

ABSTRACT

BACKGROUND

Two themes in children's education have received a great deal of attention in the last few decades. One concerns the stresses children face, leading to a high prevalence of child and adolescent mental health (CAMH) issues. The other is a disturbing trend in dysfunctional youth behavior. These themes have led thinkers to advocate giving weightage to social emotional learning (SEL), educating the whole child and focusing on character education along with academic knowledge. This thinking reflects, to a large extent, the Indian ethos of education, as articulated by thinkers like Swami Vivekananda and J Krishnamurti, and, as seen in the ancient Indian *gurukula* system of education.

The present study hypothesized that the purpose of equipping children with the power of concentration, SEL and good character may be well served by meaningfully integrating *yoga* with education. Its purpose was threefold:

1. To build a theoretical model of *yoga* in education based on ancient *yogic* knowledge and modern scientific research.
2. To develop and validate a school-based short duration Integrated Classroom Yoga Module (ICYM). The present study observed that though schools were aware of the benefits of *yoga*, most had either not incorporated *yoga* in the school curriculum or had done so sub-optimally, usually one class a week. The reasons ranged from lack of time, a packed schedule and the need for resources like *yoga* rooms, *yoga* mats and trained *yoga* instructors. An efficacious short duration ICYM could potentially overcome such challenges and pave the way for *yoga*'s inclusion in the daily schedule.
3. To provide empirical evidence of the effect of the short duration ICYM on physical fitness, cognitive performance, emotional well-being and personality characteristic measures of school children through a methodologically rigorous study.

AIMS AND OBJECTIVES

Aim

To study the effect of a short duration ICYM on physical fitness, cognitive performance, emotional well-being and personality characteristic measures of school children.

Objectives

1. To develop a theoretical model of *yoga* in education based on the juxtaposition of ancient knowledge and scientific research.
2. To develop and validate a short duration ICYM and test its feasibility and efficacy in a pilot study design.
3. To study the effect of a short duration ICYM on physical fitness, cognitive performance, emotional well-being and personality characteristic measures of school children in a randomized controlled study design.

Research Question

Does a short duration ICYM have a positive impact on physical, emotional, cognitive and personality measures of school children?

Hypothesis

1. The short duration ICYM has a positive effect on physical fitness of school children.
2. The short duration ICYM has a positive effect on cognitive performance of school children.
3. The short duration ICYM has a positive effect on emotional well-being of school children.
4. The short duration ICYM has a positive effect on personality characteristic of school children.

Null Hypothesis

1. The short duration ICYM does not have a positive effect on physical fitness of school children.
2. The short duration ICYM does not have a positive effect on cognitive performance of school children.
3. The short duration ICYM does not have a positive effect on emotional well-being of school children.

4. The short duration ICYM does not have a positive effect on personality characteristic of school children.

METHODS

1. DEVELOPMENT OF THEORETICAL MODEL OF YOGA IN EDUCATION:

The theoretical model of *yoga* in education developed in this study is unique because it juxtaposed ancient knowledge and modern research. The underlying principles, sequence of practices and their interconnectedness were derived from ancient texts. The benefit outcomes were derived from modern research. This made the need to hypothesize the underlying mechanisms from outcomes redundant. Ancient literature itself points out the causes of problems in the physical, mental and emotional domains and explains why *yoga* is efficacious in addressing those problems. Modern research corroborates many of the claims made in ancient literature.

From ancient literature, the understanding of the mind complex, the sheaths of human personality, the five mental planes, the balancing of left and right brain energies and *Pātanjali's* eight limbed *yoga* protocol were considered important for developing the model. From scientific research, the evidence of the benefits of *yoga* went into constructing the model.

2. DEVELOPMENT AND VALIDATION OF SHORT DURATION ICYM: A four phased methodology was adopted to develop and validate the short duration ICYM.

1. Selection of practices based on the review of ancient literature
2. Validation of selected practices by subject matter experts
3. Design of the short duration ICYM incorporating validated practices
4. Pilot study to confirm feasibility and efficacy of the short duration ICYM

Ancient and contemporary texts of *yoga* were reviewed to shortlist 24 *yoga* practices. 21 subject matter experts evaluated and rated these practices. Lawshe's Content Validity Ratio (CVR) was the statistical tool employed to analyze the expert ratings. The module included different limbs of *yoga* namely, *āsana* (physical postures), *prānāyama* (breathing exercises), *dhyāna* (meditation) and *mantrā* (chanting).

A pilot study was undertaken to test the module's efficacy. The design was a pre-post measurement and the analysis tool was a paired sample t-test. The intervention period was one month. The assessments were selected keeping in mind the goals of evaluating (i) physical fitness with 4 tests of the EUROFIT physical fitness testing battery, (ii) cognitive performance using the Stroop color-word naming task, (iii) self-esteem measured by Rosenberg self-esteem scale, (iv) emotional well-being measured by WHO-5 well-being index, and (v) personality characteristic measured by the *triguna* using the Sushruta Child Personality Inventory.

3. STUDY OF THE EFFECT OF ICYM ON PHYSICAL FITNESS, COGNITIVE PERFORMANCE, EMOTIONAL WELL-BEING AND PERSONALITY CHARACTERISTIC MEASURES OF SCHOOL CHILDREN: A RANDOMIZED CONTROLLED STUDY DESIGN

Participants:

The participants for the study were selected from two urban campuses of the multi-campus Samsidh Mount Litera Zee School Group in Bengaluru, India. The Yoga intervention group was drawn from one campus and the Control group from the other campus. All students from grades 7-10, who met the inclusion criteria, participated in the study. The randomization was unequal because two different campuses were involved in the study.

Sample Size:

Since the physical fitness variables required significantly more time and resources to measure, the sample size for physical fitness tests was restricted to 98. For cognitive performance (N = 253), emotional well-being (N = 244) and personality characteristic variables (N = 254), the sample sizes were larger. The variation in the sample sizes achieved for different measures was due to the unequal availability of students on the days each test was administered.

Design:

The design of the study was randomized control trial with unequal randomization. The intervention period was two months.

Assessment:

The primary outcome measures comprised (i) four tests from the EUROFIT physical fitness testing battery, (ii) Stroop color-word naming task to evaluate effect on cognitive performance, (iii) Rosenberg self-esteem scale, (iv) WHO-5 well-being index and (vi) Sushruta Child Personality Inventory to assess impact on *triguna*. The secondary outcome measure was a qualitative assessment of the quality of experience, benefits reported and feasibility of continuation of the practice. This was assessed through focus group discussions with participants and teachers.

Data Analysis:

At the first level, pre-intervention and post-intervention means of the Yoga group and Control group were compared separately using paired sample *t*-test. The effect size was calculated using Cohen's *d* formula. At the next level, repeated measure analysis of variance (RM-ANOVA) was carried out. The Within-subjects factor was Time (pre-intervention and post-intervention). The Between-subjects factor was Groups (yoga and control). The alpha level was set at $p < .05$. The raw data was analyzed using Statistical Package for Social Science (SPSS) version 26.

RESULTS

1. THEORETICAL MODEL OF YOGA IN EDUCATION

Overall Framework:

Yoga, with its physical, breathing and contemplative practices, works on the body and mind. The principle behind the eight limbed *yoga* is to stabilize the body, then the breath, senses and mind, in that order. However, there is interaction between body, breath and mind and each benefit by improvement in the other. Hence, the model takes into account this interaction. Second, calming of the mind impacts both cognitive performance and emotional control. In the model, personality is considered a separate bucket since *yoga* may help to transform it by infusing qualities like a gentleness, cheerfulness, and tranquility.

Creating an Enabling Environment:

Yogic vision of education revolves around self-transformation. This may require an enabling environment. To frame the components of such an environment, the model drew inspiration from the first two limbs of *yoga* namely, *yamā* and *niyamā* or restraints and observances. The enabling environment in the model was built on three hypothesized pillars. The first was voluntary moderation in life style. Moderation in diet, sleep, work, play, entertainment and exposure to media are suggested. The second was a transformed student-teacher relationship. This is a key strategy to inculcate good character traits. Teachers playing the role of caregivers, role models and mentors inspire the student to acquire good character traits. In return, the student learns to relate to their teachers with deep respect. The third was support from parents. Parents have to buy into the equal weightage given to academic knowledge and character building and be inspired by the values that the school espouses.

Practice of *Yoga*:

The practice includes the next four limbs of *yoga* namely, *āsanā* (physical postures), *prānāyama* (breathing exercises), *pratyahāra* (control of senses) and *dhāraṇa* (one-pointed attention). Every traditional school of *yoga* includes meditation. In fact, meditation is at the core of *yoga*. The separation of meditation/mindfulness and *yoga* in some quarters goes against this very core. *Āsanā* steadies the body while *prānāyama* increases *prāṇic* energy. These two practices calm the mind and, in turn, the senses imitating the state of mind are calmed. This is the state of *pratyahāra*. Relaxation techniques further promote *pratyahārā*. *Dhāraṇa* trains the mind to develop one-pointed attention.

Benefits of *Yoga*:

Yoga has effects on the physical body, vital energy body and the mind in interconnected ways. In the physiological domain, fitness, strength, flexibility, balance, vigor and good health develop. The calming of the mind has an effect on both cognitive performance and emotional control. In the cognitive domain, attention and concentration improve, speed of information processing increases, spatial and verbal memory are enhanced and aspects of intelligence improve. In the emotional domain, negative aspects of mood and feelings are attenuated and

positive aspects enhanced. Anger, tension and stress are controlled. The impact on personality is rooted in the increase in *sattvā* energy. This makes the personality gentle, cheerful, joyous and resilient. Prosocial behavior improves.

2. VALIDATION OF ICYM

In Lawshe's CVR analysis, 17 out of 24 practices were validated. A pilot study was conducted with school children ($N = 49$). The mean age was $M = 13.63$ (1.014). The age range was 12-16 years and gender ratio was $B:G = 23:26$. The paired sample *t*-test was associated with statistically significant effect in physical fitness, cognitive performance and self-esteem variables. The effect sizes ranged from small to medium in physical fitness measures, medium to large in the cognitive performance measure and small in the measure of self-esteem. The difference in means of emotional well-being and personality characteristic variables were insignificant. The module was well accepted by both teachers and students. No problem was encountered in practicing the module in the classroom environment.

3. STUDY OF THE EFFECT OF ICYM ON PHYSICAL FITNESS, COGNITIVE PERFORMANCE, EMOTIONAL WELL-BEING AND PERSONALITY CHARACTERISTIC MEASURES OF SCHOOL CHILDREN: A RANDOMIZED CONTROLLED TRIAL DESIGN

The Yoga group showed significant differences compared to Control group in EUROFIT tests of flexibility and strength, Stroop color-word score and WHO-5 emotional well-being. There were no significant differences in EUROFIT tests of balance and agility, self-esteem and *triguna*. The effect size in the RM ANOVA analysis was large for EUROFIT test of flexibility and medium for the test for strength. For the Stroop color-word test and WHO-5 test for emotional well-being, the effect sizes were small.

The qualitative assessment buttressed the benefits shown in the quantitative results of the study. Students and teachers found the duration of the ICYM just right. Further, no problems were experienced with its implementation and students found the practice enjoyable. This augers well for the inclusion of the short duration ICYM in the daily school schedule.

CONCLUSION

The alarming incidence of CAMH conditions and deteriorating youth behavior have led scholars to suggest inclusion of SEL, educating the whole child and imparting character education in the school curricula. *Yoga*, with its effect in the psychosocial domain, promotes SEL. The effect of *yoga* on physical, cognitive, emotional and psychosocial domains can aid in the development of the whole child. The effect on emotional regulation and personality characteristics makes it a suitable aid in imparting character education.

To achieve the aim of integrating *yoga* with education, the present study developed a theoretical model of *yoga* in education, validated a short duration ICYM and that proved its efficacy in a randomized controlled trial study.

The randomized controlled trial study showed that the ICYM positively impacted physical fitness, cognitive performance and emotional well-being. While the effect size in physical fitness tests were medium to large, those on cognitive performance and emotional well-being were small. It can be argued that small effect size should not be dismissed since every little improvement in school children's well-being is encouraging. The qualitative assessment buttressed the results of the quantitative study.

The question arises as to why the short duration ICYM positively impacted physical, cognitive and emotional measures. One possible reason could be that the module itself was developed methodically. It was an integrated module incorporating *āsana* (physical postures), *prānāyama* (breathing practice), *dhyāna* (meditation) and *mantrā* (chanting). The practices were specifically selected for their impact on physical fitness, mental calmness, stress reduction and impact on concentration. They were sequenced in a manner that the physical postures involved full body movement namely, sideways bending, forward-backward bending, stretching and balancing. The breathing exercises included full breathing, balancing breathing and inward focusing practice. Chanting and meditation were included since they promoted calmness, stress reduction and concentration. The module had been validated by subject matter experts. The second possible reason could be that the convenience of the module made it possible to practice daily. The daily practice may have contributed to its efficacy. The third reason may be that the ICYM was a shorter version of a practice known to work. Earlier studies have shown that *yoga* is connected with physical, cognitive and emotional benefits.

It may be concluded that the short duration ICYM can be considered for inclusion in the daily school schedule when it is not feasible for the longer duration module to be included. The importance of the present study, thus, is that it paves the way for inclusion of *yoga* in the daily school schedule by addressing the obstacles of time, space and resources.