more groups.

Yoga therapy interventions

In a group setting, YT interventions are tailored to suit the broad diagnostic categories of each unit, as well as the day-to-day variance in cohorts within a single unit. Yoga interventions were categorized into four groups: energizing, relaxing, balanced and mindfulness. Energizing interventions consist of yoga practices and breathing techniques that energize the nervous system and require some physical exertion. For example, an energizing session often starts with a flowing series of poses (e.g. the Sun Salutation, a common flow of poses used in many styles and schools of yoga) and continues with standing and balancing poses. In groups with few injuries that demonstrated natural strength and endurance, challenging poses like arm balances were introduced. However, even energizing sessions end with a calming technique such as relaxation pose or a calming meditation. The purpose of the energizing session is to create focus and concentration through challenging poses that make participants focus on the present moment. The energizing session also affords those with anxiety and hyperactivity an outlet for excess energy.

In contrast, relaxing interventions often involve much less sustained movement. Relaxing sessions might consist of breathing techniques, deep stretches (such as hip openers and forward folds, which calm the nervous system) and deep relaxation practices such as Yoga Nidra [11], a progressive relaxation technique. These sessions were intended to help participants experience a sense of deeper relaxation. Balanced interventions often start like the energizing session with Sun Salutations or other activating postures but also include more calming floor stretches, like hip openers and hamstring stretches. These sessions also end with deep relaxation or short meditation. The purpose of balancing sessions is to cultivate self-regulation through a balanced flow of postures and techniques.

Mindfulness is a key component of yoga, and taught in all of the sessions. However, the sessions labeled as primary Mindfulness interventions did not include yoga poses. Instead, these sessions utilized other mindfulness practices such as walking outside using the five senses, walking a labyrinth path on the hospital grounds, or eating in a mindful manner.

Measures

The Fast Assessment of Child Emotions (FACE; 1) is a pictorial measure assessing six distinct mood states: angry, confused, sad, energetic, anxious and tired. It was derived from the Profile of Mood States (Profile of Mood States 2nd Edition by Heuchert, JP and McNair, DM, Multi-Health Systems, Inc.), but is much shorter. Each mood item is represented by both words associated with that mood and a recognizable emoticon. Patients are asked to record their mood state at the beginning and end of each YT session. All moods are rated on a three-point scale: ("not at all"=0, "a little"=1 or "a lot"=2); the activity item is reverse scored. The Total Mood Score (TMS) is calculated by adding all of the six mood states. The score has shown good validity and reliability, with an overall Cronbach's alpha of 0.77. It was chosen due to its ease of use in a clinical setting.

Data collection

All completed FACE surveys from the participants of group YT between August 2010 and March 2013 were cleaned and moved to a Research Electronic Data Capture (REDCap) [12], an electronic data capture tool hosted at the University of Colorado Denver. From this dataset, Medical Record Numbers (MRNs) were used to obtain patient characteristics using the Electronic Medical Record. Patient

characteristics included: age, gender, race, ethnicity, psychiatric diagnosis (up to two), and treatment unit (APU, ADT or EDU). In REDCap, FACE data was linked to the compiled patient characteristic information by MRN. Once demographic information for a patient was linked to the appropriate FACE survey(s), the data was de-identified for analysis.

We examined the dataset for missing data. A FACE measure was complete if the participant rated all six emotions both pre and post a yoga therapy session. If a FACE was incomplete, we removed the measure and the associated patient information from the dataset. We did not compare the data from individuals with incomplete FACE measures to those with complete FACE measures. When looking at patients eligible to attend the yoga group versus the number of completed FACE measures we have, approximately 20-30% of the FACE measures are not complete. In general, participants did not fully complete FACE measures if they arrived late to YT, were pulled early from the session due to other clinical needs, or refused to comply with the instructions. Clinicians reported the first two situations to be the most common reasons for incomplete FACE measures. We have no reason to believe that patients with non-complete FACE measures are different from those that completed FACE measures.

Data analyses

Only the first FACE measure for each participant was used for the data analysis. Demographic and clinical differences between the groups were compared using One-way ANOVA and chi-square tests. The probability of change in score was described using proportions and exact binomial confidence intervals. This method has been used in other studies utilizing the FACE measure [13,14] and shown to be clinically significant in that mood change measured this way was significant following a therapy group, but not significant following a meal in patients without eating disorders [15]. Logistic regression was used to determine what clinical and demographic factors were associated with a change in score. Chi-square tests were used to determine if there was an association between change in mood score and intervention. This potential association was further tested in a stratified analysis, considering patients with eating disorders and all other patients, as there were significant differences in gender and pre-score on the FACE between these two groups. All hypothesis tests were two-sided with significance set at 0.05. R version 3.1.1 software (R Foundation for Statistical Computing, Vienna, Austria, <http://www.R-project.org/>) was utilized.

Results

The sample included 480 adolescent participants who were primarily White, female and non-Hispanic, consistent with the demographics of the patient population of the psychiatric units. There was no difference in age or race between the three units. As was expected, there were significantly more female patients and more patients with eating disorders in the EDU, but no difference between the other two units. There was a significant difference in total pre score between the three units; the EDU patients scored significantly higher than the other two units, $p < 0.01$, which were not significantly different from one another, $p = 0.8$. Table 1 describes the demographic characteristics of the sample.

One of the primary aims of the study was to see if adolescents report a change in their mood states following a group yoga therapy intervention. Table 2 illustrates the probability of a change in mood score along with 95% confidence intervals for the estimates.

Each of the six individual mood scales has a low probability of a change, but the overall probability of a change in total mood score

Variable	ADT (n=197) Mean ± SD or n (%)	APU (n=143) Mean ± SD or n (%)	EDU (n=140) Mean ± SD or n (%)	P value
Age (years)	15.2 ± 1.4	15.3 ± 1.5	15.6 ± 2.3	0.13
Total Pre Score	3.9 ± 2.3	4.1 ± 2.8	5.3* ± 3.0	<0.0001
Gender				<0.0001
Male	69 (35%)	58 (41%)	16 (11%)	
Female	128 (65%)	85 (59%)	124 (89%)	
Race				0.79
White	147 (75%)	102 (71%)	103 (74%)	
Other	50 (25%)	41 (29%)	37 (26%)	
Ethnicity				<0.0001
Not Hispanic	161 (82%)	111 (78%)	105 (75%)	
Hispanic	22 (11%)	28 (20%)	10 (7%)	
Unknown	14 (7%)	4 (3%)	25 (18%)	
Diagnosis				<0.0001
Anxiety Disorder	17 (9%)	6 (4%)	0 (0%)	
ADHD	6 (3%)	1 (1%)	0 (0%)	
Eating Disorder	1 (1%)	3 (2%)	134*(96%)	
Mood Disorder	156 (79%)	111 (78%)	3 (2%)	
Psychotic Disorder	5 (3%)	11 (8%)	0 (0%)	
Non-Psychological	2 (1%)	2 (1%)	2 (1%)	
Other Psych	10 (5%)	9 (6%)	1 (1%)	

*significantly different than the other two columns
Statistical tests were one-way ANOVAs for continuous variables and Chi-Square tests for proportional variables

Table 1: Demographic and clinical characteristics.

Mood	Estimate	Lower 95% CI Limit	Upper 95% CI Limit
Total	0.74	0.70	0.78
Anger	0.21	0.18	0.25
Confusion	0.28	0.24	0.33
Sadness	0.28	0.24	0.33
Energy	0.41	0.36	0.45
Anxiety	0.34	0.30	0.38
Fatigue	0.45	0.40	0.49

The probability of change in score was described using proportions and exact binomial confidence intervals

Table 2: Probability of mood score changes all psychiatric populations.

was 0.74. The seemingly contradictory results reflect the nature of the mood measure; any change in any mood state contributes to a change in total mood score. These results suggest that group YT cannot predict change in a specific mood for all the participants, but there is a very high chance that total mood state will change for most participants. The mean absolute change score was 1.40, with a S.D. of 1.36. This was significantly different than 0 (Z statistic=14.96; $p < 0.0001$). Mean absolute change scores in the individual mood states ranged from 0.25 (change in anger) to 0.48 (change in tired). All were significantly different from 0 at the $p < 0.0001$ level.

Additionally, we examined whether patients who had more than one YT session continued to report change in mood with subsequent YT sessions. The number of patients filling out FACE measures for more than one YT session was 210 (43% of total). The reason these patients had more than one YT group was because they were in the program for a longer length of time, typically indicating more severe illness. When comparing the change in total mood score from the first YT session to following YT sessions, we found no difference in change scores by individual patient, indicating that YT continued to produce a significant change in total mood score.

A secondary aim was to understand the relationship between mood change reported after a yoga therapy group and certain patient characteristics. There was not a significant association between change in mood score and age, diagnosis, gender or unit, indicating that the yoga intervention was equally beneficial to all.

A final aim was to understand if particular yoga interventions changed mood more or less. The type of yoga interventions performed varied significantly across the three units; $p=0.02$. Specifically, relaxing interventions were performed 26% of the time in the EDU, compared to 16% of the time in the ADT and APU. This was done due to the needs of patients with restrictive anorexia. Table 3 includes the analysis of mood changes by yoga intervention (energizing, balanced, relaxing and mindfulness).

All of the types of yoga interventions equally affected change in total mood scores. However, there was a statistically significant association between change in sadness score and intervention group; $p=0.01$. A change in sadness was noted less often in the energizing intervention compared to the balanced, mindfulness and relaxing interventions (16% vs. 33%, 31% and 32%) which was statistically significant (p -values: 0.002, 0.03, 0.01). There was also a statistically significant association between change in energy score and intervention ($p=0.03$.) There was a lower proportion of change in energy in the relaxing intervention, 28%, relative to the other three interventions. The highest proportion of change in energy occurred in the balanced intervention, 47%. There was also a significant difference in the proportion of energizing scores that changed between the relaxing and the balanced and energizing interventions (p -values: 0.004 and 0.05).

Since there was a significant difference in pre-scores on the FACE, as well as % of patients who were females, between the EDU and the other two units (APU and ADT), the above analyses were done stratified by patients on the EDU compared with patients on ADT or

APU. Although the findings were still in a similar direction, they were no longer significant at the $p<0.05$ level.

Discussion

Adolescents presenting to a psychiatric hospital with moderate to severe emotional and behavioral disturbances are often unable to regulate their mood states, or are even unaware of them. A goal of psychiatric inpatient treatment is to help the child understand and regulate their internal emotional states. A non-verbal means of communicating is often the first step in helping depressed, anxious, angry, or highly controlled youth identify internal states and express these states in a beneficial manner. One such primarily non-verbal intervention is yoga therapy. Clinicians involved with this intervention state that it is helpful in engaging and reaching youth [16], but there are few quantitative studies to assess the utility of YT in youth.

The primary aim of this research was to assess whether group yoga therapy sessions had an impact on adolescent mood states. The 480 adolescents in this study were patients in inpatient or partial hospitalization settings for acute psychiatric conditions, and so were receiving multiple therapeutic interventions concurrently. It is difficult to evaluate the effectiveness of one therapy in the midst of many therapeutic interventions. Thus, this preliminary study could only examine immediate changes in mood states as one measure of the impact of yoga therapy.

Yoga therapy was well accepted by teens with acute mental health problems, as well as by staff on the psychiatric units. The yoga teacher reported no adverse events with the practice of yoga on these units, but this was not systematically tracked. Furthermore, yoga was able to change self-reported mood states significantly, regardless of gender, race, ethnicity or diagnoses (within the confines of our sample). Since yoga therapy may be effective in either decreasing perceived negative mood states or increasing awareness of these underlying emotional states, the investigators did not place a value judgment that mood states should change from a negative to a more positive direction. Understanding the direction of the change in mood was not the intended outcome of this research.

With this population of highly acute adolescents with severe psychopathology, most of whom had a negative mood state at time of admission, the significant probability of a change of any mood is to be seen as clinically meaningful. Our previous research has already shown that CAM interventions are able to change mood significantly more than a neutral intervention [1]. As an intervention within a therapeutic milieu, the ability to effect change in emotional states within a short span of time seems a benefit in terms of helping patients identify underlying emotions, as well as helping patients move out of or through, problematic mood states.

The secondary aim of this study was to identify any patient demographics that were influenced more or less by yoga therapy, and to assess whether or not it affects any specific mood state more than others. Patient demographic variables of age, gender, diagnosis, length of hospital stay, psychiatric medication, insurance type, race, ethnicity, or treatment unit did not have a statistically significant effect on the odds of change in mood state. In this large sample of adolescents, evidence suggests that yoga therapy elicits changes in mood states for a diverse range of adolescents with acute psychiatric conditions.

Finally, this study evaluated whether specific types of yoga were more likely to elicit changes in specific mood states. When looking at the population as a whole, sadness was least affected by the energizing

Variable	Balanced (n=193)	Energizing (n=107)	Mindfulness (n=75)	Relaxing (n=87)	P value
Overall					
Same	47 (24%)	24 (22%)	24 (32%)	24 (28%)	
Change	145 (76%)	83 (78%)	51 (68%)	63 (72%)	0.48
Anger					
Same	150 (78%)	81 (76%)	63 (84%)	67 (77%)	
Change	42 (22%)	26 (24%)	12 (16%)	20 (23%)	0.58
Confusion					
Same	136 (70%)	70 (65%)	61 (81%)	61 (70%)	
Change	57 (30%)	37 (35%)	14 (19%)	26 (30%)	0.13
Sadness					
Same	129 (67%)	*90 (84%)	52 (69%)	59 (68%)	
Change	64 (33%)	17 (16%)	23 (31%)	28 (32%)	0.01
Energy					
Same	103 (53%)	62 (58%)	45 (60%)	*63 (72%)	
Change	90 (47%)	45 (42%)	30 (40%)	24 (28%)	0.03
Anxiety					
Same	125 (65%)	69 (64%)	54 (72%)	56 (64%)	
Change	68 (35%)	38 (36%)	21 (28%)	31 (36%)	0.67
Fatigue					
Same	107 (55%)	56 (52%)	37 (49%)	57 (66%)	
Change	86 (45%)	51 (48%)	38 (51%)	30 (34%)	0.16

Chi-square tests were used to determine if there was an association between change in mood score and intervention

Table 3: Change in mood score by intervention all psychiatric populations.

yoga interventions, whereas energy was least affected by the relaxing interventions. This trend held, but was not significantly significant when stratified by unit, possibly due to a lower number of participants. Knowing that types of yoga interventions can affect certain mood states allows the yoga therapist to select nuanced interventions for specific needs of participants. Future research involving yoga interventions should specify the type of yoga intervention utilized to further our understanding of these effects.

There are several limitations of this study. This was an open observational study, without a control group. Another consideration was that the surveys were self-report, which means the data was limited by the self-awareness and cooperation of the subjects. Using multi-method and multiple sources for data collection may be more explanatory, but was unavailable in this study due to logistics and funding constraints. Future research should examine various changes in the FACE measure with other clinical improvements or outcomes. Additionally, this sample was largely a white, insured sample of adolescents, so may not be applicable to all socio-economic and cultural groups.

Conclusion

Yoga Therapy was a safe, relatively inexpensive intervention utilized on three separate psychiatric units for children and teens. It is important to note that a Registered Children's Yoga Teacher provided the interventions, which likely improved safety and accessibility. Yoga was able to effect quick change in self-reported emotional states, fostering quicker acknowledgement of underlying problematic emotions, as well as providing a strategy for youth to manage their emotions in a more productive fashion. This study showed that integration of this CAM modality was well accepted by patients in these structured settings.

While it may be more powerful to study the effects of yoga on adolescent outpatients with health concerns, as more sessions can be provided, and a multi-method, multi-reporter methodology can be utilized to assess changes, it has been shown that recruitment and maintenance of participation in outpatient yoga is more difficult for this age group than young adults [17], although the teens still benefit. Tailoring the yoga intervention to this age group is important, as is addressing transportation and scheduling. Embedding yoga as a school intervention has led to better attendance [18] with positive outcomes, but not for adolescents with specific health problems. Future research on the benefits of yoga for youth with mental health concerns may benefit from getting youth started with yoga while in a structured therapeutic setting, so that they can begin to enjoy the benefits and be more likely to commit to regular practice once they are outpatients.

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