



# International Journal of Physical Education, Sports and Health

P-ISSN: 2394-1685  
E-ISSN: 2394-1693  
Impact Factor (ISRA): 5.38  
IJPESH 2016; 3(6): 128-133  
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[www.kheljournal.com](http://www.kheljournal.com)  
Received: 24-09-2016  
Accepted: 25-10-2016

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## Beneficial effect of bratachari and folk games programme on blood lipid profile of obese adolescent

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### Abstract

Purpose of the study was to investigate the twelve weeks bratachari and folk games programmes on blood lipid profile before and after of the obese adolescents.

Subjects were selected from North 24 Parganas district under the state of West Bengal with 45 male sample sizes on three equal groups i.e. bratachari dance group ( $G_1=15$ ), folk game group ( $G_2=15$ ) and control group ( $G_3=15$ )

Variables were considered on blood lipid profile i.e. HDL, LDL, TC and TG cholesterol of obese adolescent.

Criteria of blood lipid profile in each component were measured as enzymatic-photometric analyzer and recorded in mg/dL respectively.

Experimental protocol was set into bratachari and folk games group and control group and twelve weeks' training period was served to experimental group.

Statistics were done on mean, standard deviation, standard error of mean, and ANCOVA for investigating the effect of twelve weeks bratachari and folk games programmes in which level of significance was set at 0.05 level of confidence.

Result of the present study of twelve week programmes shows that significant differences have been observed among the mean value of pre test, post test and adjusted post test scores among two experimental group and control group.

Implementation leads that physicians and health experts can use the bratachari and folk game programmes for improving lipid disorders of overweight children and adolescents, and thus can prevent major diseases through training them about proper nutrition and regular physical activity.

Conclusions are made that systematic and well planned bratachari and folk games programmes significantly reduce the total cholesterol, LDL cholesterol, triglycerides and significantly increase the level of HDL cholesterol in obese adolescents.

**Keywords:** Bratachari, folk games, obese adolescent, blood lipid

### 1. Introduction

In every society there is a collection of inherited cultures that is passed on in the different areas of life which reflects the nature of this society and its lifestyle, the little folk dance, social games and bratachari dance are an integral part of the cultural heritage, most people may look at these games as just a way of playing and entertainment and having something to do in their free time, in the past kids used these games as a refuge to alleviate the hardness of life, but the truth is that these games have meanings, educational values and good educational goals, it also plays a role in developing the psycho-physiological areas of life (Al Musri, 1998) [25].

Apart from modern games and sports, the folk games and bratachari dance also play a unique role in social reconstruction, prosperity for development of culture of the society and self. Folk games like Baguddi, Hu tu tu, Bohuchori, Gambhadian develop better physical fitness and can be compared with modern physical activities. The small folk games have also become of the important means that help in the development of moral values and develop social relationships, and help students in their physical, motor, psychological, social and mental development. (Sayeh, 2007) [26].

The increasing prevalence of childhood obesity has been met with increased presence and earlier onset of CVD risk factors. Approximately 30% of overweight/obese children display an adverse lipid profile. While weight loss is the commonly prescribed intervention, success in treatment has been limited. The substantial involvement of lipid metabolism by skeletal muscle

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suggests recreational training has the potential to improve lipid profile even in the absence of weight loss, although investigations in the pediatric population are limited. Restricting caloric intake and increasing caloric expenditure through physical activity and exercise are effective ways of reducing body weight and fatness while normalizing blood pressure and blood lipid profiles. (Morrow, 2005) [27].

Regular physical activity positively affects the blood lipid and lipoprotein profile. The scientific understanding is that physical activity or planned exercise positively alters blood triglyceride levels. However, total blood cholesterol is not usually changed after exercise training unless body weight is lowered or dietary composition is changed. What does happen is that the way cholesterol is carried by the blood lipoprotein is changed so that more of the good high density lipoprotein cholesterol is found in the blood. (Durstine, 2002) [9].

## 2. Aim of the Study

To determine the prevalence of ascertain factors related to obese adolescent on lipid profile.

To identify the effect of blood lipid profile variables such as total cholesterol, triglycerides, LDL-cholesterol and HDL-cholesterol before and after the twelve weeks bratachari and folk games programmes of obese adolescents.

## 3. Method and Materials

Subjects were randomly selected from large numbers of population of North 24 Parganas district under the state of West Bengal with 45 obese adolescent school boys. The age of the subjects were ranged between 13-18 years.

Variables were regarded under blood lipid components i.e. high density lipoprotein cholesterol, low density lipoprotein cholesterol, total cholesterol and triglycerides cholesterol of

obese adolescent.

Criteria of blood lipid profile in each component were measured by using an enzymatic-photometric analyzer and recorded in mg/dL respectively. Blood sampling was performed by a certain individual and through antecubital veins.

Experimental protocol was set into two experimental groups and one control group with fifteen subjects in (n=15) each. Experimental group<sub>1</sub> underwent bratachari programme, Group<sub>2</sub> underwent folk game practices and Group<sub>3</sub> served as a control group for the training period of 12 weeks.

Intervention programme duration was restricted to twelve weeks and the number of days per week was confined to four. The folk games item were restricted to blind man's buff, british bulldogs, dandy shandy, double dutch, forty forty, fox and geese, hunt the thimble, huckle buckle beanstalk, paddle ball, tic-tac-toe. Bratachari programme incorporated with sixteen alies of bratachari i.e. aabrittali, krityali, sangeetali, kreerali, mallali, shilpali, gnanali, dakshatali, foujali, kathali, kautukali etc. (Bengali term).

Statistical techniques of the collected data from the three groups before and after the experimental periods were statistically examined for significant improvement by using analysis of covariance (ANCOVA). Whenever the 'F' ratio was found to be significant, scheffe's test was used as post-hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence ( $P<0.05$ ).

## 4. Result and Discussion

The result of the study has been presented in tabular and numerical form as given here under.

**Table 1:** Analysis of covariance (ANCOVA) for the pre test and post test data on HDL-cholesterol scores of bratachari, folk games and control group

		Bratachari	Folk games	Control group	S V	S S	df	MSS	F ratio	
Pre test	Mean	37.07	35.76	36.19	A	13.23	2	6.61	2	
	SD	1.94	1.66	1.84	W	138.79	42	3.30		
	SEM	0.5009	0.428	0.4750						
Post test	Mean	38.6	36.85	35.73	A	62.59	2	31.29	11.38*	
	SD	1.75	1.69	1.53	W	115.54	42	2.75		
	SEM	0.4518	0.436	0.395						
Adjusted post test	Mean	37.98	37.35	35.86	A	34.64	2	17.32	55.18*	
					W	12.87	41	0.314		

F (0.05) (2, 42 and 2, 41) = 3.22, \*Significant at 0.05 level of confidence.

Above Table-1 shows that the pre-test means in HDL-cholesterol of the bratachari group, folk game group and the control groups are 37.07, 35.76 and 36.19 respectively, resulted in an "F" ratio of 2, which indicates statistically no significant difference between the pre test means at 0.05 level of confidence.

The post test means and adjusted post test means of HDL-cholesterol are 38.6, 36.85, 35.73 and 37.98, 37.35, 35.86 respectively, resulted in "F" ratio of 11.38 and 55.18 which indicates statistically significant difference at 0.05 level of confidence where require table value is 3.22 with df 2 and 42.

**Table 2:** Scheffe's test for differences of the adjusted post-test paired means of HDL- cholesterol

Bratachari	Folk game	Control group	M D	Confidence Interval
37.98	37.35	35.86	0.63*	0.52
37.98			2.12*	
	37.35		1.49*	

\* Significant at 0.05 level.

Table-2 shows that the adjusted post-test mean difference in HDL-cholesterol between bratachari group and folk game group (0.63), bratachari group and control groups (2.12), folk game group and the control groups (1.49) respectively which

are statistically significant at 0.05 level of confidence. However, it is concluded that bratachari group is to be found better in increasing the level of HDL- cholesterol in blood than folk game group.

**Table 3:** Analysis of covariance (ANCOVA) for the pre test and post test data on LDL- cholesterol scores of bratachari, folk games and control group

		<b>Bratachari</b>	<b>Folk games</b>	<b>Control group</b>	<b>S V</b>	<b>SS</b>	<b>df</b>	<b>MSS</b>	<b>F ratio</b>
Pre test	Mean	185.4	186.87	186	A	16.31	2	8.16	1.14
	SD	3.69	1.81	2.14	W	301.33	42	7.17	
	SEM	0.9527	0.4673	0.5525					
Post test	Mean	178.78	182.93	185.6	A	354.37	2	177.2	13.63*
	SD	4.70	1.79	3.69	W	545.88	42	12.99	
	SEM	1.2135	0.4621	0.9527					
Adjusted post test	Mean	179.28	182.37	185.66	A	303.41	2	151.7	16.08*
					W	386.88	41	9.44	

F (0.05) (2, 42 and 2, 41) = 3.22, \*Significant at 0.05 level of confidence.

Above Table-3 shows that the pre-test means in LDL- cholesterol of the bratachari group, folk game group and the control groups are 185.4, 186.87 and 186 respectively, resulted in "F" ratio of 1.14, which indicates statistically no significant difference between the pre test means at 0.05 level of confidence.

The post test means and adjusted post test means of LDL- cholesterol are 178.78, 182.93, 185.6 and 179.28, 182.37, 185.66 respectively, resulted in "F" ratio of 13.63 and 16.08 which indicates statistically significant difference at 0.05 level of confidence where require table value is 3.22 with df 2 and 42.

**Table 4:** Scheffe's test for differences of the adjusted post-test paired means of LDL- cholesterol

<b>Bratachari</b>	<b>Folk game</b>	<b>Control group</b>	<b>M D</b>	<b>Confidence interval</b>
179.28	182.37		3.09*	0.08
179.28		185.66	6.38*	
	182.37	185.66	3.29*	

\* Significant at 0.05 level.

Table 4 shows that the adjusted post-test mean difference in LDL- cholesterol between bratachari group and folk game group (3.09), bratachari group and control groups (6.38), folk game group and the control groups (3.29) respectively which

are statistically significant at 0.05 level of confidence. However, it is concluded that bratachari group is to be found better in decreasing the level of HDL- cholesterol in blood than folk game group.

**Table 5:** Analysis of covariance (ANCOVA) for the pre test and post test data on T- cholesterol scores of bratachari, folk games and control group

		<b>Bratachari</b>	<b>Folk games</b>	<b>Control group</b>	<b>S V</b>	<b>SS</b>	<b>df</b>	<b>MSS</b>	<b>F ratio</b>
Pre test	Mean	196.73	199.2	195.47	A	108.13	2	54.07	1.4
	SD	7.49	3.88	6.68	W	1619.06	42	38.55	
	SEM	1.9339	1.001	1.7248					
Post test	Mean	189.07	195.06	196.5	A	466.24	2	233.12	6.27*
	SD	7.64	4.15	6	W	1562.58	42	37.21	
	SEM	1.9726	1.0715	1.5492					
Adjusted post test	Mean	189.44	193.13	198.05	A	554.35	2	277.2	72.67*
					W	156.39	41	3.81	

F (0.05) (2, 42 and 2, 41) = 3.22, \*Significant at 0.05 level of confidence.

Above Table-5 shows that the pre-test means in T-cholesterol of the bratachari group, folk game group and the control groups are 196.73, 199.2 and 195.47 respectively, resulted in "F" ratio of 1.4, which indicates statistically no significant difference between the pre test means at 0.05 level of confidence. The post test means and adjusted post test means

of T-cholesterol are 189.07, 195.06, 196.5 and 189.44, 193.13, 198.05 respectively, resulted in "F" ratio of 6.27 and 72.67 which indicates statistically significant difference at 0.05 level of confidence where require table value is 3.22 with df 2 and 42.

**Table 6:** Scheffe's test for differences of the adjusted post-test paired means of T- cholesterol

<b>Bratachari</b>	<b>Folk game</b>	<b>Control group</b>	<b>M D</b>	<b>Confidence interval</b>
189.44	193.134		3.694*	1.83
189.44		198.05	8.61*	
	193.134	198.05	4.916*	

\* Significant at 0.05 level.

Table 6 shows that the adjusted post-test mean difference in T- cholesterol between bratachari group and folk game group (3.694), bratachari group and control groups (8.61), folk game group and the control groups (4.916) respectively which are

statistically significant at 0.05 level of confidence. However, it is concluded that bratachari group is to be found better in decreasing the level of HDL-C in blood than folk game group.

**Table 7:** Analysis of covariance (ANCOVA) for the pre test and post test data on TG- cholesterol scores of bratachari, folk games and control groups

		<b>Bratachari</b>	<b>Folk games</b>	<b>Control group</b>	<b>S V</b>	<b>S S</b>	<b>df</b>	<b>MSS</b>	<b>F ratio</b>
Pre test	Mean	173.06	175.73	175.00	A	57.240	2	28.62	1.019
	SD	4.987	2.186	7.387	W	1179.21	42	28.076	
	SEM	1.2876	0.5644	1.9073					
Post test	Mean	169.9	174.24	177.1	A	395.734	2	197.87	7.534*
	SD	4.875	2.368	7.029	W	1103.03	42	26.263	
	SEM	1.2587	0.6114	1.8149					
Adjusted post test	Mean	171.4	173.2	176.8	A	223.707	2	111.86	60.037*
					W	76.386	41	1.863	

F (0.05) (2, 42 and 2, 41) = 3.22, \*Significant at 0.05 level of confidence.

Above Table-7 shows that the pre-test means in TG-cholesterol of the bratachari group, folk game group and the control groups are 173.06, 175.73 and 175 respectively, resulted in an "F" ratio of 1.019, which indicates statistically no significant difference between the pre test means at 0.05 level of confidence. The post test means and adjusted post test

means of TG-cholesterol are 169.9, 174.24, 177.1 and 171.4, 173.2, 176.8 respectively, resulted in an "F" ratio of 7.534 and 60.037 which indicates statistically significant difference at 0.05 level of confidence where require table value is 3.22 with df 2 and 42.

**Table 8:** Scheffe's test for differences of the adjusted post-test paired means of TG- cholesterol

<b>Bratachari</b>	<b>Folk game</b>	<b>Control group</b>	<b>M D</b>	<b>Confidence interval</b>
171.4	173.2		1.8*	
171.4		176.8	5.4*	1.26
	173.2	176.8	3.6*	

\* Significant at 0.05 level.

Table-8 shows that the adjusted post-test mean difference in TG-cholesterol between bratachari group and folk game group (1.8), bratachari group and control groups (5.4), folk game group and the control groups (3.6) respectively which are statistically significant at 0.05 level of confidence. However, it is concluded that bratachari group is to be found better in decreasing the level of HDL- cholesterol in blood than folk game group.

## 5. Discussion of Findings

Result of the present study shows that systematic and well planned bratachari and folk games programmes significantly reduce the total cholesterol, LDL-cholesterol, triglycerides in obese adolescents. In the sedentary state, the low LPL and high HTGL activities lead to a decrease in the production of LDL particles as a result of reduced catabolism of triglyceride rich lipoproteins, which in turn also reduces LDL. However, in physically active individuals, the LPL activity is high, which contributes to the generation of LDL particles. Reductions in LDL TG and T-cholesterol in obese adolescent indicate that the effects folk games and bratachari programme reduced fat intake and increased physical activity on lipid profile.

The main function of LDL cholesterol is to transport cholesterol from the liver to the tissues that incorporate it into the cell membranes. The oxidation of LDL cholesterol is believed to have a central role in atherosclerosis. Oxidized LDL cholesterol may be involved in atherosclerosis by inducing smooth muscle cell proliferation.

The previous research conducted by Saremil *et al.* (2010)<sup>[28]</sup> suggested 12 weeks of aerobic training reduce the TC, LDL and TG level in blood among over weight and obese male. In a study Huang *et al.* (2007)<sup>[35]</sup> on obese volunteers, after 12 weeks physical exercise programmes, a significant reduction in triglycerides, LDL and total cholesterol along with significant elevation of HDL cholesterol and physical fitness. The research conducted by Dhananjai *et al.* (2010)<sup>[30]</sup> stated that the 12 weeks of folk dance practice decrease the TC, LDL and TG of 56 obese subjects. Meta-analysis of 70 studies (Datillo and Kris-Etherton 1992) showed that weight loss is

associated with decreases in all lipid level, except high density lipoprotein cholesterol, which increases with weight loss. Supported to our results in the pediatric population, a study conducted by Sung *et al.*, on 82 obese children (ages 8-11) showed significant decreases in total cholesterol and LDL-C after resistance training for 6-weeks.

Provide the result of this study indicate that bratachari and folk games programme significantly increased the level of HDL-cholesterol when compared with a control group as well as pre test. Increases in skeletal muscle lipoprotein lipase (LPL) expression, which is suggested to be mediated through exercise-induced production of AMP-activated protein kinase (AMPK), allow muscle to clear greater quantities of circulating lipids. AMPK is also observed to be activated in both the liver and adipose tissue where it is associated with decreases in a number of enzymes involved in lipid synthesis. Further, exercise is observed to improve the reverse cholesterol transport by facilitating HDL-C function and increasing liver expression of LDL receptor, increasing hepatic uptake of LDL-C from circulation and decreasing HTGL. Traditional games are diverse and culturally important. Required skills of these games are well-matched with fundamental motor skills, locomotor, and object control skills. In traditional games as motor experiences, there are all kinds of locomotor skills (such as gallop, hop, slide, jump ...) and object control skills (catch, throw, kick, dribble ...).

Exercise is widely believed to induce favorable changes in the lipid profiles of men, particularly to increase cardio protective high-density lipoprotein cholesterol (HDL-C) fraction. Cross sectional study by Leite *et al.* (2009)<sup>[36]</sup> has confirmed that physical exercise increase the higher HDL-C levels in obese adolescents. Benounis *et al.* (2008)<sup>[37]</sup> reported that recreational exercises increase the HDL-C level in healthy subjects. Study by Acharya *et al.* (2010)<sup>[38]</sup> has confirmed that regular practice of aerobic dance exercise increase the HDL-C level. Jimenez *et al.* (2012)<sup>[39]</sup> observed a reduction in LDL-C (-11.4 mg/dL, p=0.03) and an increase in HDL-C (3.2 mg/dL, p=0.04) after an 8-week resistance training regimen.

## 6. Guidance for Implementations

1. Further investigations with a larger, diverse sample size are necessary to explore the role of lipids in human physiology during adolescence and to clarify longer term the effects of folk games and bratachari programme on lipid profile in obese and non-obese youth.
2. These findings may be a result of increasing lipid mobilization to fuel growth-related process during puberty.
3. Need for high levels of physical activity to maintain good health and weight loss. 45-60 minutes per day of moderate intensity physical activity is required to maintain a significant weight loses.
4. The physicians and health experts can use the bratachari and folk game programmes for improving lipid disorders of overweight children and adolescents, and thus preventing major diseases through training them about proper nutrition and regular physical activity.

## 7. Conclusion

Systematic and well planned bratachari and folk games programmes significantly reduced the total cholesterol, low density lipoprotein cholesterol, triglycerides in obese adolescents. Due to the influence of bratachari and folk games programme the level of high density lipoprotein cholesterol is increased when compared with a control group. This programme also helps to reduce the obesity of adolescent.

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