

Yoga-Preksha-Dhyan Practice As A Cost-Effective Preventive Strategy Against Aggressiveness In Primary School Children

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Abstract

Increasing aggressiveness in adolescents and youth throughout the world has become a global public health issue involving huge psychological, social and economic costs. High aggressiveness in children has been observed very often to develop into conduct disorders, anti-social activities, and juvenile delinquency. Therefore, it is important to identify children with tendencies of high aggressiveness at an early age and to develop cost-effective preventive strategies, which can be implemented on a large-scale.

Our previous pilot studies on primary school children in a model municipal school in New Delhi showed a significant reduction in aggressiveness after administration of a *yoga-preksha-dhyan* ((YPD) intervention module, specially developed for children (Jain et al., 2014). We have, therefore, undertaken further investigations on larger number of subjects from multiple schools to assess reproducibility and generalizability.

The present study was conducted on 2080 elementary school students of IIIrd to Vth class (Age; 7-14 years, average 9.3 ± 1.7 yrs) from 5 South Delhi Municipal Corporation schools. 330 highly aggressive students (Boys: 181; Girls: 149) were identified on the basis of scores obtained using a validated and reliable Self-Report Questionnaire which also distinguishes proactive aggression (PA) from reactive aggression (RA). The multi-modal YPD module consisting of *asanas*, *pranayama* and *preksha-dhyan* components, was administered to students with high Overall aggressiveness Scores (OA-Score) for 36 sessions (45 minutes/session, 3 days/week). Aggressiveness was assessed by the self-report questionnaire pre and post-YPD intervention. The results show that, after the intervention the OA-, PA- and RA-Scores of students reduced considerably. The average pre-YPD OA-Scores (44.26 ± 6.5) decreased to OA-Score (30.40 ± 8.3) post-YPD, which is statistically highly significant (p -value = 0.001).

The results are in agreement with our previous pilot study, confirming that YPD practice could be a cost-effective preventive intervention against the development of conduct disorders, anti-social behaviors and violent crimes. Since it is relatively easy to implement, the introduction of YPD program on large scale in schools, could lead to a more peaceful society in future. Further research is therefore warranted.

Key Words: Aggressiveness, *Yoga-Preksha-Dhyan*, Proactive aggression, Reactive aggression, Primary school children, Prevention Strategy, Anti-Social Behavior.

Running Title: Reduction of aggressiveness by *Yoga-Preksha-Dhyan*

INTRODUCTION

High aggressiveness among children is often associated with the development of conduct disorders and criminal behaviours later in life and is emerging as a serious social and public

healthproblem (Kazdin 1985; Loeber 1985; Robins, 1979; Rutter & Giller, 1983). Aggressiveness is the tendency to commit aggression. The term aggression pertains to a complex of human behaviors directed toward causing harm to physical / social

environments, which include living beings and objects. Harm includes the physical as well as psychological hurt/injury. Aggressive behavior can be classified broadly into two sub-types (reactive and proactive) on the basis of function or motivation. Reactive aggression (RA) is defensive and protective, which primarily occurs in response to a perceived provocation or threat. It is impulsive behavior accompanied by high levels of emotional arousal (hot blooded). In contrast, Proactive aggression (PA) is intentional, goal-directed, and planned with low emotional arousal (cold blooded). Studies in developmental biology have confirmed that aggressive behavior begins early in life, reaching a peak between 2 – 4 years of age which gradually declines in most children. However, in some children, aggressiveness levels do not decline, become stable or even increase (Campbell et.al.2000). Persistent childhood aggression may give rise to development of conduct disorders and juvenile delinquency (violation of laws).

Several preventive interventional approaches, including diverse forms of individual and group cognitive therapies, skill developments, pharmacotherapy, are under study (Kazdin, 1985). Various multi-modal socio-cognitive programs, universal or targeted to high risk populations, have been implemented in USA and Europe (Muris et.al.2005; Stirtzinger et.al.2001) and found to yield moderate reductions in aggressiveness in children and adolescents. However, these programs are neither cost-effective nor suitable for implementation on large scales, especially in developing countries. Therefore, there is an urgent need to develop better cost-effective and simple preventive strategies, which can be easily applied to large populations of children.

Yoga comprising several components including physical postures (*aasans*), breathing techniques (*pranayama*) and meditation (*dhyana*) has become very popular for its various applications in physical and mental health. Numerous studies describe the progressive impact of yoga on psychological, physiological (Vempati et.al.200) and biochemical (Selvamurthy et.al.2005) factors

for reduction of several psychosocial conditions like stress, anxiety (Brown et.al.2005; Shannahoff et.al.1996), depression (Jorm et.al.2002; Janakiramaiah et.al.2000), anger, dilemma and emotional trauma (Lavey et.al., 2005). Recent studies in adolescents and adults have indicated positive effects of various components of yoga on reduction of aggressiveness (Sharma et.al.2014; Sharma et.al., 2012; Sharma et.al., 2016; Shirath et.al., 2015; Dubey et.al., 2011; Deshpande et.al., 2008; Singh et.al., 2015). The generalizability of the results from these studies is, however, limited because of small sample sizes. Differences in methodology and diversity of intervention modules used. Also studies on the effects of yoga on aggressiveness in children are lacking.

Among the various types of yoga and meditation techniques practiced worldwide. *Preksha-Dhyana* is a very systemic meditation of Jain yoga formulated by Late Acharya Tulsi and Acharya Mahaprajna (Acharya Tulsi 1994; Acharya Mahaprajna 2003). *Prekshadhyana* has been shown to be very effective in balancing autonomic nervous system activity, reducing stress and negative emotions (Mishra et.al. 1999, 2010).

Recently a pilot study was conducted by our group using a specially designed yoga-preksha-dhyana(YPD) intervention module, which yielded very promising results for the reduction of aggressiveness in primary school schools (Jain SD et.al., 2014). A systematic and comprehensive project was, therefore, undertaken to study the effects of YPD intervention on aggressiveness profiles in larger samples of children drawn from 5 South Delhi Municipal Corporation primary schools in Chattarpur, New Delhi. The preliminary results have been presented (Jain et.al.2017).

MATERIAL AND METHODS

Study Sample

Healthy school children; both boys and girls with age group 7-14 years (mean age 9.3) studying in IIIrd to Vth standards of 5 South Delhi Municipal corporation (SDMC) primary schools, located in Chattarpur and neighboring areas in New Delhi were recruited for

participation in the present study. Socio-demographic information was collected through a pre-designed, semi-structured questionnaire. The subjects in the study population belonged to low socio-economic Hindu and Muslim families.

Ethical Considerations

Clearance from Ethical Committee of the Institute and permission by Department of Education, South Delhi Municipal Corporation, New Delhi was granted to conduct the study on school students. Informed consent was obtained from the parents/guardians of the participants before starting the study.

Study Parameters and Tools:

The psychological instrument used in the present study to quantitatively assess levels of aggressiveness among the children was a simplified Hindi version, based on a self-report questionnaire (Raine et.al. 2006). The questions pertained to 16 actions related to reactive (8 actions) and proactive (8 actions) aggressive tendencies. Students in the class were asked to truthfully answer each question on a 4-point scale, the overall aggressiveness score (OA-score) is measured between 16 (minimum) - 64 (maximum). The modified Hindi version of the self-report aggressiveness scale has been tested for validity and reliability (Jain et al., 2017).

Identification of Students with Aggressive tendencies

Table 01 : The multi-component *yoga-preksha-dhyana* (YPD) intervention module

S.N	COMPONENT	DESCRIPTION	TIME
1	Adarsh JeevanGeet (Ideal Life Song)	Auto-suggestion by group singing to imbibe the values and virtues of truth, non-violence, discipline etc. for ideal ethical behavior	2 min
2	SukshmaKriya (Warm up exercise)	Neck (Up/Down, Right/Left, Clock/Anti-clockwise Rotation)	10 min
		Shoulder (Clock/Anti-clockwise Rotation)	
		Chest (Expansion/Contraction)	
		Stomach (Expansion/Contraction)	
3	Asan (Postures)	Tadasana (Mountain Pose)	10 min
		Konasana (Angle Pose)	
		Padhastasan (Hands touching Feet Pose)	
		Shashankasan (Hare Pose)	
4	Pranayama (Breathing Exercises)	Anulom-Vilom (Alternate Nostril Breathing)	10 min
		Nadishodhan	

The OA-scores of the self-report questionnaire (range from 16 to 64) provide an estimate of aggressive tendency of an individual student. Children with OA-scores 16 to 32 were broadly categorized as low/non-aggressive; those with OA-scores 33 to 48 as moderately aggressive and children with OA-scores 49 to 64 as highly aggressive (Jain et al., 2017).

Total 697 children with moderate (OA-Score ≥ 35) and high aggressive tendencies were considered for administration of YPD-Intervention according to their OA-Scores. YPD module were administered to 651 students in 4 schools (one school could not provide undisturbed space for YPD Administration).

YPD-Intervention:

A special *Yoga-Preksha-Dhyana* (YPD) module was designed under the guidance of Late Swami Dharmanand Jain (2014) exclusively for primary school children. This multi-component module (Table 1) comprised of warm up exercises (*sukshmkriya*), Postures (*Asans*), Breathing Exercises (*Pranayama*), Meditation (*Kayotsarga, jyoti Kendra preksha*), Resolutions/vows (*Sankalp*) and Group Songs related to Ideal Life (*AdarshJeeven*) and Self-Restraint (*Sanyam*). The intervention module was administered 3 times per week (45min/session) by qualified trainers in groups of the identified "aggressive children" in respective schools. The pre- and post-intervention AG-Scores were measured after every 6 session.

		(Channel purification by slow and deep RhythmicBreathing	
6	PrekshaDhyān (Meditation)	Mahaprandhwani ('Om' or 'M' chanting)	10 min
		Kayotsarga (Relaxation of body and mindfollowed by experience of Self Realization and Transcendence from body)	
		Jyoti-Kendra Preksha (Focus awareness on the Centre of Enlightenment at the middle of eye brows)	
7	Sankalp (Moral Pledge/vows)	Resolve not to cheat in exams, avoid offensive words, respect teachers and parents, and maintain cleanliness, not to indulge in stealing, violence & substance abuse.	2 min
8	SanyamGeet (Song of Self-restraint)	Auto-suggestions to cultivate life of self-restraint,tolerance , friendship and discipline	1 min

Statistical Analysis of Data:

After collection of data on printed data sheets, it was double entered in Microsoft Excel Sheet and validated. A clean database was generated and copied into SPSS sheet (version 20.0). The data was analyzed using SPSS (version 20.0, IBM Corporation). Frequency distributions of OA-scores in the study population were analyzed and T-test was conducted; p-value =/ <0.01 was considered significant. To evaluate and compare the effect of the intervention,Cohen's d ((Mean2-Mean1)/Standard Deviation pooled) and effect sizes correlation coefficientwere calculated(Cohen 1988).

RESULTS

From the 651 subjects identified with moderate or high aggressiveness, some did not attend the YPD sessions regularly. Therefore,

only 330 subjects (Boys: 181; Girls: 149) who had more than 90% attendance, were considered suitable for analysis.

YPD- Intervention Response Profileof the Identified Aggressive Group of Children

Distributions of pre- and post-YPD OA-scores of the selected studentsshown in Fig.1a and 1b,indicatethat majority (85.9%) of students positively responded toYPD intervention with significant reductionsin the OA-Scores after 36 sessions (3 session/week) were termed as Responders. Only 14.1% were identified as Non-Responders from the study.

YPD - Intervention Response on Average Overall, Proactive- and Reactive-Aggressiveness

The pre & post YPD-Intervention average OA-, PA-,& RA- Scores of students are given in Table 2;

Table 02
Comparison of Average Pre- & Post- YPD intervention (18 sessions)
OA-, PA-, RA-Scores of the Targeted Aggressive Subjects

		NUMBER	MEAN \pm S.D	LEVEL OF AGGRESSIVENESS, %			T-VALUE	P-VALUE
				LOW	MODERATE	HIGH		
OA-SCORE	PRE-YPD	Total 330 Subjects (BOYS: 181, GIRLS: 149)	44.26 \pm 6.48	0 51.2%	78.8% 46.1%	21.2% 2.7%	20.8	<0.001**
	POST-YPD		32.62 \pm 8.19					
PA-SCORE	PRE-YPD		20.69 \pm 4.26	10.9% 65.5%	72.1% 30.3%	17.0% 4.2%	17.39	<0.001**
	POST-YPD		15.09 \pm 4.62					
RA-SCORE	PRE-YPD		23.27 \pm 3.44	1.2% 40.0%	68.5% 51.2%	30.3% 8.8%	17.33	<0.001**
	POST-YPD		17.68 \pm 4.90					

the minimum score being 16 and maximum is 64 on a 4 point aggressiveness scale The pre-

YPD average OA-score of the 330 subjects was 44.26 with a standard deviation of 6.48

which reduced to mean OA-score of 30.40 with standard deviation of 8.27 after 36 sessions of YPD. The differences between pre- and post- scores are statistically highly

Effectiveness of YPD-Intervention

Effect sizes of YPD intervention on OA, PA-, RA- scores, of boys and girls in different school environments are shown in Table 3, the

significant (p-value =0.001) in agreement with our pilot study. Post-YPD Average PA- and RA-Scores also decreased significantly (p-value =0.001) compared to Pre-YPD scores.

effect sizes are in the range 0.5 – 0.7 after 18 session of YPD. The effect is more among boys in single sex schools (0.73) compared to girls (0.66).

Table 03
Effect Sizes of YPD-Intervention (18 sessions) on Aggressive Subjects in Different School Environments

S.N	YPD-Administered Subjects	N of Subjects	OA-Score		Cohen'D	Effect Size correlation coefficient (r)
			PRE-YPD	POST YPD		
1	OA-Score (Total)	330	44.26 ± 6.48	32.62 ± 8.2	1.57	0.62
2	PA-Score (Total)	330	20.69 ± 4.26	15.09 ± 4.62	1.26	0.53
3	RA-Score (Total)	330	23.3 ± 3.44	17.68 ± 4.9	1.33	0.55
4	Single-sex school (Boys) OA-Score	110	48.81 ± 6.95	32.4 ± 8.4	2.12	0.73
5	Single-sex School (Girls) OA-Score	96	41.53 ± 4.8	30.29 ± 7.7	1.75	0.66
6	Mixed-sex Schools (Boys & girls) OA-Score	124	42.3 ± 4.9	34.6 ± 7.8	1.18	0.51
7	Mixed-sex Schools (Boys) OA-Score	71	42.7 ± 5.1	35.7 ± 7.6	1.08	0.47
8	Mixed-sex Schools (Girls) OA-Score	53	42.0 ± 4.8	33.5 ± 8.2	1.26	0.53

DISCUSSION

Key findings of the present study are:

1. YPD administration significantly reduced the overall aggression scores with moderately high effect sizes. Most children, boys as well as girls, responded positively to the YPD- Intervention within 36 sessions (3 Months, 3 sessions /week); only about 14% children remained non-responders.
2. The YPD - intervention reduced proactive - and reactive-aggressiveness in majority of children almost to an equal extent.

This is the first study providing information about the positive effects of YPD intervention on reducing aggressiveness in primary school children, confirming the results of our

previous pilot study (Jain et al. 2014). Results are also in broad agreement with other studies showing beneficial effects of yoga or one of its components(*pranayama* and *asans*, chanting of *Om* etc.) on reducing aggressiveness in adolescents and adults (Deshpande et.al.2008; Sharma et.al.2012; Sharma et.al.2014; Sharma et.al.2016; Singh et.al. 2015; Shirsath et.al.2015).

The present study differs, however, from the previous yoga studies in two important aspects:

- (i) the YPD intervention module is more comprehensive employing elements of most of the components of yoga as described by Patanjali (*the Ashtanga yoga*); and

(ii) our studies have been carried out on elementary school children, at a development stage when children are learning to face and adapt to new challenges in the school environment and are more likely to accept the offered interventions.

In the present study, effect sizes are in the range 0.5-0.7 (medium-high range according to Cohen, 1988) have been observed, which are higher or similar to those obtained in broad-based Cognitive Behavioral Therapy (CBT) and other implemented psychotherapies (Sukhodolsky et.al.2004, Wilson, 2007), suggesting that YPD can be a cost-effective large scale intervention for aggressive tendencies in children. Interestingly, the results further indicate that children with high aggressiveness, are likely to benefit most from YPD intervention.

The present study used a multi-modal YPD module comprising *Mahaprandwani, SukshmaKriya, Asans, Pranayama, Dhyana, Anupreksha&Sankalp*, which makes it a comprehensive intervention to reduce aggressiveness in elementary school children. The psycho-biological processes underlying the effects of YPD remain yet to be investigated. Each and every component of this module plays an important role in reduction of aggressiveness along with overall fitness of children. *SukshmaKriya*(warm up exercises) help to induce flexibility in joints for further Asans/Postures. Simple and easy-to-do *Asans* have been included which provide physical health and mental peace. *Pranayama* (*anulom-vilom* and *nadi-shodhan*) used in the module have been already validated for the reduction of aggressiveness as well as anxiety and depression (Singh et.al.2015; Gupta et.al.2010). *Kayotsarga* is known to balance activity of the autonomic nervous system and enhances stress coping capacity (Khangarot et.al.2015). *Jyoti-kendrapreksha* (component of *preksha-dhyana*) may help in emotional regulation. *Sankalp* builds determination in students to avoid anti-social activities. Auto-suggestions offered through group songs

cultivate a value system for an ideal and peaceful personal and social life.

This study has limitations that include the use of only self-report dependent assessment /measures of aggressiveness and lack of a control group. Despite these limitations, the study has several strengths. In the present study 330 school children of both genders were administered YPD intervention as compared to previous studies using yoga interventions for aggression, which were carried out on small sample sizes of adolescents & adults. Furthermore, in addition to overall aggressiveness, tendencies for proactive- and reactive-aggression have also been analyzed in different school environments.

Aggression is a very common and complex behavior, which is affected by multiple factors. Though the psycho-biological processes underlying the effects of yoga remain yet to be investigated and understood, yet it may be stated that a composite, multi-component Yoga module, where all the components contribute in reducing aggressiveness at different levels, is likely to be more effective as a strategy to prevent development of high aggressiveness and its consequences in children and adolescents.

Implications of the Present Results for Social Transformation

Despite some limitations, the findings of the present studies have very important implications for bringing out a gradual long-term behavioral transformation in children to reduce development of anti-social activities in later life and thereby enhance harmony and peace in the society. With relatively high effect sizes for the reduction of aggressiveness along with high acceptability by children, the YPD intervention module is very suitable for applications on large scales in schools.

CONCLUSION

It may be concluded that YPD is a cost-effective, acceptable and feasible preventive strategy easy to implement in schools on large scale and can be useful in reducing aggressiveness and violence in society. In view of the social implications, further

longitudinal studies on children with different cultural and socio-economic backgrounds are recommended to validate the present results and verify their generalizability.

CONFLICT OF INTEREST:
None

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