

# Effect of Residential Yoga Camp on Psychological Fitness of Adolescents: A Cohort Study

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## ABSTRACT

**Introduction:** Discovering and promoting ways that improve adolescents' psychological fitness has been a recurrent concern in the field of health and psychology. Adolescence, as a period of transition, is highly prone to have mental health risks and unhealthy behaviour patterns. Thus, it is the right time to promote healthy practices to prevent problems of health and behaviour in adulthood. As Yoga provides practical solutions for mental health, we anticipated that exposure to it should improve psychological fitness among adolescents.

**Aim:** To evaluate the effectiveness of short term residential yoga intervention on psychological constructs in adolescents.

**Materials and Methods:** A pre, post-yoga interventional study was carried out in a 10 day residential camp. Three independent cohorts of adolescents from India, in three batches (1, 2 and 3), with sample size of 148 (87 boys and 61 girls), 167 (122 boys and 45 girls) and 195 (121 boys and 74 girls), respectively were examined. A holistic integrated yoga module with eight hours of

yoga sessions per day was given as an intervention. Emotional Intelligence (EI), emotional regulation strategies, Clinical anger and self-concept parameters were studied using psychometric scales like Schutte Emotional Intelligence Scale (SEIS), Cognitive Emotion Regulation Questionnaire (CERQ-short), Clinical Anger Scale (CAS) and Self-concept Scale respectively. Authorised scales and software were used for assessments and analyses.

**Results:** Significant ( $p < 0.05$ ) improvements in EI, emotional regulation and anger management were observed in all the three batches. However, no significant improvement was found in self-concept in either of the cohorts. The observation of the results of assessed outcome measures in all the three batches confirms the positive effect of Yoga intervention on psychological fitness. The pattern of changes was consistent across all three batches.

**Conclusion:** Residential Yoga camp improves the psychological fitness among adolescents. Even short term courses are effective and induce positive behavioural signatures.

**Keywords:** Anger, Emotional intelligence, Emotional regulation, Self-concept

## INTRODUCTION

According to World Health Organisation, 1.2 billion of the world population is between the age of 10 and 19 years and are classified as adolescents [1]. This group of individuals are undergoing a stage of distinct and formative biological, physiological and social transition [2].

Especially in low and middle-income countries, many psychological and substance-use disorders reach a peak in this stressful time span of adolescence [3]. According to National Survey on Child and Adolescent Well-being (NSCAW II) in USA, high rates of mental health problems are seen in teens of all ages [4], increasing health problems among young adults [5]. Academic pressures, peer pressure, problems with bullying, addiction to social media has serious implications for mental and physical well-being of adolescents, leading to impaired performance and may contribute to the overall growth retention [6-8]. Improving the transition during adolescence is one of the priority areas to enhance health care for young adults [9].

Adolescence is the best time for teaching strategies of self-control and self-regulation [3]. It is also a phase that is more amenable to learning and more receptive to corrective changes if provided by intervention programs to improve their mental health.

Yoga as holistic intervention in which each pupil can find his/her unique trajectory of change and improvement is now considered as an important intervention for promoting psychological health [10]. Yoga shows a reduction in anxiety, depression, psychological distress in high risk adolescents [11]. Studies also report positive

correlation of yoga with self-concept and well-being in adolescents [12,13]. Residential yoga program for young adults has shown positive effects on perceived stress and quality of life [14]. Meditation sessions in schools have beneficial effects across physiological, psychosocial, and behavioural outcomes [15]. Additional studies of school-based yoga interventions also suggest positive effects of yoga on several factors such as concentration, attention, mood, anxiety, working memory, anger and self-esteem [16-21]. Many reviews suggests that yoga is generally effective at improving physical and mental health in children and adolescents [22-25].

In the available yoga research studies on adolescents, the yoga intervention of 3-4 months duration is used in the school setting as part of curriculum or before/after school hours with yoga sessions ranging from 2 to 3 hours per week for a homogeneous sample. Most of them were conducted with special education, high-risk samples, and small sample size. According to a literature review, residential yoga intervention studies are very few [26].

An important research question in this area relates to whether yoga offers any benefits for student psychological fitness in a setting different than school setting. Thus, the present study is to explore effect of short term residential yoga intervention program on psychological fitness of adolescents. An objective was also to examine the effects of residential yoga on psychological fitness across different age groups. The present study is a part of a mega study to assess overall fitness among adolescents registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

## MATERIALS AND METHODS

**Design:** It is a pre-post yoga interventional study carried out in a residential setting (Residential Yoga Camp for high school children). Three independent cohorts (Batch 1, 2 and 3) of adolescents underwent yoga intervention program in the same setting with same guidelines as consecutive studies during April 1-10 (batch 1), April 11-20 (Batch 2) and April 21-30 (Batch 3) in year 2016. The duration of the study was 10 days with 8 hours per day of classroom yoga sessions. All other components were kept consistent and similar as far as possible like teachers, living conditions, daily routine and dietary plan. This study was conducted in the campus of Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA) Yoga University, Bengaluru, India.

**Participants:** The participants of the study included adolescent children studying in English Medium Schools who registered for a yoga camp in summer holidays. Healthy adolescents of both genders, between the age of 9 and 16 years participated in the study. The participants were divided into three batches depending on the registration. Batch wise sample size was 148 (87 boys and 61 girls), 167 (122 boys and 45 girls) and 195 (121 boys and 74 girls) in batch 1, 2, and 3 respectively. Since, the Age range 9-16 is wide considering the rapid changes during adolescents, the participants were divided into juniors (9-12 years) and seniors (13-16 years) to evaluate changes. Age wise sample were (93 juniors and 55 seniors), (90 juniors and 77 seniors) and (112 juniors and 83 seniors) in batch 1, 2 and 3 respectively.

They were further randomly divided into smaller groups of 12-15 participants which made it easy to implement the intervention. Each smaller group was supervised by two teachers for better monitoring. All teachers have bachelor degree in yoga and were trained on the implementation of the intervention to ensure uniformity.

Since, the study was conducted as a yoga camp during summer holidays, the sample was heterogeneous representative sample in nature with subjects from different family backgrounds, socio-economic status, cultures and traditions, faiths and different academic status (school boards such as state, ICSC, CBSE etc.), Subjects with single parents, acute or chronic health problems, on medication, having attended any residential yoga program in the last three months were excluded.

Ethical approval was obtained from the Institutional Ethical Committee of S-VYASA with reference number RES/IEC-SVYASA/64/2015. A signed informed consent from parents and a signed informed assent from all participants were obtained after explaining the study in detail prior to screening.

**Intervention:** The modified version of Integrated Yoga Module (IYM), based on Pancha kosha model (five layers of existence) as explained in Taittiriya Upanishad, comprised of yogic techniques that benefit each of the koshas (Gross body-Annamaya Kosha, Energy body - Pranamaya Kosha, Emotional Body - Manomaya Kosha, Intellectual Body - Vijnanamaya Kosha and Bliss Body-Anandamaya Kosha). The module was designed referring to various yogic texts on yoga for children and in consultation with subject experts. The module was specially designed for the retreat with suitably modified yogic techniques to address the needs of psychological health development.

The yoga module included Asana, Pranayama, Relaxation, Meditation and also Jnana Yoga (yama niyama concepts) and Bhakti Yoga (prayers and chantings). The bhakti yoga sessions included chanting and singing while jnana yoga sessions included lectures, creativity like role-playing, story-telling, parables, journaling-diary entry etc., to drive yama niyama concepts and yogic concept of food. Few friendly competitions were kept between groups to encourage participation and team building.

The 8 hour class room yoga sessions consisted of roughly 2 hours of Asana practices, 2 hours of Jnana Yoga sessions, 1 hour each

of Pranayama (breathing exercises coupled with body movements), Meditation, Relaxation and Bhakti Yoga. The sessions were designed with a mix of events to make the program interesting. Detailed schedule is given below in [Table/Fig-1].

Time	Session	Details
5am	-	Wake Up
5:30am to 5:45am	Session 1	Morning prayer
5:45am to 6:45am	Session 2	Asana practice (physical postures)
6:45am to 7:30am	Session 3	Meditation (om meditation, cyclic meditation)
7:30am to 8:15am	-	Breakfast
8:15am to 9.00am	Session 4	Social works (altruistic group activities)
9.00am to 10:00 am	-	Bath and wash
10:00am to 11:00am	Session 5	Lectures on concepts of Yoga (yama niyama concepts)
11:00am to 12:00pm	Session 6	Pranayama practice
12:00pm to 1:00pm	-	Lunch
1:00pm to 2:00pm	Session 7	Relaxation (Deep relaxation technique, Quick relaxation technique, Instant relaxation technique)
2:00pm to 3:30pm	Session 8	Indoor activities (parables, creativity, chanting)
3:30pm to 4:30pm	Session 9	Asana practice
4:30pm to 5.00pm	-	Evening tea, snacks
5.00pm to 6:15pm	-	Free time
6:15pm to 7:15pm	-	Dinner
7:15pm to 8:30pm	Session 10	Happy assembly
8:30pm to 9.00pm	Session 11	Tranquilling pranayama and meditation
9.00pm to 9.15pm	-	Milk, snacks
9.15pm to 9:30pm	Session 12	Diary writing
9:30pm	-	Sleep

[Table/Fig-1]: Daily schedule of intervention.

**Assessment:** Assessment of psychological fitness parameters were done using following psychometric tools:

- Schutte Emotional Intelligence Scale (SEIS): This self-reported scale is based on Salovey and Mayer's (1990) original model of EI. This is a 33-item scale with test-retest reliability of 0.78 for total scale scores. Each item has a 5-point Likert's rating from 1 (strongly disagree) to 5 (strongly agree). Some item has reverse coding. The total score ranges between 33 to 165, high score indicates more characteristic EI [27].
- Cognitive Emotion Regulation Questionnaire (CERQ-short): This 18 item self-report questionnaire comprises of nine domains (Self-blame, Other-blame, Rumination, Catastrophising, Positive refocusing, Refocus on planning, Positive reappraisal, Putting into perspective and Acceptance) independent from one another. Each item has a 5-point Likert's rating from 1 (almost never) to 5 (almost always). Each domain has different scoring, high score represents often used of cognitive coping strategy. Cronbach's alpha reliability coefficient ranged from 0.73 to 0.81 [28].
- Clinical anger Scale (CAS): This 21 item scale is designed to measure different symptoms of clinical anger. Each item has a 4-point Likert's rating from 0 (I feel fine) to 3 (I feel completely miserable). The total score ranges between 0 to 63, high score represents high clinical anger. This scale has reliability coefficients of 0.94 (males and females together) [29].
- Self-Concept: This 30 item self-report scale comprises of five domains that make up an adolescent's self-concept: 1) Athletic Competence; 2) Conduct/Morality; 3) Peer Acceptance; 4) Physical Appearance; 5) Scholastic Competence. Each item has a 5-point rating from 1 (strongly disagree) to 5 (strongly agree).

agree). Some item has reverse coding. High score indicates positive self-concept [30].

Socio-Demography Measures: Children and parents completed a short demographic questionnaire in order to obtain descriptive data for the sample. Screening sheet was filled by parents and children. Variables included are age group, gender, handedness, family type, sibling hierarchy, father's age, mother's age etc.

Data collection was done on the first (pre-data) and last day (post-data) of the program, in small group settings by trained staff. The investigator and two teachers were available to clear doubts and provide unbiased guidance during the data collection.

## STATISTICAL ANALYSIS

To maintain the confidentiality, the data sheets were coded and names and other personal identifiers were omitted during data entry. Analysis was done using SPSS (Version 19.0). Change over time was evaluated using the paired sample t-test. The results of the tests were deemed to be significant if probability values were less than 0.05 whereas trends ( $p < 0.1$ ) have also been highlighted.

## RESULTS

The recruited study sample included adolescents with a mean age of  $11.84 \pm 1.77$ ,  $12.22 \pm 1.82$  and  $12.06 \pm 1.82$  in Batches 1, 2 and 3 respectively. Gender ratio in Batch 1 of 148 {87 (58.78%) boys and 61 (41.22%) girls}, Batch 2 of 167 {122 (73.05%) boys and 45 (26.94%) girls} and Batch 3 of 195 {121 (62.05%) boys and 74 (37.94%) girls}. All three batches were evaluated for the effects of a ten day holistic IYM on SEIS, CERQ-short-form, CAS and Self-Concept scale.

In the present study, overall scores of SEIS in Batch 1 (123.59 to 129.86 with  $p < 0.001$ ), Batch 2 (122.27 to 126.04 with  $p = 0.002$ ) and Batch 3 (123.63 to 126.15 with  $p = 0.032$ ) increased significantly in all three batches. Scores of CERQ kids in Batch 1 (51.83 to 57.11 with  $p < 0.001$ ), Batch 2 (55.79 to 60.10 with  $p < 0.001$ ) and Batch

3 (54.15 to 58.62 with  $p < 0.001$ ) increased significantly in all three batches. Self-Concept has not shown significant change in any of the batches. Significant decrease was seen in the scores of CAS in Batch 1 (13.59 to 10.94 with  $p < 0.001$ ), Batch 2 (16.23 to 14.09 with  $p = 0.008$ ) and Batch 3 (14.61 to 12.51 with  $p = 0.003$ ) which was a positive change [Table/Fig-2].

The analysis was also carried out separately for juniors and seniors in each batch as detailed below.

The sub-factor analyses within juniors in different batches indicate, significant increase in scores of SEIS in Batch 1 juniors, and trend of increase was seen in Batch 2 juniors and Batch 3 juniors. Scores of CERQ kids in juniors increased significantly in all three batches. Self-Concept has not shown significant change in juniors in any of the batches. Significant decrease was seen in the scores of CAS in Batch 1 juniors and decrease was seen in juniors of Batch 2 and Batch 3 but not significant. Reduction in clinical anger was a positive change [Table/Fig-3].

The sub-factor analyses within seniors in different batches indicates, there was a significant increase in the scores of SEIS in seniors in Batch 1 and Batch 2 and non-significant increase was seen in Batch 3 seniors. Scores of CERQ in seniors increased significantly in all three batches. Self-Concept has not shown significant change in seniors in any of the batches. Significant decrease was seen in the scores of CAS in seniors in all the three batches. Reduction in clinical anger was a positive change [Table/Fig-4].

## DISCUSSION

The present study demonstrated the positive effects of short term integrated yoga module program on psychological fitness in residential setting within summer break. Results suggest that yoga is an acceptable practice in residential camp by adolescents.

Present study showed significant improvement in EI. Yoga practices may significantly influence the process of self-awareness and self-control [31]. Previous research indicates improved EI through

Variables	Batch 1 (n=148) Mean±SD		p-value	Batch 2 (n=167) Mean±SD		p-value	Batch 3 (n=195) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Pos-	
Emotional Intelligence	123.59±16.09	129.86±19.30	<0.001*	122.27±15.62	126.04±17.98	0.002*	123.63±17.40	126.15±18.98	0.032*
Emotional regulation strategies	51.83±10.68	57.11±13.59	<0.001*	55.79±10.15	60.10±11.02	<0.001*	54.15±10.47	58.62±12.47	<0.001*
Self-concept	103.36±12.99	103.64±14.70	0.766	101.89±14.10	101.58±14.66	0.724	103.04±13.06	102.13±14.67	0.315
Clinical anger	13.59±10.44	10.94±10.68	<0.001*	16.23±10.77	14.09±11.52	0.008*	14.61±10.59	12.51±10.54	0.003*

[Table/Fig-2]: Paired sample t-test for three cohorts.

\*indicates  $p < 0.05$ ; SD: Standard deviation

Variables	Batch 1 (n=93) Mean±SD		p-value	Batch 2 (n=90) Mean±SD		p-value	Batch 3 (n=112) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Post-	
Emotional Intelligence	121.46±17.21	128.77±20.33	<0.001*	121.32±16.77	124.21±16.76	0.078	120.52±18.50	123.76±20.30	0.068
Emotional regulation strategies	52.20±11.52	58.65±13.31	<0.001*	55.09±10.97	59.02±10.87	0.002*	52.48±10.66	58.42±13.59	<0.001*
Self-concept	103.51±12.86	103.26±15.16	0.836	102.62±14.75	100.72±15.10	0.115	104.02±14.26	102.35±15.81	0.209
Clinical anger	14.74±10.56	12.48±11.18	0.023*	15.58±10.49	15.31±11.68	0.759	14.17±10.60	13.23±10.55	0.308

[Table/Fig-3]: Paired sample t-test for juniors.

\*indicates  $p < 0.05$ ; SD: Standard deviation

Variables	Batch 1 (n=55) Mean±SD		p-value	Batch 2 (n=77) Mean±SD		p-value	Batch 3 (n=83) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Post-	
Emotional Intelligence	127.26±13.29	131.74±17.42	0.026*	123.38±14.18	128.18±19.21	0.007*	127.82±14.88	129.39±16.60	0.265
Emotional regulation strategies	51.20±9.18	54.53±13.79	0.049*	56.61±9.11	61.35±11.13	<0.001*	56.41±9.82	58.88±10.84	0.040*
Self-concept	103.11±13.29	104.31±14.02	0.480	101.03±13.36	102.58±14.16	0.218	101.71±11.18	101.82±13.07	0.926
Clinical anger	11.67±10.06	8.36±9.32	<0.001*	16.97±11.10	12.01±11.06	<0.001*	15.19±10.63	11.53±10.50	0.001*

[Table/Fig-4]: Paired sample t-test for seniors.

\*indicates  $p < 0.05$ ; SD: Standard deviation

20 minutes of meditation over eight weekly sessions in graduate students [32]. Evidence suggests increased self-awareness, EI, and social skills in response to sitting meditation in youth [15].

Significant change was seen in overall emotion regulation and strategies. Pranayama, breathing practices, chanting and meditation, yama-niyama concept driven creativity and games especially designed for emotional development may have accounted for these positive changes and enhanced coping abilities in the present study. Results of present study on emotion regulation is in line with previous study done on 159 students with yoga based intervention in classroom setting [33].

Self-concept didn't change although, some sub-domains of it did change. Long and more periodic intervention maybe required to change self-concept.

In the present study, significant reduction in CAS in Batch 1 (13.59 to 10.94 with  $p < 0.001$ ), Batch 2 (16.23 to 14.09 with  $p = 0.008$ ) and Batch 3 (14.61 to 12.51 with  $p = 0.003$ ) shows reduction in cognitive, physiological, social, and behavioural symptoms due to anger. In present study, specially designed yoga module given in residential setting may have accounted for significant improvement in anger management and other significant positive psychological changes. Improved anger control through yoga module while in one previous RCT, insignificant changes in anger control and many of the psychological parameters were seen within groups and between groups with semester long intervention in school curriculum in adolescents [13]. In another RCT, no changes were seen in emotional and behavioral functions within yoga group as well as between groups [34]. Small sample size and inadequate dose of intervention (only 18 hours in 12 weeks) may be reason for no changes. All these limitations were well taken care in present study in the form of well-organised integrated yoga module and the intervention was repeated with three independent cohorts with large sample sizes (Batch 1-148, Batch 2-167, Batch 3- 195) . Positive findings of another study on psychological measures done in adults with 5 day residential yoga program supports the positive findings in the present study [35].

The sub-factor analysis between age groups indicates similar changes in EI in both juniors and seniors. Similar positive significant changes were seen in emotion regulation in both juniors and seniors and consistent in all three batches. Self-concept has not shown any significant changes in both juniors and seniors in any of the batches. Clinical anger scores were reduced in both age groups but more (significant) in seniors showing better anger control in seniors. Results of all parameters are consistent in all the three batches showing the consistency and confirmed effect of the Yoga intervention. Pranayama, meditation and Jnana Yoga activities may help them to look for the positive side of events, think positive and respond responsibly. Multi-component nature of yoga and intervening effect of each technique on various koshas makes it complex to precisely assign the effect on any particular parameter. According to sage Patanjali, practice of yogic postures leads to expansion of mind and ceasing of dualities [36]. Practice of pranayama gives better clarity on thoughts. Meditation and Relaxation work on cellular activity or metabolic activities. Jnana Yoga sharpens the mind while Bhakti yoga calms down the mind.

The positive outcomes in the study are generally consistent with previous studies of yoga, meditation in school settings, although the use of different outcome measures and research designs precludes a precise comparison [37,38]. The results showed significant improvement in all assessed outcome measures except self-concept in all three consecutive studies and reflects a positive change. Since, this is residential setting and participants were from many different cities (diverse data), it was not practically feasible to have active control group. So, three independent cohorts with large and matched sample size were done with same intervention to test the repeatability and consistency of the effect. Consistent similar

trend of results in all three cohorts confirms the positive effect of given integrated yoga module in adolescents.

The strength of the study lies in including heterogeneous representative samples with relatively bigger sample size. Multiple components in the yoga module can be seen as limitation as well as the strength. Limitation in terms of not able to assign the effect to any particular component of module. It is a strength because of strictly following the comprehensive integrated holistic approach of Yoga as said in the classical texts. The integrated approach to yoga comprises of yogic postures (asanas), breathing techniques (pranayama), relaxations (guided relaxation techniques), meditations (guided meditations), knowledge points (Jnana Yoga) and prayers and chanting (Bhakti Yoga). Guided relaxation techniques such as deep relaxation technique, quick relaxation technique and instant relaxation technique also include postures and body movements and breathing techniques that provide flexion and extension to muscles. Guided meditations include different postures and concepts of focusing which warrants establishing certain physical postures with hand gestures (mudras).

In Yogic parlance, concept of human existence comprises of five layers-the gross body, the energy body, the emotional body, the intellectual body and the bliss body. Integrated approach to yoga is employing specific yogic techniques to address all the layers of existence in order to get holistics or overall health.

The integrated module of yoga especially designed for yoga camp for adolescence was very well accepted by the children and received complements from the parents too. Maintaining uniformity in execution of intervention and overall conducting of program across the three batches acts as a replication of the study. The similar results/trends in each batch not only confirm the effectiveness of the program in establishing the psychological fitness among adolescents but also nullifies the lacuna arising due to absence of active control group.

## LIMITATION

The absence of control may act as a limitation of the study. However, by repeating the intervention thrice with three different batches, this limitation was tried to overcome. As there were no indigenous scales available to study the psychological parameters in the Indian setting, the psychometric scales that were developed by Westerners, used in the study. This may also be considered as another limitation of the study.

## CONCLUSION

The 10 day Residential Yoga camp is effective in improving the psychological fitness among adolescent children especially EI, cognitive emotional regulation strategies and anger management. The findings also highlight the potential of short term integrated yoga in bringing significant improvements in psychological constructs among adolescents. Further the study also demonstrates the feasibility and effectiveness of residential integrated yoga program for adolescents.

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