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Biophysical and anthropometric indices of children enrolled in acustomized sports club in a school setting

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ABSTRACT

Background: Achieving lasting impact on health outcomes requires a focus not just on patient care, but on community wide approaches (such as school) aimed at improving population health. Interventions that address the conditions in the places where we live, learn, work, and play have the greatest potential impact on our health and beginning early in school settings can go a long way.
Aim: The study aimed to assess the biophysical and anthropometric indices of children enrolled in a customized sports club in a school setting along with assessing the feasibility and effectiveness of establishing a customized "Sports Club" in a school setting.
Methods and Materials: Uncontrolled quasi experimental design was employed. Students of 5^{th} – 8^{th} standard who consented to participate were enrolledin a customized "Active Sports Club" for 90days. Pre-tested questionnaire, anthropometric and biophysical measurements were conducted before and after the intervention. The customized sports club schedule included 15 minutes of Pranayam daily; fixed set of aerobic exercise and sports conducted alternately.
Results: Overall the enrollment of boys (64%) was double than girls (36%) in the sports club and girls of 12-14 years had higher values of total body fat (TBF%) as per the cut-offs. Blood pressure values were in the "at risk" range. The sports club was well accepted by students, teachers and parents. Post intervention proportion of children having normal nutritional status increased; undernourished decreased while overweight remained stagnant. TBF percent values did not shift in "at risk" category and the blood pressure values reduced dramatically among the selected children.
Conclusions: The customized sports clubcan be extrapolated the school facilities and could be managed with existing staff as well as time and a positive impact on the anthropometric and biophysical parameters of the participants was recorded.

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1. Introduction

Mechanized lifestyle among Indian children has changed the definition of "childhood". Children are busy growing up with sedentary aids such as computers, tablets, video games, mobiles, auto bikes and so on. Nearly $3/4^{th}$ of the school age children do not perform the recommended levels of physical activity;[1] and the statistics is not much different for Indian children. Though immense health benefits of physical activity have been documented, yet issues regarding the "WHEN, WHERE and WHICH physical activity should be recommended" has not been clearly tackled. Also, it is difficult to claim the array of health benefits to a particular set of physical activity.[2]

Precisely, physical activity can be defined as any bodily movement produced by skeletal muscles that results in energy expenditure, while exercise is a subset of physical

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activity that is planned, structured, and repetitive such that it can improve or maintain physical fitness; which is measured by health or skill related set of attributes.[3] Thus indulging into sports, household chores, yoga, gym, aerobics, dance or any other modality can be termed as being "physically active". However, to obtain health benefits, the CDC guidelines suggests a minimum of 30 minutes of moderate intensity of exercise[4] for school age children.

Results documented in several studies create an ambiguous picture of the best suitable exercise modality, type of schedule and duration of activity that can offer health benefits. Aerobic exercises use fat as fuel (along with protein and carbohydrate) during the exercise; while anaerobic activities (strengthening exercise) burn fat upto 48 hour post exercise;[5] thus balancing the metabolism. According to McCambridgeet[6] physical activity can reduce weight, BMI, WC, LDL-C and improving insulin sensitivity; whereas regular aerobic exercise[7] can reduces both systolic and diastolic blood pressure.[8] Physical activity of moderate to high intensity showed independent association with insulin resistance[9] and continuation for 6 months along with a coordinated school based intervention lowered the hs-CRP.[10] Yoga, on the other hand demonstrated an overall wellbeing.[11]

In order to develop and maintain overall well being of school age children as well as to ensure their daily participation in physical activity; it is important to amalgamate different forms of exercise to obtain their varied health benefits. A regime having aerobic, yoga and sport during school hours, within the school premises has not been seen in Indian school setting. The following study was thus planned with an objective to assess the feasibility and effectiveness of a customized "Sports Club" in a school setting and its impact on the physical activity levels of the children.

2. Materials and Methods

2.1. Study design

Uncontrolled quasi experimental design.

2.2. Subject selection

Total strength of the selected school was 1540 students. Students from 5-8th standard, aged 9-14 years (n=169) were enrolled for the Active Sports Club (ASC) based on their informed consent. This group was divided into 4 sub-groups for ease in management.

3. School specification

The selected School was an English medium, co-educational, privately managed institute that followed the Gujarat state board curriculum.

The school had spacious campus divided into 6 different precincts of which 3 areas were developed as basketball, volleyball and football field; closely adhering to the high school standards (Sports, field and court dimensions, 2012). The remaining 3 regions were constructed as semi-open courts for undertaking yoga and karate.

Each defined arena (field/ court) had an average capacity of 30 students. Unlike most of the schools in the city, the selected school had proportionate number of coaches, which made it possible to perform 3 different sports with different groups of students simultaneously.

3.1. Active Sports Club (ASC)

1. **Schedule:** Moderate to vigorous intensity of physical activity (MVPA) was planned which included aerobics, selected sports and cool down sessions.
2. **Duration:** The MVPA under ASC was conducted for 90 days excluding the holidays or any school based activity that may coincide with the sports schedule.
3. **Precaution:** In order to avoid on missing the regular classes for the selected subjects, the ASC was scheduled 20 min prior to the actual school timing and extended for another 25 min which comprised of the school assembly.
4. **Training:** The ASC was conducted with the help of 5 trained physical education (PE) teachers of the school.
5. **Attendance and Compliance:** An attendance sheet was maintained for the participants. Weekly monitoring of the activity was done using mobile phones via SMSs by the researchers for all 169 students enrolled for the ASC.

3.2. Nutritional status assessment

1. **Anthropometry:** Physical measurements such as height, weight, waist and hip circumference were taken using the standard techniques. BMI for Age (BAZ) was calculated using WHO's Anthro Plus software; while Waist Hip Ratio (WHR) and Waist Height Ratio (WHtR) was calculated on Microsoft Excel using the set formula. The measurements were taken prior to and post the ASC, to assess the effectiveness of the sports club.
2. **Biophysical:** Blood pressure (BP) and Total Body Fat Percent (TBF%) were measured as biophysical parameters that can contribute in the assessment of the nutritional status. Omron digital blood pressure monitor, OMRON HEM-650that works on oscillometric technology was used to take three consecutive readings at the left arm of the participant. Efforts were made to measure the BP during first half of the school hours before the recess. The TBF% was assessed using the TANITA-076, Japan body fat analyzer. This machine works on the Bioelectrical

Impedance Analysis (BIA) technique. Students were instructed to void urine before the measurements and efforts were made to take the measurements before recess hours.

3.3. Statistical analysis

Independent t-tests were applied using IBM SPSS 16 version.

4. Results

4.1. The active sports club

Deciding on the "time" for the ASC, was a major concern. School management, Physical Education (PE) teachers, students as well as parents were reluctant to stay back after the school hours. Organizing the ASC after school hours was not acceptable due to issues such as: security, fixed working hours, tiredness, other commitments, etc. Therefore, the ASC started 20 min prior to assembly and extended for another 25 min during the school assembly; so that the enrolled students may not miss their regular classes.

Under the ASC, combination of exercise having moderate and vigorous intensities of physical activity (MVPA) was planned. The selected 169 students were divided into 4 groups. Three groups consisted of 42 students while one group had 43 students. Two groups performed similar activities on one day (Table 1). A team of 5 coaches was employed for the same. Their duty was to teach and train the students in both aerobics and sports (of their choice), take daily attendance and coordinate for conducting the ASC daily.

The customized schedule included 35 minutes of aerobics conducted three days a week followed by 10 minutes of cool down. The remaining three days, games (football, basketball or volleyball) were conducted for 35 minutes followed by 10 minutes of cool down. Hence, aerobics and sports were performed on alternate days. The total time allotted for the MVPA under the ASC was 45 minutes. Two groups did aerobics on one day, and at the same time the other two played sports of their choice. The selection of sport was predetermined.

The MVPA under ASC was conducted for 90 days excluding the holidays or any school based activity that may coincide with the sports schedule. During holidays and weekends, the participants were motivated to undertake the aerobics at home under their parent's supervision. Extra days/week of trainings were organized for those students who remained absent during the training period due to personal reasons. Weekly monitoring of the activity was done using mobile phones via SMSs by the researchers for all 169 students enrolled for the ASC.

4.2. Composition of the subjects

The group of 169 students that was enrolled for the ASC were randomly selected from 5^{th} – 8^{th} standard. Boys constituted 64% of the total strength while girls were nearly half of it (36%); clearly revealing the effect of gender in inclination towards exercise and physical activity. Based on the age the students were divided into two groups where 46% students belonged to age groups of 9-11 years and 54% in the age group of 12-14 years.

4.3. Nutritional status of the subjects

Anthropometric indices of height, weight, waist and hip circumference were computed into indicators viz. BAZ, WC, WHR and WHtR to measure the nutritional status. According to BAZ82% of the subjects had normal nutritional status, 6% were overweight and 13% were underweight. However according to WC 35% subjects were overweight and WHtR computed 54% of the subjects to be overweight; while WHR categorized only 2% as overweight (Table 2).

The mean value of TBF% for total sample was 19%, while the gender based mean varied significantly by 2.1, $p<0.05$ 95% CI where girls had slightly higher values (Table 3). The mean of TBF% also varied between the two age groupsat 1.9 ($p<0.05$, 95% CI) with higher values among students of 12 – 14 years.

Blood pressure was compared with two different standards[9&12] BP cutoff values of Indian children. As per both the cut-offs, majority of the values were towards "higher or at risk" level with distinctly large deviation. Both systolic (113 ± 13 mmHg) and diastolic (74 ± 11 mmHg) values were higher among boys as compared to girls.

4.4. Impact of the intervention on the anthropometric parameters

Subject to the normal growth process, linear increase was seen in height, weight, waist and hip circumference (Table 4). The mean values of waist circumference increased by 2.1 cm ($p<0.05$, 95% CI) among girls and it increased by 4.6 cm ($p<0.001$, 95% CI) among the children of elder age group. Hip circumference however, showed a significant rise in both the age groups at $p<0.001$, 95% CI.

The waist hip ratio varied significantly across the gender; where it increased by 7.6 at $p<0.001$, 95% CI among boys and reduced among girls by 2.4 ($p<0.01$ 95% CI). The mean values of WHR increased by 1.9 and 2.2 among children of younger and elder group respectively at $p<0.05$, 95% CI. WHtR increased only among children of elder group and it remained unaltered among the younger age group of children. The BAZ values showed a positive shift from under-nourished to normal nutritional status and there was no rise in the percent of overweight or obese individuals.

The increase in anthropometric measurements can be attributed to the physical, physiological and biological growth spurt. However the beneficial effect of the ASC can be explained by stagnancy in number of over nourished children, rise in number of normal nourished children and reduction in proportion of under nourished children.

4.5. Impact of the intervention on the biophysical parameters

The mean values of TBF percent were in the normal range among boys and girls of both the age groups. As per the cut-offs, 35% boys and 32% girls were classified for having higher TBF percent; which increased by 1.5 and 7.5 among boys and girls respectively. Similarly 23% children of younger age group and 41% children of the elder age group had higher values of TBF percent; which increased by 7% among 9-11 year old children, while remained almost similar among 12-14 year old children.

The mean values of blood pressure (BP) among the participants who were near to the risk category as per the cut offs given by Raj et al., (2010). Diastolic BP was uniformly high across the participants irrespective of gender and age groups. As much as 60 - 65% boys (systolic ≥ 111.1 mmHg and diastolic ≥ 71.3 mmHg) and 47 – 50% girls (systolic ≥ 113.1 mmHg and diastolic ≥ 73.4 mmHg) had high BP which reduced by 17 – 20% post physical activity intervention. The Systolic BP values showed significant reduction among boys by 2.2 mmHg, $p<0.05$ 95% CI and among girls by 2.4 mmHg, $p<0.01$ 95% CI. Of the two, DBP reduced uniformly among boys and girls at $p<0.001$, 95% CI. After the intervention, the blood pressure values reduced dramatically by 40% among the children of younger age group and by 15% among the children of elder age group.

4.6. Feedback

At the end of the 1^{st} week, a feedback was taken from the participants, parents and the trainers and was repeated at the end of 1^{st}, 2^{nd} and 3^{rd} month. Teachers reported increase in attentiveness and enthusiasm among the volunteers of the ASC. Absenteeism had also reduced as stated by the teachers. Parents mentioned that the children enjoyed the ASC and kept looking forward for it. The ASC helped the children regularize their schedules. In general their moods also remained cheerful. The examples of the verbatim of the parents, teachers and students are listed in the table 5 and indicate the positive influence of the ASC.

5. Discussion

With rising trends in obesity and diabesity, it is important that we initiate early interventions using coordinated school health approaches. Various studies in India by our team have indicated that health and nutrition services offered in school have improved the nutritional status of children and it is essential to offer the eight components of Coordinated school health approach (CSHA) suggested by the Centre for Disease control for improving school environment and for the prevention of the rising dual burden of malnutrition.[12,13] The consensus statement for health and wellbeing presented in the consensus dietary guidelines for healthy living and prevention of obesity, the metabolic syndrome, diabetes, and related disorders in Asian Indians[14] also focuses on moderation and early mediations. School settings and assessment of school canteens and food systems are essential to assess and alter the dietary habits of children.[15]

Statistics reveal that more than 60% children and adolescents do not partake in any form of physical activity[4,16] and are increasingly becoming sedentary. Similar trend was found even in a demographically small city of India, Vadodara as reported by[17–20] in school children as well as university students.

Thus there is a reason to mandate moderate to vigorous physical activity for minimum of 23 minutes per day.[21] This could be taken up as a part of classroom activity, school break, after-school activity program, before school activity[22] and needs encouraging support from the family and community.[23] The ASC incorporated with these fundamentals proved to be a feasible intervention. Moreover availability of a well-trained instructor and suitable environment[6] encourages partaking in physical activity.[24]

The pre intervention data shows existence of both under (13%) and over (6%) nutrition along with normal nutritional status (82%) which could be attributed to the epidemic of inactivity.[25] However the school based intervention of ASC resulted in a positive shift as under-nourished children turned to become normally nourished and none of the students turned overweight or obese. MVPA performed daily for 30 min over 12 months affects BMI and waist circumference, showing health benefits among overweight as well as non-overweight children, especially of 9 – 10 year.[26–28]

Growth spurt among the school children under the study explains the increase in body dimensions and a concomitant increase in fat fold thickness. MVPA for 45 – 60 min per day can maintain healthy growth among children.[23,29,30] The complexity in fat distribution pattern, lifestyle and hereditary gives mixed results on relation of adiposity and physical activity. However, an increase in the physical activity can delay the onset of unhealthy aberrations, and deposition of the percent body fat.

Aerobic activity of moderate intensity has beneficial effect on the cardio-respiratory system also.[24] Children under the following study had high values of systolic and diastolic blood pressure which reduced dramatically after the ASC. Regular physical activity also reduces the disturbance in blood acid-base balance and has improved

Table 1: Schedule of the customized sports club for 169 enrolled students (n=42*3+43)

Activity	Time	Frequency	Details	Group type	Group strength
Sports	30 min	Monday	Volleyball	Girls	15
		Wednesday	Basketball	Boys	14
		Friday	Football	Boys	14
Aerobics	30 min	Tuesday	50 spring jumps	Mixed both boys and girls	21
		Thursday	Joint movements		21
		Saturday	Jogging		
Yoga	15 min	Everyday	Pranayam	Mixed both boys and girls	21
			Meditation		21

*The described schedule is for one group. In all there were 4 groups of which three groups had 42 participants and one group had 43 participants. Similar pattern was followed by all four groups where pranayam and meditation was done by all the groups daily.

Table 2: Anthropometry based nutritional status of the participants before the ASC (n=169)

Parameter	Cutoffs	Nutritional status	Boys	Girls	Total
BAZ	<-2 SD	Under-nourished	16 (15)	6 (10)	22 (13)
	≥-2 to <2 SD	Normal	85 (79)	54 (89)	138 (82)
	≥ 2	Overweight	7 (7)	1 (2)	9 (6)
WC: Boys	≤ 59.3 cm	Undernourished	24 (22)		**UN** 37 (22)
	59.4 – 68.2 cm	Normal	43 (40)		
	≥ 68.3cm	Over-nourished	41 (38)		**Nor** 73 (43)
Girls	≤ 60.1cm	Under-nourished	13 (21)		
	60.2 – 69.1 cm	Normal	30 (49)		**ON** 59 (35)
	≥ 69.2 cm	Over-nourished	18 (30)		
WHR: Boys	≤ 0.84 cm	Under-nourished	30 (28)		**UN** 39 (23)
	0.85 – 0.94 cm	Normal	74 (69)		
	≥ 0.95 cm	Over-nourished	4 (4)		**Nor** 126 (75)
Girls	≤ 0.79 cm	Under-nourished	9 (15)		
	0.80 – 1.80 cm	Normal	52 (85)		**ON** 4 (2)
	≥ 1.81 cm	Over-nourished	0		
WHtR: Boys	≤ 0.40 cm	Under-nourished	20 (19)		**UN** 22 (13)
	0.41 – 0.44 cm	Normal	32 (30)		
	≥ 0.45 cm	Over-nourished	56 (52)		**Nor** 56 (33)
Girls	≤ 0.41 cm	Under-nourished	10 (16)		
	0.42 – 0.45 cm	Normal	27 (44)		**ON** 91 (54)
	≥ 0.46 cm	Over-nourished	24 (39)		
Gender		**Waist Hip Ratio (WHR) WHO, 2009 report**	**Waist Circumference (WC) Kurian et al. 2011.**		**Waist Height Ratio (WHtR)**
Boys		≤ 0.84	≤ 59.3		≤ 0.40
		≥ 0.85 –<0.95	≥ 59.4 – <68.2		≥ 0.41 – < 0.44
		≥ 0.95	≥ 68.3		≥ 0.45
Girls		≤ 0.79	≤ 60.1		≤ 0.41
		≥ 0.80 – <1.18	≥ 60.2 – <69.1		≥ 0.42 - < 0.45
		≥ 1.18	≥ 69.2		≥ 0.46

NS = Non-significant difference. p<0.05, p<0.01** and p<0.001*** at CI=95%.Cutoffs and references as documented below table no. 3; Values in paranthesis are the percentages. UN=Undernourished, ON=Overnourished and Nor=Normal

Table 3: Pre intervention biophysical parameters compared across gender and age of the participants (n=169)

S.No.	Parameters	Range	Total (Mean± SD)	Boys (n=108)	Girls (n=61)	t-Value	9 – 11 yr (n=78)	12 – 14 yr (n=91)	t-Value
1.	TBF (%)	5 - 53.7	19.2±10.2	17.9 ± 11	21.3 ± 7.5	-2.1*	17.5 ± 9.7	20.5 ± 10.5	-1.9*
2.	SBP (mmHg)	64 – 139	112.6±12.5	113 ± 13	111 ± 11	0.5NS	111.32 ± 12	113 ± 12.6	-1.2NS
3.	DBP (mmHg)	42 – 104	73.9±10.4	74 ± 11	73 ± 9	0.8 NS	74 ± 10	73 ± 10	0.16 NS

Parameters and reference	Cutoffs	Boys	Girls
Total Body Fat (TBF) Percent Mc.Carthy et al., 2006	Low	≤ 14%	≤ 19.6%
	Normal	≥ 14.1 – ≤ 19.1%	≥ 19.7 – ≤ 25.1%
	High	≥ 19.2%	≥ 25.2%
Systolic Blood Pressure (SBP) mmHg Raj et al., 2010	Low	≤ 100.4	≤ 101.4
	Normal	≥ 100.5 – ≤ 111	≥ 101.5 – ≤ 113.2
	High	≥ 111.1	≥ 113.3
Diastolic Blood Pressure (DBP) mmHg Raj et al., 2010	Low	≤ 65.9	≤ 66.4
	Normal	≥ 66 – ≤ 71.2	≥ 66.5 – ≤ 73.3
	High	≥ 71.3	≥ 73.4

NS = Non-significant difference. p<0.05, p<0.01** and p<0.001*** at CI=95%.BP values taken 3 times for each individual at different points of time

Table 4: Impact of the intervention on the anthropometric parameters of the participants (n=169)

Parameters	Boys (n=108)		Girls (n=61)		9–11 yr (n=68)		12-14 yr (n=101)		Total	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Height (cm)	146 ± 9	148 ± 9	146 ± 9	147 ± 9	140.7 ± 8	142 ± 9	149.8 ± 7	151.7 ± 7	146 ± 9	147.9 ± 9
t-Value	-7.8***		-7.2***		-4.9***		-9***		-9.9***	
Weight (kg)	38 ± 11	40 ± 10	38 ± 10	39 ± 10	33.9 ± 8	5.1 ± 9	42 ± 10	42.9 ± 10	38.7 ± 10	39.8 ± 10
t-Value	-3.4***		-0.9^{NS}		-2.9**		-2*		-3.2***	
BAZ	-0.25 ± 1	-0.23 ± 1	-0.34 ± 1	-0.48 ± 1	-0.38 ± 1	-0.32 ± 1	-0.22 ± 1	-0.33 ± 1	-0.28 ± 1	-0.32 ± 1
t-Value	-2.3^{NS}		0.9^{NS}		-0.5^{NS}		1.1^{NS}		0.5^{NS}	
WC (cm)	66.1 ± 9	67.8 ± 10	66.1 ± 8	67.6 ± 10	62.6 ± 8	63.6 ± 9	68.4 ± 8	70.6 ± 9	66.1 ± 10	67.7 ± 9
t-Value	-0.8^{NS}		-2.1*		-1.6^{NS}		-4.6***		-4.5***	
HC (cm)	75.7 ± 9	78.9 ± 9	76.7 ± 8	80.6 ± 9	72 ± 8	75 ± 8	78.7 ± 8	82.3 ± 8	76 ± 9	79.4 ± 9
t-Value	-4.2***		-8.4***		-4.9***		-11.6***		-11***	
WHR	0.87 ± 0.08	0.85 ± 0.04	0.86 ± 0.05	0.83 ± 0.06	0.87 ± 0.1	0.84 ± 0.05	0.86 ± 0.04	0.85 ± 0.05	0.87 ± 0.07	0.85 ± 0.05
t-Value	-7.6***		2.4**		1.9*		2.2*		2.8**	
WHtR	0.45 ± 0.05	0.45 ± 0.05	0.45 ± 0.04	0.45 ± 0.06	0.4 ± 0.04	0.4 ± 0.05	0.45 ± 0.05	0.46 ± 0.05	0.45 ± 0.05	0.45 ± 0.05
t-Value	-1.8^{NS}		-1.4^{NS}		-0.4^{NS}		-2.6**		-2.3*	

NS = Non-significant difference. p<0.05, p<0.01** and p<0.001*** at CI=95%. Cutoff and references given below table no.6.8

metabolic health biomarkers among children and youth aged 5–17 years.

After school physical activity intervention focusing on "fitness" improved body composition; cardiovascular fitness[31] and prevented accumulation of central fat mass among pre-pubertal children.[30] Thus the findings of the study and related review provide support for daily physical activity recommendations to prevent excess fat mass accumulation in childhood.

School based physical activity interventions have reported certain inherent limitations.[26] But at the same time school-based multi-level programs, environmental approaches such as parent and community involvement, participation in organized and non-organized active leisure pursuits, fostering a classroom and school culture that encourages more physical activity at school, and other areas[28,28] have shown to increase the level of physical activity as well as healthy behaviour modifications among school children.

Table 5: Impact of the intervention on the biophysical parameters of the participants (n=169)

Parameters	Boys (n=108)		Girls (n=61)		9–11 yr (n=68)		12-14 yr (n=101)		Total	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
TBF (%)	17.9 ± 11	18 ± 10	21.3±7	23.4±8	17.1 ± 9	18.8 ± 10	20.5 ± 10	20.7 ± 10	19.1 ± 10	19.9 ± 10
t-Value	-0.2^{NS}		-2.7**		-2.7**		-0.4^{NS}		-2.15*	
SBP (mmHg)	113 ± 13	109 ± 12	111±11	107± 12	110 ± 12	103 ± 12	114 ± 12	112 ± 11	112 ± 12	108 ± 12
t-Value	2.2*		2.4**		3.5***		1.3^{NS}		3.2***	
DBP (mmHg)	74.4 ± 11	65.2 ± 11	73±9	65±9	73 ± 10	64 ± 12	74 ± 10	65 ± 9	73 ± 10	65 ± 10
t-Value	6.8***		5.1***		4.9***		7***		8.6***	

NS = Non-significant difference. p<0.05, p<0.01** and p<0.001*** at CI=95%. BP values taken 3 times for each individual at different points of time

Table 6: Verbatim on the feedback of the parents, participants and school authorities

Feedback	Verbatim
Parents	**"**My child has become more active than before"
	"My daughter has started eating more since she has joined active sports club"
	"My son enjoys attending the sports club and has developed interest in being active"
	"Such activities should be conducted on a regular basis in the school"
	"It will be good if children get to learn different sport in the school itself during the school hours"
	"My daughter spends less time in front of the television and has started playing outdoor even after school"
	"Though I have to come to school a bit early, I am enjoying the activities taught under the sports club"
Participants	"I have learnt more about games after joining the sports club than what we learn during our P.T. periods"
	"We used to have free period in the name of our P.T. periods and used to get very less chance to play, now I am enjoying my games of volleyball "
	" I feel fresh after the morning participation in the active sports club"
	"Beginning the day with games motivates me to come to school"
School authorities	"The participants of the sports club have started showing more alertness in the class as compared to their counterparts"
	"We thought it would be difficult to operate the sports club, but now we can incorporate the idea for other students also"
	"We have got requests from parents to initiate a sports club for other students also on regular basis"
	"If this is going to improve the academic performance, we would like to scale it up on a larger basis"

6. Conclusion

The modernized schools have made major changes in their curriculum, teaching pattern as well as infrastructure. However, "Physical Activity" is the area that still lags behind in almost all the academically oriented schools. The results lay an emphasis on "MVPA" that could be developed in any suitable combination and can be inculcated at any time period within a school's working range. Though this intervention could not reduce the prevalence of over nourished children; yet it was successful in maintaining the nutritional status and improving the mental wellbeing of students. Clearly such sports club can contribute to attain holistic development of children.

7. Conflict of Interest

None.

8. Source of Funding

None.

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