

Short-Term Residential Yoga Module Development for Bio-Psycho-Social Health Among Adolescents



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Abstract

Background: Adolescent's health and fitness is often complex phenomenon and dealing with it requires a comprehensive, biopsychosocial approach. Yoga modules as a holistic approach for Adolescent's overall health, especially in residential setting has not been well researched. Integrated and holistic approach of Yoga is explored in this study to develop a short-term residential yoga module for Bio-psycho-social health among adolescents.

Methods: Concept of five layers of existence (Pancha koshas) (Integrated Approach to Yoga Therapy (IAYT) principles) and literary review was the basis for concepts of adolescents' biopsychosocial health and integrated yoga module. Focused group discussions (FGD) amongst researchers, experienced yoga gurus, teachers, and psychology experts, were conducted with the objectives of determining needs of the adolescents' biopsychosocial health and yoga practices that could prove efficient. Feasibility and effectiveness were tested in pre-post study (N=510) conducted in three cohorts in residential setting as yoga camps.

Results: The techniques included in final module based on IAYT was validated by experts. The accumulative results of pre-post study have shown the effectiveness of the yoga module. The correlation between change in variables (δ scores) was explored to understand the relationships between the changes brought about by yoga and interdependence between bio-psycho-social domains.

Conclusion: The developed yoga module is recognized as an effective and accepted short-term residential yoga program for Bio-psycho-social health among adolescents. This study is registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

Keywords: Yoga Module; Physical; Psychological; Social; Health; Adolescence

Abbreviations: IAYT: Integrated Approach to Yoga Therapy; FGD: Focused group discussions; HYP: Hatha Yoga Pradipika; BG: Bhagavad Gita; SEL: Socio-Emotional Learning; PYS: Patanjali Yoga Sutras

Introduction

Adolescents in general go through distinctive hormonal and biological changes which in turn are associated with psychological changes during puberty [1,2]. These developmental changes are manageable but often produce specific behaviour patterns, and unique challenges for individual if not handled satisfactorily. Onset of psychological and psychiatric problems become more prevalent during adolescence, e.g. anxiety, depression, attempted suicide, phobias, mood swing, obesity, bullying, sleeplessness, substance abuse, addiction, engage in risky behavior, attention-deficit disorders etc [3-5]. The situation is serious in several low and middle-income countries [6]. Adolescence is the time for social development, creating a personal identities and sense

of autonomy which may sometimes lead to disagreements with their parents, teachers or care givers. Most adolescents deal this satisfactorily and enjoy positive relationships with their families and friends. Adolescents are highly vulnerable to social risks such as experimentation and risk-taking, negative peer pressure, issues related to their bodies and sexuality. George Engel, an American psychiatrist introduced the bio-psycho-social model (BPS model) of overall health [7] in modern psychology. Adolescent's bio-psycho-social health and fitness is often a complex phenomenon and requires a comprehensive, holistic approach. Early investment in the overall health of adolescents would bring ultimate future benefits in health, finance and social facets [8,9].

Considering the importance of physical, psychological and social health, researchers and clinicians have prescribed a variety of intervention programs for adolescents as helpful measures. Studies have shown that multidisciplinary interventions are essential to tackle health issues of adolescents [6,10] Adapting emotional and social skills during adolescence helps in handling lifestyle, attitude, anxiety, violence, bullying, conflict, anger, and so on [11,12]. Socio-Emotional Learning (SEL) interventions are studied for promoting emotional abilities among youths [13]. Recent years studies have reported usefulness of yoga in improving physical and mental health [14-16], resilience, mood and self-regulation [9,17] Studies also report positive correlation of yoga with self-concept [18], well-being [19], calming effect [20] in adolescents and reduction in anxiety and depression in high risk adolescents [21]. Yoga, which has been medically recognized as an effective complementary and alternative therapy [20], plays a major role in any holistic approach. Yoga is one of the six systems of Indian Philosophy and a psychophysical spiritual science of holistic living. The yoga way of life encompasses the philosophy of Jnana yoga (path of knowledge), Bhakti yoga (path of devotion), Raja yoga (path of self-discipline and practice) and Karma yoga (path of detached action). Raja Yoga or Patanjali yoga, which is also known as Ashtanga Yoga comprises of 8 limbs called Yama (social conducts), Niyama (individual adherences), Asana (postures), Pranayama (breathing techniques), Pratyahara (control of senses), Dharana (focusing), Dhyana (meditation) and Samadhi (contemplation). Yogic psychology conceives human existence as a multi leveled entity comprising Gross Body (Annamaya Kosha), Energy Body (Pranamaya Kosha), Emotional Body (Manomaya Kosha), Intellectual Body (Vijnanamaya Kosha) and Bliss Body (Anandamaya Kosha). This concept is well defined as Pancha Kosha in Taittiriya Upanishad [22].

Right kind of food, good eating habits, postures and games facilitate the development of the physical body (Physical Sheath - Annamaya Kosha). Breathing exercises (pranayama) and cleansing practices improve the quality of the energetic body (Vital Energy Sheath - Pranamaya Kosha). Study of literature, chanting, meditation, devotional sessions for emotional culture and calming the mind for the development of the psycho-emotional body (Mental Sheath - Manomaya Kosha). Activities like lectures, yogic counseling, debates, problem-solving that challenge one's intellect develop the wisdom body (Intellectual Sheath - Vijnanamaya Kosha). All these activities help to go beyond oneself and give an opportunity to identify with the fact that the natural state of oneself is to exist in Bliss (Blissful Sheath - Anandamaya Kosha), which is a state of silence and wakeful awareness [23]. The evolution from one sheath to the next entails prescribed yogic techniques leading to structural framework for linking the emotions, feelings, intellect, energy levels and value systems. Integrated approach of Yoga Therapy (IAYT) or Integrated approach to Yoga Module (IAYM) targets all these five levels of existence which is a holistic approach to promote health and wellbeing at Physical, Psychological, Social and Spiritual level [24,25]. The Pancha Kosha model bears many similarities to the BPS model as used in present-day health psychology. Both these conceptual frameworks understand the interdependence of physical, emotional, psychological, social and spiritual aspects, and its role in optimizing health [26]. The biopsychosocial approach to yoga revisits the very old Kosha model in Taittiriya upnishad (the philosophical basis for yoga) while incorporating the insights of modern psychosomatic research. Also the BPS approach to understand health is complemented by the rich ancient traditional concepts provided by various scriptural texts of yoga [27,28] (Figure 1).

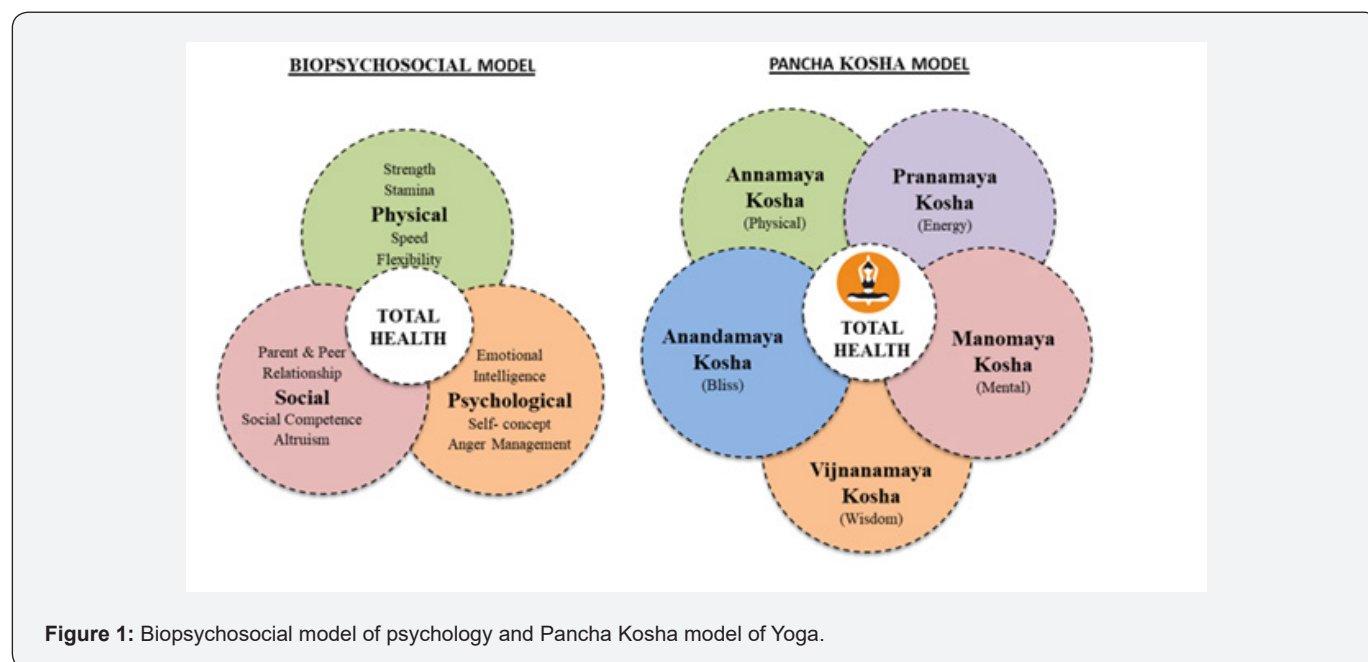


Figure 1: Biopsychosocial model of psychology and Pancha Kosha model of Yoga.

Adding these two concepts, an attempt is made to develop an integrated and holistic residential yoga program for overall health among adolescents. Holistic and integrative approach is established by considering the yogic practices suited to five layers of existence and forms of yoga such as Raja Yoga, Bhakti Yoga, Karma Yoga and Jnana Yoga. Although systematic reviews reported the benefits of yoga programs but available studies suffer from several limitations like inconsistency in intervention type, delivery mechanism, setting, and frequency, small samples, methodology [29,30]. Reviews recommended standardized formats for interventions, robust methodologies, large sampled well-designed and replication studies for firm research evidence base [29,31]. There is a steep increase in research studies on effect of yoga on adolescents and few of yoga modules were also developed for specific problems in adolescents [32,33]. However, to the best of our knowledge, there is no appropriate yoga module developed for overall holistic health of adolescents in residential setting. This study aims at developing an integrated and holistic short-term residential yoga module for Bio-psycho-social health among adolescents.

Material and Methods

The purpose of the study is to develop a yoga module for bio-psycho-social health among adolescents. The scope of the study include a) construction of the module based on IAYT principle and literary review, b) validation of the module, and c) assessing the feasibility and effectiveness of the module. d) explore correlations between change in variables to understand the relationships between the changes brought about by yoga. The whole study is planned in phases. It is a residential yoga program designed to provide in school vacations as a residential yoga camp. This study was approved by Institutional Ethics Committee of S-VYASA Yoga University. This study is registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

Phase 1: FGD to understand need of adolescents' overall health

First focused Group Discussion (FGD) was organized with a 3-point agenda (a) To understand the concept of health and fitness in adolescents (b) To assess the needs of this transition phase (adolescence) (c) To set the purpose of module. Primary author also solicited the opinion of psychologists, teachers and counsellors. Based on the FGD and experts' opinion, needs and factors that influence health in adolescents was generated.

Phase 2: Literary review and FGD's

Literary review: The study relies on scriptural evidence for deriving various techniques and contemporary yoga books for selecting relevant yogic practices. The concepts of overall health and personality are widely embedded in Indian scriptures. Accordingly, Taittiriya Upanishad, Manusmriti, Patanjali Yoga Sutras (PYS), Hatha Yoga Pradipika (HYP) and Bhagavad-Gita (BG) [34-38] were referred to understand the concepts and techniques

of biopsychosocial and spiritual health. The concept of Pancha Kosha in Taittiriya Upanishad enumerates the concept of health and fitness at physical, energy, mental, intellectual and bliss level. This formed the basis of classifying health into four categories i.e. Physical, Psychological, Social and spiritual domains. 1) Annamaya Kosha (The Physical Sheath): physical strength, agility, stamina, body awareness, 2) Pranamaya Kosha (The Vital Energy Sheath): Breath Rate, perseverance, discipline, Self-regulation, 3) Manomaya Kosha (The Mental Sheath): Emotions and feelings, a deep relationship between mind, intellect and body, Empathy, 4) Vijnanmaya Kosha (The Intellectual Sheath): Intellect, Will power, guiding factor in man's actions, motivation, 5) Anandamaya Kosha (The Blissful sheath): Altruism, love and harmony for Spiritual growth results in a feeling of bliss (Ananda) which can be invoked at will. Concept of physical, psychological, social and spiritual health is embedded in the form of duties, rights, laws, conduct, virtues and values in Manusmriti. Practicing yama and niyama concepts, Asana and pranayama practices of PYS will make life disciplined, physically and mentally fit and give physical, mental, social and spiritual strength and stability. Concept of emotional Intelligence in Indian context is embedded in its highly valued morals and virtue practices in BG. The Indian view of emotional Intelligence is context sensitive and focuses on the significant role of guru, parents, family and society. Social skills like respecting elders, helping others, concern for wellbeing of others constitute silent features of EI. Morality of caring and sharing determine emotional responsiveness. Few contemporary yoga texts like Yoga Education for Children: volume 1 & 2 [39,40], Integrated approach of yoga therapy for positive health and Krida Yoga [41,42] were also referred.

FGD's (Focused group discussions): As the need and factors that influence health in adolescents was understood, another string of FGDs were organized with these objectives (1) components of the program (2) which are the yoga practices that could prove efficient under these components (3) which kosha they touch upon (4) how do the efficacy of the module can be assessed (5) what domain of bio-psycho-social health these assessment parameters relate to. Experts who were present with researchers, are Yoga gurus with experience of 30 years, Doctor of Medicine (MD) in Yoga, Doctorates (PhD) in Yoga, and yoga therapists (MSc in yoga), psychologists, schoolteachers. Group came up with different responses which were reviewed and based on that, connections between the elements of intervention, measurements and domains were drawn and the plan of program were laid which is presented in Figure 2.

Phase 3: Designing of module for adolescents' overall health

After understanding the need of adolescents' overall health, literary and literature review, FGD's and expert consultation, the actual designing of the module began keeping pancha kosha concept and IAYT as the basis for the development of this module and laying emphasis on holistic and integrated approach as a base.

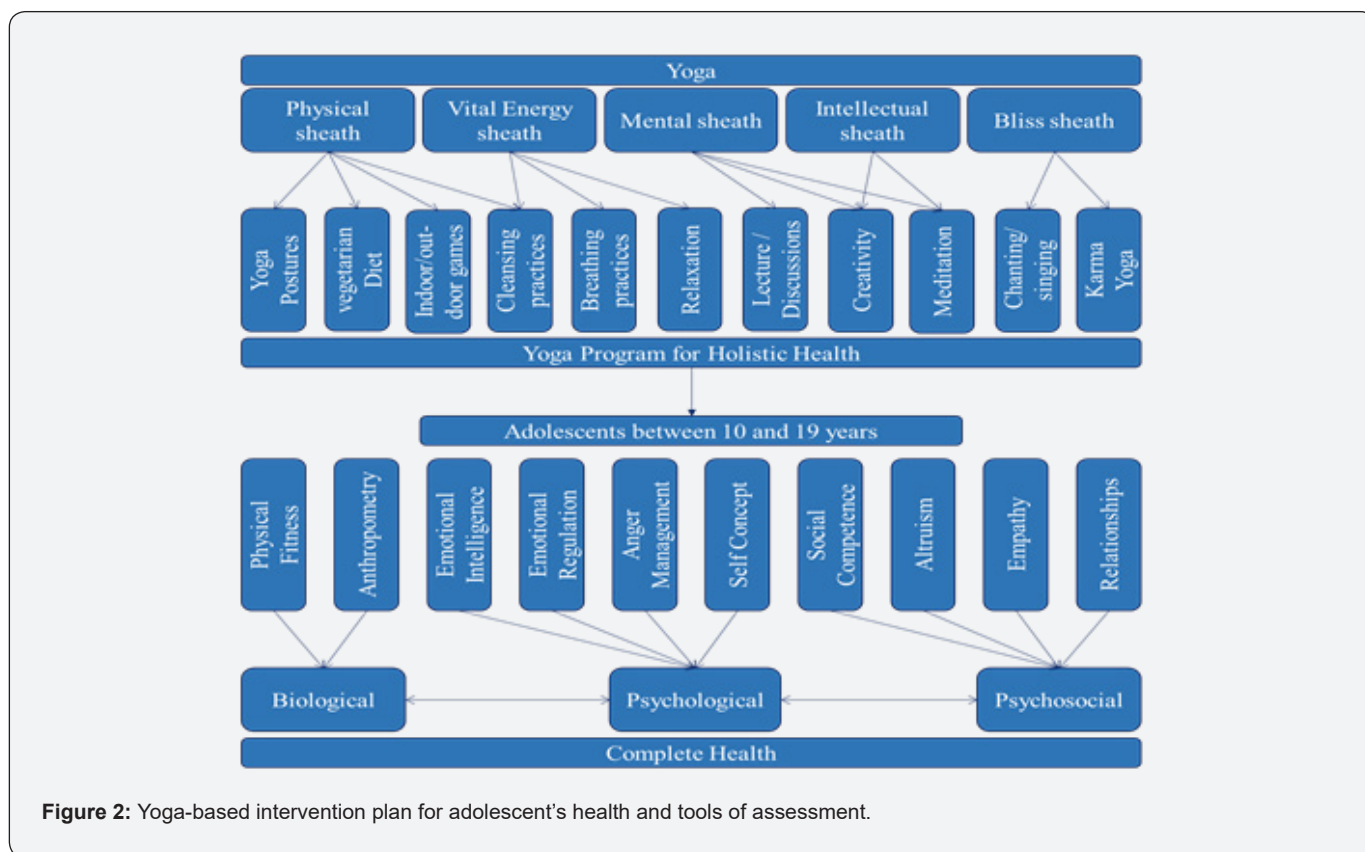


Figure 2: Yoga-based intervention plan for adolescent's health and tools of assessment.

The basic framework for this module development came from the Personality Development Camp conducted by S-VYASA Yoga University during summer vacations every year from last 20 years. The module is designed for a residential setting and for a short duration. This comprised of these major components: Prayers & spiritual singing (Bhakti yoga), warm up practices (Sukshma Vyayama) & physical postures (Asanas), Breathing practices & Pranayama, Relaxation (Vishrama Tantras) & Meditation (Dhyana) (Raja yoga), Lectures & creative activities (Jnana Yoga), Selfless service activities (altruistic group activities - Karma yoga), Games & nature walk (Krida yoga) and Happy assembly (cultural

programs).

Since the module is designed for residential setting, activities are spread over throughout the day for all days. A rough framework of activities with time allotment are detailed in the Table 1 and basic plan of study in Figure 2. Specific techniques and their relevance were identified from major streams of Yoga for biopsychosocial and spiritual development in adolescent. Scientific evidence has also been provided for different activities of the module for their relevance and expected benefits which are provided in Table 2.

Table 1: Time allotment for different components of the yoga module.

SI No.	Name of the Intervention Session	Duration
1	Prayer session	15 min
2	Breathing practices and Pranayama session	1 hour
3	Asana practice sessions	2 Hours
4	Relaxation session	1 hour
5	Meditation session	45 min
6	Lecture session	1 hour
7	Chanting and spiritual singing session	1 hour
8	Creativity and Karma yoga session	2 hours
9	Game session	1 hour
10	Happy assembly	1 hour

Table 2: Relevance and expected benefits of components.

Components	Relevance and Expected Benefits
Prayer	good health and healing [43] associated with changes in cognitive processing [44]
Loosening practices & Asana	play an important role in healthy development improvement in physical activity, sport competence cardiorespiratory fitness metabolic parameters coordination, flexibility muscular strength, balance, speed/agility and static strength [45,46]
Surya Namaskara (Sun Salutation)	Musculoskeletal system activation Enhance executive function Promotes well-being complete mind-body yogic program [47]
Breathing practices & Pranayama	improve respiratory function develop and expand mind-body awareness balancing of the autonomic nervous system, mental focus and attention [45,48] Calming down the mind Harmonizes the hypothalamic functions
Meditation & Relaxation	develop mind-body awareness reduce sympathetic activity and activated the parasympathetic nervous system enhance attention [49] cognitive control [50] emotion regulation [51] reduce psychological distress [52] evoke a calming effect [20]
Jnana Yoga	Yama, Niyama concepts refer to behaviour and beliefs that support healthy functioning relevant to physiology psychology of physical, psychological and social domains Cultivate self-awareness and Self-discipline Learn to response not to react Yogic concept of food Mindful eating and learn food types (rajasic, tamasic and satavic) Lectures on different topics from experts and daily journal promotes critical self-reflection enhance ability at self-discovery [53] Story-telling sessions, making story strings and other activities promote expression and communication inculcate moral values [54] focus helping to shape creative talent [55] session (role-plays) encourage social learning experience [56] improve leadership skills improve confidence and remove stage fear
Bhakti Yoga	Mantra chanting calming and focusing of the mind and body deep relaxation [57] Singing songs improves mood reduces anxiety helpful in interaction and communication [58]
Karma Yoga	aid in the treatment of stress disorders [59] helpful in developing altruistic (pro-social) [60] relate to high dutifulness [61] better emotional intelligence [62] understand the value of doing a service that helps their surroundings learn practical aspects of positive psychology to improve one's lifestyle

Krida Yoga	encourage participation and sportsmanship teaches team building can be an outlet for the child's everyday stress and boredom [63] keep away from the addiction of electronic gadgets
Happy Assembly	social skills learn to enjoy together and friendly bonding

Phase 4: Validation and Field study

This framework of yoga module was prepared considering its ability to implement in the camp settings and presented in FGD for comments and suggestions. A yoga module was constructed using techniques that were qualified in expert validation. This comprised of these major components: Prayers & spiritual singing (Bhakti yoga), warm up practices (Sukshma Vyayama) & physical postures

(Asanas), Breathing practices & Pranayama, Relaxation (Vishrama Tantras) & Meditation (Dhyana) (Raja yoga), Lectures & creative activities (Jnana Yoga), Selfless service activities (altruistic group activities - Karma yoga), Games & nature walk (Krida yoga) and Happy assembly (cultural programs). The developed module with all the components and practices is presented in Table 3 and Table 4.

Table 3: List of practices of the Integrated Yoga Module.

Components	Name of Practices	Targeted Domain
Prayers	Shanti Mantra, Bhojan (prayer before food) mantra	Mental, spiritual and Intellectual level
Warm up and loosening practices	Jogging, jumping, forward & backward bending, Side bends, Twisting, loosening for toes, ankle, knee, hips, fingers, wrist, elbow and neck, Hands stretch, Ankle stretch, Back stretch, Tiger stretch, Lumber stretch, Cycling, Rowing, Rocking and rolling	Physical and Vital energy level
Suryanamaskara (12 Steps)	1 st round with mantra 11 rounds without mantra	Physical, vital energy and psychological level
Asana (Standing, Sitting, Prone, and Supine)	Vr̥kṣāsana, Pādahastāsana, Trikoṇāsana, Ardha cakrāsana, Vajrāsana, Paścimottānāsana, Uṣṭrāsana, Śaśankāsana, Ardhamatsyendrāsana, Bhujāṅgāsana, Salabhāsana, Dhanurāsana, Sarvāṅgāsana, Naukāśana, Matsyāsana (4 asanas practice- 1 from each category in each session)	Physical, mental and vital energy level
Breathing practices	Conscious breathing (Awareness of natural breathing pattern) Sectional breathing (Separately Abdominal, Thoracic and Clavicular breathing) Full yogic breathing (combination of Abdominal, Thoracic and Clavicular breathing)	Physiological, vital and psychological levels
Pranayama and Mudra	Bhastrika (Dynamic - Breathing with rapid inhalation & exhalation) Anulom-vilom (Balancing - slow & rhythmic alternate nostril breathing) Bhramari (Tranquilising - Exhalation, with a honeybee sound) Jnana mudra	Physiological, vital and psychological levels
Relaxation	QRT - (Quick Relaxation Technique). Awareness of breath simultaneously belly movement IRT - (Instant Relaxation Technique) By tightening body parts sequentially DRT - (Deep Relaxation Technique) Toes to head guided relaxation	Physical, mental, psychological level
Meditation	OM meditation - Chanting OM mentally - fast/slow CM (Cyclic meditation) - Based on alternate stimulation and relaxation	Intellectual, mental, psychological and psychosocial level
Jnana Yoga	Lectures - Topics related to yama niyama concepts (Table 4)	Intellectual, mental, psychological and psychosocial level
	Creativity session (Individual activity) - Emotion wheel, Goal setting (what is my goal), Traffic light (concept of anger), Turtle (be composed), Motivation collage	
	Creativity session (Group activity) - Don't get mad, Story string, Parables and moral stories, Role play, Best from the waste	
	Diary writing (Scan of the day)	

Bhakti Yoga	Chanting (BG), Singing (spiritual, motivational and patriotic)	Spiritual, psychological and social level
Karma Yoga	Altruistic selfless activities	Spiritual, psychological and social level
Krida Yoga	Indoor/outdoor games - Self-help, Follow the leader, etc.	Social, physical, mental level
Happy Assembly	Cultural events (performance done by trainers for children also)	Mental and social level

Table 4: Topics of lectures and themes of creativity sessions.

Day of Holistic Program	Lectures and Themes of Creativity Sessions Based on Yama- Niyama Concept
1	Yoga and self-awareness - Iswara Pranidana (Surrender to Supreme)
2	Emotions, management and regulation strategies - Santosha (contentment), Brahmacharya (self-restraint), Shoucha (cleanliness)
3	Self-motivation - Swadhyaya (self-awareness)
4	Morality and Prosocial behaviour - Satya (truthfulness), Asteya (non-stealing)
5	Anger management - Ahimsa (non-violence)
6	Leadership, team building - Tapas (penance)
7	Social skills, communication - Aparigraha (non-covetousness)

The pre-post study was done in three independent cohorts (batch 1, 2 and 3) of healthy adolescents of both genders (age 9-16 years) (N = 510, 35% girls) in same residential setting (Residential Yoga Camps for adolescents). Parental consents and assents from participants were obtained prior to study. The total duration of the camp is 10 days with 7 full day formal intervention with 1st

day for registration and pre data collection and 9th and 10th day for post data collection and valedictory program respectively. To evaluation, a few parameters in Physical, Psychological and Social fitness domains were tested using standardised and validated tools and tests. Details of parameters are given in Table 5.

Table 5: Overview of parameters (measures) and assessment tools (instruments).

Domain	Measures	Instrument	
Physical	Strength	EUROFIT Physical Fitness Test Battery	
	Flexibility		Standing board jump (SBJ), Sit-Ups Test (SUP)
	Speed		Sit-and-Reach Test (SAR)
	Coordination		10x5m Shuttle run (10x5mR)
	Anthropometry	Plate-Tapping Test (PLT)	
Psychological	Emotional Intelligence	Height, Weight, BMI (Wt in kg)/ (Ht in m) ²	
	Emotion regulation	SEIS (Schutte Emotional Intelligence Scale)	
	Self-concept	CERQ-kids (Cognitive Emotion Regulation Questionnaire)	
	Anger	Self-concept scale	
Psychosocial	Empathy	CAS (Clinical anger scale)	
	Altruism	Teen Empathy	
	Social Competence	Teen Altruism	
	Relationships	Teen social competence	
Demographic	Socio-demography	Peer relationships Positive parent relationship	
		Age, gender, Handedness, Family type, family background, sibling hierarchy, father's age, mother's age etc.	

The accumulative pre and post data of study is analyzed using paired *t*-test to examine the effectiveness of the yoga module. The compiled results confirm the field validation of Integrated Yoga Module for its effectiveness. The results showed reduction in the body weight of participants (-2.52%, *p* < 0.001) and the BMI (-2.67%, *p* < 0.001) was also significantly decreased. Besides, there was a significant decrease in time taken (sec) in shuttle run (-0.74%, *p* = 0.059) and plate tapping (-2.72%, *p* = 0.008) that showed increase in agility, speed and coordination respectively as reduction in time shows better performance. Likewise, there was

significant increase in the board jumping (3.67%, *p* < 0.001) that showed positive change in strength, significant increase in sit-ups (13.34%, *p* < 0.001) and sit and reach (3.39%, *p* < 0.001) showed positive change in muscle endurance and flexibility respectively. Also, SEIS score (3.25%, *p* < 0.001), CERQ kids (9.29%, *p* < 0.001), empathy (5.55%, *p* < 0.001), altruism (4.42%, *p* < 0.001), social competence (3.11%, *p* < 0.001) and parent relationship (1.99%, *p* = 0.020) increased significantly. CAS significance decrease (-15.05%, *p* < 0.001) showing positive change. Summary of overall changes is provided in Table 6.

Table 6: Summary of changes.

Outcome Measure	Pre-Mean±SD	Post Mean±SD	% Change
Weight	42.94±12.61	41.86±12.54	-2.52
BMI	18.89±3.82	18.38± 3.78	-2.67
Explosive Leg Strength	129.13± 26.04	133.87±26.55	3.67
Abdominal Strength	14.84±6.37	16.82±6.44	13.34
Hand eye coordination	12.41±1.98	12.08±2.35	-2.72
Flexibility	31.30±6.64	32.36±6.89	3.39
Emotional Intelligence	123.17±16.42	127.19±18.79	3.35
Emotional Regulation	53.99±10.52	59.01±11.58	9.29
Self-Concept	102.75±13.38	102.39±14.67	-0.35
Anger	15.32±10.47	13.02±10.89	-15.09
Empathy	14.3±3.25	15.09±3.34	5.55
Social Competence	32.91±6.22	33.94±6.52	3.11
Altruism	13.11±3.56	13.69±3.57	4.42
Peer Friendships	20.42±4.21	20.35±4.01	-0.34
Parental Relationship	23.62±4.61	24.09±4.72	1.99

Phase 5: Feedback for Feasibility

Quantitative data could not be collected. But qualitative feedback was taken from parents and participants after the study. Qualitative analysis revealed that participants found the module very interesting and adoptable. The overall participation and positive response of the adolescents establishes the effectiveness of the module. According to parents, this intervention may be a well-accepted option for their kids’ health and personality development as a residential camp in summer holidays. According to parents’ suggestion, time duration of intervention could be more.

Discussion

In this study, an effort was made to develop a comprehensive holistic yoga module based on traditional textual and modern references and expert’s advice for the overall health among

adolescents in India. The module was carefully designed to ensure that the prescribed techniques constitute a comprehensive program for overall health of adolescents. To our knowledge, this is the first time a feasible residential yoga module has been developed with specific components addressing each dimension of health. Holisticity was achieved by considering the yogic practices that work at different Koshas. Integrated approach was achieved by emphasizing Yama, Niyama, Asana, Pranayama, Pratyahara, and Meditation as well as considering Bhakti yoga and Jnana Yoga. Experts were involved at all stages of discussion and development of the module. A master list of all components were compiled and presented to the experts and their inputs were collected in focused group discussion (FGD) and taken into consideration. Using a humanized method, rather than a questionnaire scoring method, provided flexibility and a wide scope for the evolution of the concepts. Also rendered a helping hand to researchers as they

were allowed to collaborate and gradually develop the module. The development of the modules was done by comprehensive questioning and intense discussion session where one shared their experiences in evolving the steps of the modules.

Relevant aspects of Ashtanga yoga are included in direct or indirect form. Emphasis is given on yama-niyama concepts because inculcation of discipline and moral values are far more important in adolescent and help to make a good transition [64]. The lectures and creative activities were designed keeping in mind the bio-psycho-social health parameters considered in the field study. In the school environment, pressure of studies and competition is so much that students, teachers, and even parents think of academic performance. A residential setting provides a wealth of ways to help children grow and expand their horizons. The experience and intervention, with 24/7 access to experts, is intense and builds meaningful values. A few benefits of children attending a residential yoga camp during the summer break are to learn self-responsibility and independent living; create a disciplined routine to get up, go to bed etc. The main focus to develop a residential module is to provide adolescents a valid chance in holidays to focus and improve their behavioral skills, learn to breathe calmly in every situation; to respond and not to react; to embrace the experience as their own; to show empathy toward others; to extend kindness; form bonds with children from other parts of the country; to understand giving and sharing; to develop a greater sense of responsibility which may further help

in reducing childhood stress, anxiety and improve their self-esteem and overall personality. It's an opportunity for adolescents to learn life skills in a safe, holistic environment beyond the classroom. Practices like spiritual singing (prayers and bhajans Bhakti yoga) releases stress and relaxes the mind. Practices like lectures and counseling (Jnana yoga) help to clear intellectual confusions and conflicts and motivate adolescents to take right decisions in their path. Altruistic activities (Karma yoga) provide sense of selfless work and duty which lead to relaxation and life satisfaction. This yoga module is specifically designed and tested in Residential Setting and not tested for school setting or non-residential setting. But it can be given in school-setting with need-based modification for longer duration. The same could be customized for the specific needs.

It is of extreme importance to provide them multi-dimensional programs at an early age as a series of research indicate that children with better developed overall fitness have better academic achievement at school [65] and more satisfied and successful emotional and social life [66,67]. Field validation was done by carrying out study using this module. The module was successfully intervened in three cohorts as yoga camps with good sample sizes and provided positive results in physical, psychological and social fitness domains. Comparison of each variable between cohorts in each domain, three month follow-up, comparison between children and parental data were also established [68,69].

Correlations between change in variables

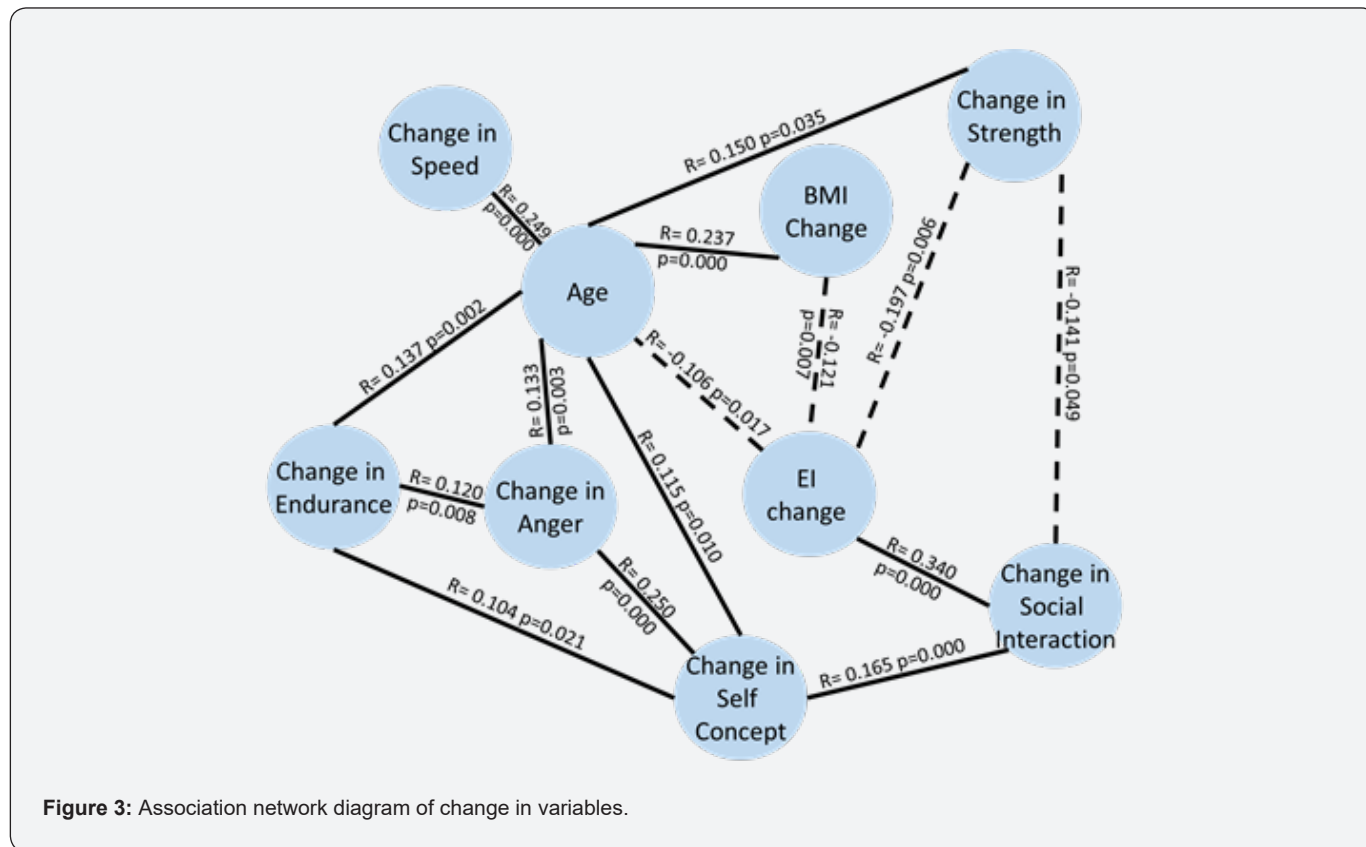


Figure 3: Association network diagram of change in variables.

The correlation between change scores (δ scores) was explored to understand the relationships between the changes brought about by yoga and interdependence between bio-psycho-social domains. The age was positively correlated with the change in physical speed, endurance, BMI, strength and temper (anger). The age was negatively correlated with the change in EI. While the change in EI was negatively correlated with the BMI, strength and age but positively correlated to social interaction. Change in self-concept was positively correlated with social interaction, anger, endurance and age. The social interaction was positively related to the change in EI and self-concept but negatively related to strength. However, the change in anger was positively related to endurance, self-concept and age. Significant associations within these variables are represented as an association network diagram in Figure 3.

Spiritual health domain could not be tested due to non-availability of appropriate scales. The developed yoga module was found to be very well acceptable by adolescents. Subjective feedback from the participants was very good and encouraging. Children enjoyed every activity and had a great learning. This proposed short-term residential yoga module could be introduced as a camp on an annual basis for adolescents during school vacations, the effects of which may be evaluated through the rest of the year.

Conclusion

This study demonstrated that the developed yoga module has good field validity which is designed as per yoga texts and the experience of yoga experts. Successful repeatability with independent cohorts provide strong evidence for validity of holistic yoga module as a powerful tool to establish overall health and fitness among adolescents. Proper integration of multiple components is uniqueness of this wholesome module.

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