Effect of Residential Yoga Camp on Psychosocial Fitness of Adolescents

Abstract
Background: Adolescence is a key phase of socialization, where improved psychosocial fitness helps to promote socioeconomic productivity in societies. Psychosocial fitness also has an impact on the academic performance, overall health, and quality of life, throughout life. The present study evaluates the effect of yoga intervention on psychosocial fitness among adolescents. Materials and Methods: A single group, pre and post yoga interventional study was carried out in three independent cohorts (batches 1, 2, and 3), having sample size of 148, 167, and 195 respectively. A 7-day integrated yoga intervention was given in a residential setting. Psychosocial assessments included social competence, empathy, altruism, parent relationship, and peer friendship. Data were collected from the participants and their parents using respective versions of the scales. While pre- and post-data were collected from all the adolescent participants, pre- and post-data from parents were collected for 340 and 43 parents only. The objective of the analyses was to evaluate the effect of the yoga program and check the consistency of these effects. Results: Significant changes (P < 0.05) were seen in social competence, empathy, and altruism in batches 2 and 3, whereas changes in batch 1 showed nonsignificant improvements. Analyses of the parental data indicated a significant improvement in parent relationship (P = 0.035) and also nonsignificant improvement in all other outcomes. Conclusion: Results suggested that yoga intervention might help in improving psychosocial fitness in adolescents. It also helped to demonstrate that administering yoga was acceptable and feasible in a residential setting.

Keywords: Adolescents, empathy, parent relationship, psychosocial fitness, social competence, yoga

Introduction
Adolescence is a time of tremendous growth, potential and socioemotional development along with considerable risk, during which social contexts exert powerful influences. Psychosocial fitness is defined as developing a sense of personal identity which will continue to influence behavior and development for the rest of a person’s life. Psychosocial fitness among adolescents plays an important role, considering the need for social integration and the search for self-assertion and independence. It is marked by a set of learned behaviors displayed by them in the interpersonal context and their performance level for the demands of a social situation. Adolescence is a crucial period of socialization that demands greater attention to the mental well-being, failing which may lead to mental health consequences that may remain throughout life and reduce the capacity of societies’ socioeconomic productivity. Appropriate psychosocial development of adolescent is an indicator of sound academic performance; physical health; and adequate social, emotional, and psychological health. Psychosocial fitness ultimately contributes in reducing the risk of psychosocial and behavioral problems, violence, crime, teenage pregnancy, and misuse of drugs and alcohol. Psychosocial fitness includes how one feels and perceives about their societal relationships that has key factors such as empathy, social competence, altruism, and so forth.

Empathy, a key component of all social functioning, is an effective cognitive ability to adopt the perspective of others in order to understand their feelings, thoughts, or actions. Altruism is a motivational state, thought, and action with the ultimate goal of increasing other’s welfare without considering one’s own well-being. Weak social competencies are thought to limit an adolescent’s ability to establish and maintain friendships. Low levels of perceived social competence and negative parental interactions are associated

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with depressive symptoms\[9\]. During the adolescent period, their relationships with family and peers undergo dramatic changes and shifts. Strong positive relationships with both family and friends are vital for healthy social and emotional development\[10\]. The quality of the parent–child relationship affects the adolescent’s self-concept, which in turn affects the adolescent’s integration into the world of peers\[11\].

Literature on interventional studies, promoting psychosocial fitness are not many and are not focused to target adolescents, their caregivers, and community stakeholders\[6,12\]. A systematic review suggested that a multimodal and multidisciplinary group-based approach was found to be an effective interventional strategy\[13\]. One of the studies suggested psychosocial assets and well-being, which could be improved among adolescent girls through a brief school day program\[14\].

Since psychosocial fitness is largely to do with how we deal with the mind, yoga may play a role in its enhancements. Yoga is a science of mind control, delineated in historical Indian texts, and comprises of holistic multicomponent practices and considered as an effective intervention to promote the overall fitness. A number of studies have been done on adolescent mental health involving yoga as an intervention that has shown benefits\[15-17\]. No studies thus far have assessed the psychosocial benefits of yoga on adolescents. Further, adolescence being at the crucial developmental stage, highly vulnerable to biological, psychological, social, and environmental factors and are in a period where they are more receptive to the corrective measures. This warrants considering their physical and psychological aspects while developing intervention programs/strategies to improve social health among adolescents. Considering the psychosocial benefits seen by the practice of yoga in other populations, there is enough to warrant an exploration in the adolescent population.

The aim of the present study was to explore the efficacy of short-term integrated residential yoga intervention on parameters of psychosocial fitness in adolescents. The objective was to evaluate the effects of yoga through a single group pre- and post-design for each cohort. This included eliciting data from adolescents and their parents and engaging in subgroup analyses of different age groups.

This study included secondary data of a registered study (CTRI/2018/02/011709) that evaluated physical, psychological, and social fitness among adolescents.

Materials and Methods

Participants

The participants of the study included healthy adolescent children between the ages of 9 and 16 years, studying in English-medium schools. Participants with single parents, acute or chronic health problems, on medication, having attended any residential yoga program in the last 3 months were excluded from the study. They were selected from children who were registered to attend three 7-day residential summer yoga programs that naturally formed the three cohorts for the study. Children were screened for suitability and once their parents provided consent along with the children’s assent, were subjected for the preassessment. Considering the rapid psychosocial changes during the adolescence, the participants were further subdivided into juniors (9–12 years) and seniors (13–16 years).

Children from each batch were further randomly divided into smaller groups of 12–15 participants, with two teachers, which made it easy to implement the intervention. Teachers included undergraduates in yoga and were trained on the implementation of the intervention to ensure uniformity.

Since the selection of participants was from a summer yoga camp during the summer break, there was good heterogeneity of the sample with respect to family backgrounds, socioeconomic strata, cultures, traditions, faiths, and academic backgrounds.

Ethical approval was obtained from the Institutional Ethical Committee of S-VYASA with the reference number RES/IEC-SVYASA/64/2015.

Assessment

The psychosocial fitness was assessed by the outcome measures of social competence, empathy, altruism, parent relationship, and peer friendship. Data were collected from the adolescents before and after the intervention. Data of empathy, altruism, and parental and peer relationship, from the parents, were collected before and after 3 months of the intervention using the parent versions of the respective scales. This would help comparing the opinions of the parents with that of their children.

The psychometric scales used are developed and validated by Child Trend\[18,19\] and they are (a) Social Competence Questionnaire – 9-item scale with Cronbach’s alpha of 0.79; (b) Teen Empathy – 4-item scale with Cronbach’s alpha 0.84; (c) Teen Altruism – 4-item scale with Cronbach’s alpha 0.80; (d) Positive parent relationship – 6-item scale with Cronbach’s alpha 0.92; and (e) Peer friendship – 5-item scale with Cronbach’s alpha 0.91.

Design

The present study is a single group pre- and post-yoga interventional study carried out during a residential yoga camp for the adolescents. Data were collected from both children, as well as parents, using respective questionnaires. Three independent 10-day residential camps for personality development were organized during the summer by VYASA organization. While the duration of camp was 10 days, the yoga intervention schedule was followed from day 2 to day
8 across the three camps. Eligible adolescents underwent the same yoga intervention program with the instructors, living conditions, daily routine, and dietary plan.

**Intervention**

The modified version of Integrated Yoga Module, 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 kosa; energy body – pranamaya kosa; emotional body – manomaya kosa; intellectual body – vijnanamaya kosa; and bliss body – anandamaya kosa). The module was based on various yogic texts, books on yoga for children, and was modified in consultation with the subject experts with more than 25 years of experience in conducting these camps.

The yoga module included Asana, Pranayama, Relaxation, Meditation, and also Jnana yoga (Yama Niyama concepts) and Bhakti yoga (prayers and bhajans). The bhakti-yoga sessions included mantra chanting and singing, whereas Jnana yoga sessions included lectures, creativity such as role playing, storytelling, parables, journaling diary entry, and so forth to drive the Yama Niyama concepts and yogic concepts of food. Few competitive activities were organized between groups to encourage participation and team building. The sessions were administered in a manner that kept the program engaging and interesting to the selected age group. Details of the intervention are summarized in Table 1.

**Data extraction**

Data collection was done for the children on the 1st day (predata) and 9th day (postdata) of the camp, in small group settings by trained researchers. The investigators and two teachers were available to clear doubts and provide unbiased guidance during the data collection. Data collection from the parents was done on the 1st day (predata), when they came to drop their wards to the camp, and after 3 months (postdata) as a follow-up data, by sending the questionnaire through E-mail.

All the recruited students completed the questionnaires before and after the intervention. A total of 340 parental responses were collected before the intervention and only 43 parental responses were obtained after 3 months as a follow-up data (postdata). Post 3 months data obtained from parents served to evaluate if the yoga intervention had long-term and sustained effects on the social behavior. Only 43 pre- and post-parental data were available that made it difficult to draw strong conclusions on the parental opinions. The reasons for attrition in parental predata were (a) parents were not available at the commencement of the camp, (b) refusal to participate, and (c) lack of English language fluency. Several parents did not respond to the follow-up assessments despite repeated E-mail and reminders due to their preoccupations or disinterest. Hence, the analyses that involved data from adolescents and their parents were from 43 participants.

**Data analyses**

To maintain confidentiality, the data sheets were coded and personal identifiers were omitted during the data entry. Analysis was done using SPSS Inc. SPSS for Windows, Version 16.0. Chicago, Change over time was evaluated using the paired samples t-test. The results of the tests were deemed to be significant if probability values were <0.05, whereas trends (P < 0.1) were also highlighted.

**Results**

The effect of a short-term residential yoga intervention was evaluated for its benefits on social competence, empathy, altruism, parent relationship, and peer friendship by a single-arm, pre- and post-study in three individual cohorts of adolescent children. The three cohorts comprised 148 (57.8% male) (62.8% juniors), 167 (73.1% male) (53.9% juniors) and 195 (62.1% male) (57.4% juniors), with a mean age of 11.84 ± 1.77, 12.22 ± 1.82 and 12.06 ± 1.82, respectively. Demographic and anthropometric data are presented in Table 2.

As seen in Table 3, comparing pre- and post-data for each of the cohorts showed that there were no significant

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**Table 1: Summary of integrated yoga intervention program**

| Name of the intervention session | Duration |
|--------------------------------|----------|
| Prayer session | 15 min |
| Asana sessions: Standing postures, sitting postures, prone postures, inverted postures, supine postures | 2 h |
| Meditation session: Om meditation, cyclic meditation | 45 min |
| Pranayama session: Conscious breathing, sectional breathing, full yogic breathing, dynamic (Bhastrika, Kapalbhati), balancing (Anuloma-viloma), cooling (Shitli), tranquilizing (Bhramari) | 1 h |
| Relaxation session: IRT, QRT, DRT | 1 h |
| Lecture session: Yama Niyama concepts, physical adolescent health, emotional appraisal and control, prosocial behavior | 1 h |
| Chanting and singing session: 18 verses from Bhagavad Gita, devotional songs, patriotic songs | 1 h |
| Creativity sessions: Karma yoga (altruistic group activities), role modeling, parables, storytelling, diary writing, competitions | 2 h |
| Game session: Yogic games, group awareness | 1 h |
| Happy assembly: Cultural program | 1 h |

IRT=Instant relaxation technique, QRT=Quick relaxation technique, DRT=Deep relaxation technique
changes, observed in the first batch, whereas the subsequent
batches showed statistically meaningful changes in teen
empathy. Social competence and altruism was significant in
the third batch. An interesting observation was that while
all changes, although nonsignificant, were in the positive
direction, peer friendship had changed negatively.

Analysis of the junior subgroup, as shown in Table 4,
indicates that empathy significantly improved in all the
three batches. Social competence improved significantly
in the first batch and altruism improved significantly in
the third batch. It was interesting to note that unlike the
overall result, peer friendship had increased, although
nonsignificantly in two of the three batches. All the other
variables also showed a nonsignificant positive change.

Analysis of the senior subgroup, as shown in Table 5,
indicates that there were no significant positive changes
in any of the outcomes in batch 1, but social competence
and empathy changed positively in the subsequent batches.
Altruism also showed a significant positive change in the
third batch. Peer friendship showed a significant reduction
in the first batch, which was not seen in the subsequent
batches.

Additional analyses compared (n = 340) predates of the
outcomes between the adolescents and their parents
(200 juniors), as seen in Table 6. There were significantly
lower altruism and peer friendship and significantly higher
parent relationship reported by parents when compared with
their children.

Changes in empathy, altruism, parent relationship, and
peer friendship were compared between the responses
and outcomes between the adolescents and their parents
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Changes in empathy, altruism, parent relationship, and
peer friendship were compared between the responses

| Variables | Mean±SD | Mean±SD | Mean±SD |
|-----------|---------|---------|---------|
|           | Batch 1 | Batch 2 | Batch 3 |
| Age       |          |         |         |
| Father age|          |         |         |
| Mother age|          |         |         |
| Height    |          |         |         |
| Weight    |          |         |         |
| BMI       |          |         |         |

SD=Standard deviation, BMI=Body mass index

| Measures          | Mean±SD | Mean±SD | Mean±SD |
|-------------------|---------|---------|---------|
|                   | Batch 1 | Batch 2 | Batch 3 |
| Pre               |         |         |         |
| Post              |         |         |         |
| Empathy           | 14.70±3.344 | 15.05±3.841 | 0.207 
| Social competence | 33.21±6.702 | 33.70±7.866 | 0.363 |
| Altruism          | 13.15±3.786 | 13.43±4.113 | 0.355 |
| Parent relationship | 23.61±4.827 | 23.84±5.273 | 0.606 |
| Peer friendship   | 20.62±4.278 | 20.45±4.678 | 0.663 |

SD=Standard deviation

| Measures          | Mean±SD | Mean±SD | Mean±SD |
|-------------------|---------|---------|---------|
|                   | Batch 1 | Batch 2 | Batch 3 |
| Pre               |         |         |         |
| Post              |         |         |         |
| Empathy           | 14.41±3.275 | 15.12±3.557 | 0.033 |
| Social competence | 32.40±6.823 | 33.83±6.882 | 0.029 |
| Altruism          | 13.56±3.740 | 13.82±3.776 | 0.488 |
| Parent relationship | 23.49±5.058 | 24.10±4.632 | 0.227 |
| Peer friendship   | 19.98±4.604 | 20.62±3.785 | 0.143 |

SD=Standard deviation

| Measures          | Mean±SD | Mean±SD | Mean±SD |
|-------------------|---------|---------|---------|
|                   | Batch 1 | Batch 2 | Batch 3 |
| Pre               |         |         |         |
| Post              |         |         |         |
| Empathy           | 15.18±3.432 | 14.93±3.411 | 0.607 |
| Social competence | 34.58±6.318 | 33.49±9.363 | 0.248 |
| Altruism          | 12.45±3.795 | 12.76±4.586 | 0.544 |
| Parent relationship | 23.82±4.448 | 23.42±6.232 | 0.640 |
| Peer friendship   | 21.71±3.436 | 20.16±5.918 | 0.031 |

SD=Standard deviation

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received by the 43 adolescents and their parents, as shown in Table 7. It was interesting to note that the adolescents reported a significant change \((P = 0.003)\) in altruism and the parents reported a significant change \((P = 0.035)\) in parent relationship as a result of the yoga intervention.

**Discussion**

The objectives of this study were to evaluate the effects that a 7-day residential yoga intervention would bring on measures of psychosocial fitness in three independent cohorts through a single group pre- and post-study. The secondary objective was to compare if these effects were also observed by the parents.

Statistically significant increase in measures of empathy, social competence, and altruism were inconsistent between the three cohorts and between the age groups, except for an increase in empathy, which was seen across all the three cohorts among juniors.

Psychosocial fitness stems from empathy or being able to put oneself in another’s situation in order to understand their feelings. This in turn impacts one’s behavior and makes them better connect with their peers, parents, and surroundings at large. Altruism is also a resultant prosocial behavioral pattern of increased empathy,[20,21] and these patterns of psychosocial behavior define an individual’s social competence. Building self-awareness is the key to developing skill of emotional appraisal and control, whereby positive social competencies might be achieved. Yoga, being the science of holistic well-being, comprises of practices that encourage internalization and development of self-awareness, and thereby, increase the capacity of self-control.[22] Yoga practices through a sequence of awareness building and relaxing practices evoke a deeper calming effect, which helps students get into a frame of mind, conducive to learning and is distinct from the effects of physical exercise alone.[16] The results of our study may suggest that 7 days of yoga practices may have only been adequate to show a change in empathy scores and a longer intervention might have been required to show consistent impact on the downstream behavioral patterns. Other studies have also indicated that Karma Yoga,[23] yoga practices, mindfulness,[24] and prayer[25] have an influence over the aspects of empathy, altruistic behavior, and social competence in adolescents.

Variables of empathy, altruism, and peer and parental relationship are easily under or overestimated while using a self-reported instrument. Thus, parallel data of these variables were also sought from the parents. It is, however, known that the parents are not able to report accurately, certain aspects of their adolescent children’s behavior[26] Comparison of the corresponding adolescent and parent data provided rich information on the discrepancies of opinions held by each of them. Comparing baseline values between parents and their children, it was interesting to note that apart from having an agreement in scores of empathy, all other outcomes were significantly different. It was more interesting that parents opined that their children had very positive parental relationship and a very-low peer friendship, but their children thought otherwise. Noting these discrepancies, we further assessed the changes in these parameters resulting from the yoga intervention in both these populations.

In the present study, adolescents reported only a trend of improvement \((P = 0.095)\) in parental relationship as a result of the yoga intervention, but the parents reported a significant \((P = 0.035)\) improvement, 3 months after the intervention. However, unlike what was expected, the parameters of peer friendship reduced significantly \((P = 0.031)\) in seniors of the first batch.

A positive parent–child relationship is an essential component of adolescent development. During this transitional age, the concept and opinions of oneself grow stronger, taking precedence over that of their parents[27] and conflicts with parental ideologies emerge. Retaining a

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**Table 6: Agreement between the parents and adolescents \((n=340)\)**

|                          | Parent data   | Adolescent data | \(P\)  |
|--------------------------|---------------|-----------------|--------|
| Empathy                  | 13.90±3.052   | 14.26±3.278     | 0.131  |
| Altruism                 | 12.31±3.339   | 12.84±3.614     | 0.023  |
| Parent relationship      | 27.10±5.084   | 23.41±4.762     | <0.001 |
| Peer friendship          | 10.29±3.113   | 20.45±4.177     | <0.001 |

SD=Standard deviation

**Table 7: Comparison of the change scores between parents and adolescents \((n=43)\)**

| Outcome measures          | Data description | Parent data set | Adolescent data set |
|---------------------------|------------------|-----------------|--------------------|
|                           |                  | Predata         | Postdata           | \(P\)               | Predata         | Postdata           | \(P\)               |
| Empathy                   |                  | 12.47±2.914     | 12.93±2.772        | 0.446              | 14.12±3.52     | 14.84±3.703        | 0.171              |
| Altruism                  |                  | 10.35±3.101     | 11±3.867           | 0.372              | 12.3±3.827     | 13.65±3.484        | 0.003              |
| Parent relationship       |                  | 24.95±5.3       | 27.05±3.879        | 0.035              | 23.19±4.36     | 23.88±4.3          | 0.095              |
| Peer friendship           |                  | 9.51±2.53       | 9.56±3.026         | 0.929              | 20.37±4.37     | 20.58±3.923        | 0.708              |

SD=Standard deviation
healthy relationship with parents and peers plays a crucial role in an individual’s psychological and physical health.\[39\] Components of the intervention also comprised activities that were geared to provide calmness and balance to the mind (Pranayama, meditation) and promoted the quality of relationships and moral behavior (Yama Niyama) in adolescents.\[29\] This effect, as observed by the parents, 3 months after the intervention could suggest a sustained change in parental relationship as a result of yoga. The adolescent data, collected before and after a 7-day intervention, might not have been adequate to appraise the change. Furthermore, not having the exposure with the parents during this time might have made it nonconducive for its appraisal. The trend seen in the present study is in line with a previous randomized controlled trial\[30\] evaluating changes in socioemotional competencies, such as empathy and prosociality, as a result of a yoga program delivered twice a week for 12 weeks to 125 low socioeconomic adolescents.

The point of reference for peer friendship during the predata was an established set of peers from their native setting, whereas the postdata elicited had a point of reference of peers from within the camp. This subtle disparity was appreciated more in seniors, which had resulted in a significant drop in scores of peer friendship, whereas in juniors there was a higher degree of adaptability indicated by a nonsignificant increase in peer friendship in the first and third batches.

This was the first time that an interventional study of this scale, in adolescents had been attempted. The intervention being tested was also developed in a comprehensive manner, referring authentic Indian texts of yoga, modern-day literature of its interpretations, and modifying it through several iterations with subject experts in yoga, psychology, and adolescent health. An intervention that is focused on the holistic psychosocial development of adolescents, administered in the group setting has shown to be more effective in improving social skills, if there has been at least one medical health professional or an adolescent psychologist involved in its development.\[13\] This ensured that while the premise of yoga is grounded to its authentic roots, the practices themselves were able to elicit the interest of the selected age group. Qualitative feedback elicited from the adolescents and parents on all aspects of the camp was very good. Considering that other literature provided stronger evidence to the benefits of yoga among adolescents, an attempt was also made to evaluate a residential camp setting as a way to impart these practices to this age group. To provide a multidimensional intervention like yoga in such large numbers, the study employed close to 40 trainers who were rigorously trained and monitored for uniform quality of instruction. In addition, capture of parental data along with corresponding data from their children was a novel endeavor, although the results had not proven to be what was anticipated.

The inconsistency in the results demonstrate that yoga being a multimodal set of activities, is heavily dependent on how well each person is able to internalize these practices and drive the change of mindset.

The absence of a control group heavily undermined the conclusions drawn in this study. Considering this, the design was reworked at detecting the repeatability of the results. Contrary to our speculation, the internal validity of the results, by virtue of the inconsistency of results, was also poor. Adolescent data should have also been collected along with that of their parents, post 3 months to evaluate the sustained changes in the relationships. The controlled environment of the camp setting might have only provided the required information needed for the psychosocial improvement and evaluating the same after the participants had been given an opportunity to express it in their existing relationships would have provided a fairer comparison. Secondary qualitative data, in anticipation of a nonconclusive result, could have been premeditated, which would have given a rich feedback on the changes needed in the module and its implementation. Future studies, while having a more robust design, should not just be able to detect the effects but also identify possible predictors and mechanisms associated with improvement in psychosocial fitness. Long-term interventions, homogenous samples, and improved and focused interventions also remain as improvements in the future researches in this field.

**Conclusion**

Adolescence is a phase of emotional and psychosocial transition and yoga, a technique of mind control, which could potentially help in improving holistic personality. The efficacy of a 7-day yoga intervention in improving psychosocial fitness was evaluated and showed that the feeling of empathy increased significantly. There was a sporadic increase in altruism, social competence, and parent relationships in some cohorts while peer relationship deteriorated. Parents providing data on their children’s perceived level of altruism, empathy, and relationship with parents and peers, before and after 3 months of intervention highlighted the discrepancy in their understanding of their children and also their ability to perceive the changes while the children could not. Design and implementation flaws, as a result of resources, limit from stating the findings of these studies as conclusive evidence but helps to plan more robust and intricate studies to assess the specific benefits of yoga and its mechanisms.

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Conflicts of interest
There are no conflicts of interest.

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