

Original Research




A mixed method evaluation of the quasi-experimental yoga-based intervention for the behavioural issues of school-going early adolescents in Jaffna, Sri Lanka

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Abstract

Introduction: Behavioural problems of adolescents, such as anger, impulsivity, hyperactivity and emotional problems is a cross-cutting issue among all communities, religions and cultures around the world. An influx of internet, social media, alcohol and illegal substances in the post-conflict period has led to the existing adolescent behaviour problems in Jaffna, Sri Lanka.

Objectives: To find out the quantitative and qualitative impact of a yoga-based intervention in the personal lives of grade 8 children in selected schools in Jaffna, Sri Lanka

Methods: A non-randomized controlled trial was carried out in four educational zones over six months during 2017-2018. The trial implemented a yoga-based intervention package: 1) slow breathing for 5-6 minutes, 2) Surya namaskar for 6-8 minutes and 3) mindfulness meditation for 5-6 minutes. The intervention was designed by relevant experts through a desk review. In both intervention and control groups, pre/post quantitative assessments were conducted using the Strength and Difficulty Questionnaire (SDQ) of parents, teachers and students; and three focus group discussions (FGD). Thematic analysis was performed from the recordings of both FGDs.

Results: The quantitative analysis indicated that according to parents' assessments, the emotional issues ($p=0.001$) along with the total difficulty score ($p=0.001$) were reduced in the intervention group ($n=584$). Within the control group ($n=499$), teachers' assessments indicated an increase in emotional problems ($p=0.001$) and a reduction in pro-social scores ($p=0.001$). The FGD results indicated that most of the students felt that their mind got quietened and that completing school homework was a relatively easy task after the yoga intervention.

Conclusions & Recommendations: This yoga-based intervention package appeared to be effective quantitatively in reducing their externalizing and internalizing behaviour issues and qualitatively to motivate them to focus on their studies.

Keywords: : adolescent behavioural problems, yoga-based intervention package, focus group discussion

Introduction

Adolescence is a unique transitional period which starts at puberty with its ongoing maturation in the physical, sexual, emotional, spiritual and socio-cultural realms that results in the formation of their identity as adults in the future. The World Health Organisation defines adolescent period as the age between 10-19 years. Globally, one in seven (14%) in this age group experience mental health conditions which go unrecognised and untreated leading to poor quality of life as adults. Depression, anxiety and behavioural disorders are the leading causes of illness and disability among the adolescents.

Exposure to poverty, abuse, violence, and parental and peer pressure at the educational and social levels along with their adventures in new relationships and habits, predisposes adolescents to “problem behaviours” (1). Research shows that if smoking, alcohol or illicit drugs are initiated at a younger age, they soon become addicted and sustain it for a prolonged period (2). The Global Health Survey during 2016 in Sri Lanka indicated that 55% of the current smokers have initiated smoking before the age of 14 and 3.2% of the students were using alcohol during the survey period (3). Although problem behaviours of adolescents is a global issue, the slightly over 30 years of internal conflict within Sri Lanka and its resultant structural and functional damages are reflected in 30% of the 13–14-year-olds having behavioural issues in conflict areas, which is nearly three times higher than other parts of Sri Lanka or other countries (4). People in the Jaffna peninsula faced several internal displacements following the internal conflict, leading to school absenteeism, child abuse, illicit drug abuse, teenage pregnancies and alcohol related family violence (5). During the post conflict period after 2009, a sudden influx of alcohol, social media, illegal substances was apparent in an unprepared society, escalating the vulnerability of adolescents.

In response to the ever-increasing behavioural issues among adolescents, Sri Lanka implemented Sathi

Pasala programme (mindfulness in schools) through the Ministry of Education with the support of religious leaders and professionals, to improve mindfulness practices and to minimise bullying, violence, corporal punishment and illicit drug abuse among adolescents (6). A subsequent cluster randomised trial conducted in post conflict areas in Jaffna showed statistically significant improvements in anxiety and function impairment in boys following CBT (cognitive behaviour therapy) and cooperative play (7). Slow breathing techniques helped the adolescents to reduce their anxiety (8), while combination of yoga postures, pranayama and mindfulness reduced the students’ depressive symptoms ($p=0.03$), behavioural symptoms ($p=0.01$) and internalizing symptoms ($p=0.04$) significantly (9). Yoga comprising of slow breathing and different postures unites the mind and body, reduces the sympathetic drive which causes the adrenaline surge and improves the parasympathetic drive which results in calmness of mind and body. This empowers the students to be aware of and control their emotions positively and also to improve their focus or concentration in their studies.

Quantitative methods do not provide a comprehensive understanding of the perceived benefits of behavioural interventions from the students’ perspective. Therefore, the aim of this study was to understand the quantitative as well as qualitative effects of a yoga-based package in the early adolescent school children in Jaffna District, which has not been studied before.

Methods

A cluster non-randomised trial was conducted in Jaffna District, Sri Lanka. A desk review was conducted with the participation of a paediatrician, psychiatrist, officials of the Ministry of Education, religious leaders and consultant community physicians to finalise the components of an intervention package. A web-based random sampling was done to select the intervention and control

schools. The intervention was carried out in 25 clusters (grade 8 class in a school taken as a cluster). Of the five educational zones in Jaffna, Jaffna and Thenmaradchi zones were selected for the intervention. The intervention had three components: 1) Two types of slow breathing techniques, 2) Surya namaskar and 3) mindfulness meditation (10). The controls were 25 clusters from Valikamum and Vadamaradchi educational zones. Both pre- and post-quantitative assessment was done using the SDQ validated for adolescents in Jaffna.

Three FGDs were carried out in two schools in the educational zones where the trial was implemented. The schools were selected randomly and the FGD participants recruited purposefully to gather information up to the data saturation point. The principal investigator conducted the FGDs along with the teacher in charge of counselling by her side.

A script with skeletal questions was used by the researcher to summarise the findings in both schools. All the FGDs were recorded with prior permission of the participants and teachers on the same day at different geographical locations within the first two weeks of completion of the quantitative assessment to minimise interviewer bias.

Data analysis

Comparison of the pre- and post-difficulty total scores as well as their five domains, namely emotional problems, conduct problems, hyperactivity, peer problems and pro-social status was done using paired t-test.

Results

In the intervention group, pre- and post-intervention data (SDQ scores) were taken from parents, teachers and students, and was analysed using paired t-test. Parent assessment showed that their children's total difficulty scores as well as emotional conduct, hyperactivity and the peer problems reduced after six months of yoga-based intervention package, and that

the reduction is highly significant ($p < 0.001$) for all sub scales (Table 1).

In the control group, pre- and post-assessment revealed that the total difficulty scores as well as emotion, conduct, hyperactivity and peer problems worsened, with higher scores shown in each of the sub-scales assessed by parents, teachers and students themselves at the end of six months, and this worsening was highly significant related to parents (conduct problem: $p = 0.001$; hyperactivity problem; $p = 0.001$).

The FGDs included a sample of 26 at the point of data saturation. Following the FGDs, several themes recurred in both schools. The discussions indicated that many of the students improved their memory and were able to get good scores in the previously difficult subjects like mathematics and history.

- **Exposure to any of the three exercises before this programme**

“We learned Surya namaskar when we were in grade 5.” (n=30)

- **Change in the dynamics of the relationship among the family members**

“I can tolerate other's views without heated arguments unlike in the past.” (n=10)

“I am willingly helping my mother and my brothers and sisters. I was not a helping person even when I was asked to help before this programme.” (n=25)

“I have reduced fighting with my siblings now.” (n=20)

- **Changes observed in personal skills**

“Problem solving is relatively easy for me now.” (n=19)

“Decision making in our daily activities is not difficult for me.” (n=29)

“My shyness and fear have reduced and as a result, I am able to ask questions from our teachers and got good friends in school now.” (n=3)

“Unlike before, I like peace and do not like to

fight with my friends.” (n=14)

“I am able to show love to all the students in my class.” (n=20)

“My mind has quietened a lot now.” (n=28)

“I can quickly complete my homework easily.” (n=26)

- **Changes related to educational achievements**

“My memory has improved, and I am easily grasping what my teacher says.” (n=24)

“I got very good marks in history and mathematics now. These were my difficult subjects before.” (n=5)

- **Changes in general health and adjustments in school**

“I can focus well and concentrate more on studies now.” (n=28)

“I used to get tired after third subject in school but now I am motivated to learn until the last period in school.” (n=27)

“I like to participate in sports activities, and I am full of energy most of the time.” (n=25)

“Complaints about body pains have reduced quite a lot now.” (n=16)

“Frequent headaches used to disturb me earlier. But now the headaches have vanished, I cannot understand.” (n=10)

“I must be nebulized in hospital once a month for my asthma. After this programme, I have no asthma and did not visit the hospital for nebulization.” (n=8)

“Obeying parents and teachers is no more a problem to me.” (n=24)

- **Composition of yoga-based programme and expansion to other grade students in the school**

“All three parts of the programme are important.” (n=36)

“I am already teaching my younger sister at home, and I will help to teach others in school as well.” (n=10)

“Taking leadership to facilitate others on a roster basis made become more confident to do and to

teach others.” (n=20)

“At the start, I did not like to do yoga but now I like it very much.” (n=20)

“It is my wish that all Sri Lankan school students do this yoga and get the benefit from it like us.” (n=29)

- **Risk of getting into sexual relationships or substance use**

“I will not say yes to the sexual relationships and substance use and will help other students not to get into those unhealthy habits.” (n=30)

Discussion

Findings of the FGDs were comparable to those found in several other studies in different countries. The quantitative findings are discussed elsewhere (10).

A qualitative clinical trial conducted by the Harvard Medical School, Boston replacing physical education classes with a yoga programme for one semester revealed that 44% (n=7) of the students liked yoga, while 25% (n=4) had a negative opinion about it due to peer pressure among the males, whereas in this study, most of the students said initially they felt that yoga was boring and difficult but with time, they were looking forward to participating in the yoga programme. The relaxation component was the most liked part by most of the students which refreshed and energized them. Likewise in a qualitative study, as part of a large randomized controlled trial, the 9th and 10th graders expressed that they enjoyed the yoga programme given to them for a semester compared to the physical education programme (11). As far as the effects of yoga programme were concerned, 69% (n=11) of the students felt yoga helped them to reduce their stress (11). Likewise in the current study, most students (28 out of 36) said their mind got quietened after starting the yoga programme.

The current study indicates that students experienced

a sizable reduction in headaches (8 out of 36), asthma attacks as well as the need for hospital visits due to

asthma (n=6). This was observed in a study in the UK as well (12).

Table 1: Comparison of pre- and post-test mean SDQ scores of the experimental group

SDQ scales and sub-scales	Pre- intervention Mean (SD)	Post- intervention Mean (SD)	t statistic	p value
<i>Parent</i>				
Externalizing behaviour	14.5 (2.5)	8.4 (2.6)	41.18	0.001
Conduct problem	7.0 (1.7)	3.7 (1.7)	33.37	0.001
Hyperactivity	7.47 (1.6)	4.7 (1.7)	28.08	0.001
Internalizing behaviour	10.8 (4.6)	5.4 (3.2)	33.12	0.001
Emotional problems	5.3 (2.9)	3.6 (2.1)	11.41	0.001
Peer problem	5.4 (2.1)	4.6 (2.1)	6.71	0.001
Total difficulty score	25.3 (5.7)	16.6 (4.7)	28.12	0.001
Pro social score	2.1 (1.5)	5.4 (2.1)	-30.16	0.001
<i>Teacher</i>				
Externalizing behaviour	13.6 (2.5)	9.6 (1.9)	25.70	0.001
Conduct problem	6.4 (1.6)	4.4 (1.4)	20.49	0.001
Hyperactivity	7.2 (1.7)	5.3 (1.6)	17.48	0.001
Internalizing behaviour	12.0 (3.4)	1.5 (2.9)	10.13	0.001
Emotional problems	5.3 (2.9)	5.1 (2.1)	1.55	0.12
Peer problem	7.3 (1.6)	5.4 (1.7)	16.87	0.001
Total difficulty score	26.2 (4.9)	20.1 (4.2)	19.87	0.001
Pro social score	2.3 (1.5)	5.5 (1.8)	-28.49	0.001
<i>Student</i>				
Externalizing behaviour	13.8 (2.7)	7.4 (4.7)	26.40	0.001
Conduct problem	7.4 (1.6)	3.1 (2.5)	31.94	0.001
Hyperactivity	6.4 (2.0)	4.3 (2.7)	13.66	0.001
Internalizing behaviour	13.6 (3.3)	10.7 (4.6)	11.37	0.001
Emotional problem	6.5 (2.2)	5.4 (2.9)	6.38	0.001
Peer problem	7.1 (1.9)	5.3 (2.1)	14.43	0.001
Total difficulty score	27.4 (4.9)	18.1 (8.5)	21.16	0.001
Pro social score	2.1 (1.4)	7.3 (2.6)	-36.51	0.001

In the Butzer and Conby studies, most of the students said yoga helped them in self-regulation of behaviour, especially anger control. Also in the current study, the students said, unlike before, after the yoga programme that they were able to show love and forgiveness to all the students in the class (20 out of 36), their fighting mentality reduced and they liked peace among them (14 out of 36) and fighting with the siblings also reduced (20 out of 36) (11, 13). In the same study, when asked about the effect of yoga on the use of drugs, alcohol and cigarettes, 44%

(n=7) of them said yoga had indirect effect on substance abuse by improving the ability to think before they act. Likewise, in the current study, the students said they were empowered to say no to substance abuse (83.3%) (11, 13).

In the Butzer study, 25% (n=4) said that yoga had a positive effect on their academic performance, and they were motivated to finish their schoolwork and homework and reduced their exam anxiety. In the current study, the students said that they were able to

concentrate and focus on the classroom learning well (28 out of 36), they were able to get good scores in their difficult subjects like mathematics and history (5 out of 36), they used to get tired after third subject in the school before, but now feel motivated until the

last period in school (27 out of 36). Their memory power was improved and were able to grasp what the teacher says (24 out of 36), they were able to finish their homework more easily and quickly (26 out of 36).

Table 2: Comparison of pre- and post-test mean SDQ scores for the control group

SDQ scales and sub scales	Pre- intervention Mean (SD)	Post- intervention Mean (SD)	t- statistic	p- value
<i>Parent</i>				
Externalizing behaviour		11.2 (2.4)	-50.48	0.001
Conduct problem	1.8 (1.3)	4.2 (1.6)	-25.89	0.001
Hyperactivity	2.2 (1.3)	7.0 (1.7)	-51.36	0.001
Internalizing behaviour	3.8 (1.8)	13.8 (2.3)	-76.41	0.001
Emotional problems	1.8 (0.9)	7.0 (1.6)	-65.58	0.001
Peer problem	2.0 (1.5)	6.8 (1.7)	-47.57	0.001
Total difficulty score	7.8 (3.3)	25.0 (3.6)	-80.31	0.001
Pro social score	8.0 (1.8)	3.9 (1.2)	43.11	0.001
<i>Teacher</i>				
Externalizing behaviour	9.9 (2.6)	12.8 (2.2)	-18.58	0.001
Conduct problem	3.7 (1.7)	5.9 (1.5)	-22.46	0.001
Hyperactivity	6.3 (1.6)	6.9 (1.6)	-5.84	0.001
Internalizing behaviour	10.2 (4.1)	13.5 (2.7)	-16.89	0.001
Emotional problems	5.0 (2.9)	6.3 (1.7)	-9.46	0.001
Peer problem	5.1 (1.9)	7.2 (1.7)	-19.17	0.001
Total difficulty score	20.1 (5.6)	26.3 (3.7)	-22.02	0.001
Pro social score	3.8 (1.8)	2.4 (1.5)	13.46	0.001
<i>Student</i>				
Externalizing behaviour	7.2 (2.9)	13.5 (2.3)	-38.16	0.001
Conduct problem	3.3 (1.9)	6.6 (1.6)	-30.20	0.001
Hyperactivity	3.9 (1.7)	6.8 (1.6)	-28.49	0.001
Internalizing behaviour	6.6 (3.0)	13.1 (2.4)	-38.08	0.001
Emotional problem	3.6 (1.9)	6.7 (1.7)	-27.14	0.001
Peer problem	3.0 (1.8)	6.4 (1.6)	-31.45	0.001
Total difficulty score	13.8 (4.9)	26.5 (3.7)	-47.91	0.001
Pro social score	6.7 (1.6)	8.1 (1.7)	13.13	0.001

Strengths of the study were that all the schools in Jaffna were available on the Northern Province educational website, with all relevant specifications like type of school and other information, which made it easier for sampling, which in turn can improve the generalizability of the results. The word “Yoga” was familiar to almost all Tamils and was thought as a sacred practice. Therefore, permission

to carry out the study was welcomed by the Ministry of Education. The other experts such as religious leaders, clinicians (paediatrician and psychiatrists) were looking for an applicable solution, and this made the desk review a success to finalize the intervention package.

Limitations of the study were that, if the FGDs were

conducted in pre- and post-intervention and in control group, it might enable us to have clearer information and the effect could be quantified to some extent. Time was the major limitation in getting the students live experiential expressions about yoga programme. The FGD script had some pre-determined questions of interest like how they liked the programme and its effect on various emotional and relationship aspects in their personal lives. This could have directed their thinking in a particular way, whereas if the questions were open-ended, their answers may be free expressions.

Conclusions & Recommendations

Practising Surya namaskar, breathing control techniques and mindfulness meditation significantly reduces both externalizing symptoms (conduct problems and hyperactivity) as well as internalizing symptom (emotional problem and peer problems) when assessed by parents, teachers and students themselves ($p < 0.001$). Accordingly, the pro-social score (i.e., good behaviour) increased significantly in the experimental group by the assessment of parents,

teachers and students self-report ($p < 0.001$). The FGDs were complementary to the quantitative findings in the intervention group. All three components combined enabled the students to cope with their day-to-day stresses better, reduced the understanding gap between their parents and teachers and themselves, equipped them to have a better control over their emotions and to improve their educational performances. Qualitative assessment proved the attitudinal change in the students which was pleasing to the students and teachers.

Based on the findings, the Ministry of Education should take initiatives to implement similar evidence-based interventions as a routine in schools. The Mental Health Directorate could take the lead in introducing a similar programme to non-school going adolescents and certified school students (or juvenile prisoners). Awareness of these methods to parents and teachers can facilitate these processes more efficiently in schools and homes. Future research should be conducted in other parts of Sri Lanka as well to see the acceptability, feasibility and effectiveness.

Public Health Implications

- The study has shown to reduce anger, improved self-control, improved the relationship between the students and among the siblings. The package also improved their educational outcomes.
- Implementing the package in schools may help both the students and teachers.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Ethics clearance was granted by the Ethics Review Committee of the University of Kelaniya. Informed written consent was obtained from each participant prior to data collection.

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