Cross sectional study on patterns of lipid profiles in obese and normal children in south Indian private schools

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Abstract

Introduction: Childhood obesity affects both developed and developing countries of all socio-economic groups, irrespective of age, sex or ethnicity.

Objective: to study the patterns of lipid profiles in obese and normal children.

Materials and Methods: A total of 50 healthy children between the age group of 10-15 years were selected from private schools in Kurnool City. Schools were selected based on simple random sampling method. The study was conducted after taking clearance from Kurnool Medical College ethical committee. Then fasting blood samples of children were collected in the morning under aseptic conditions for the estimation of lipid profile. Lipid profile was estimated in Central Clinical Laboratory of Government General Hospital Kurnool with the Semi- Auto Analyzer using the CHOD POD method.

Results: Total Cholesterol (TC), Serum Triglycerides (S.TG), High Density Lipoproteins (HDL–C), Low Density Lipoproteins (LDL-C) and TC/HDL ratio levels are significantly higher in obese children compared to normal children in the present study was noted.

Conclusion: Increased levels of Lipid profile in obese children may be due to high calorie intake and decreased physical activity of the children. The present study suggests that school children should take a balanced diet, try to avoid intake of fat food and increase their physical activity by playing outdoors.

Keywords: Children, Lipid profile, Obesity.

Introduction

Childhood obesity affects both developed and developing countries of all socio-economic groups, irrespective of age, sex or ethnicity. Childhood obesity is associated with a higher chance of adult obesity, consequent disability and early mortality.[1] Childhood obesity appears with a powerful array of cardiovascular risk factors including combined dyslipidaemia.[2] Dyslipidaemia associated with childhood obesity consists of a combination of elevated triglycerides (TG), decreased high density lipoprotein cholesterol (HDL-C), and normal to mildly elevated low density lipoprotein cholesterol (LDL-C).[3] Metropolitan cities in India have reported a high prevalence of obesity among affluent school children.[4,5] The present study was undertaken to study the patterns of lipid profiles in obese childern and to compare with normal children of private schools.

Materials and Methods

A total of 50 healthy children between the age group of 10-15 years were selected from private schools in Kurnool City. Schools were selected based on simple random sampling method. The study was conducted after taking clearance from Kurnool Medical College ethical committee. Children below 10 years and above 15 years, diagnosed to be obese due to endogenous causes, with Endocrine disorders were excluded in the present study. Anthropometric measurements like height and weight were taken to those children aged 10-15 years who are interested and for whom consent is taken either from warden or parent after explaining the procedure clearly. The age of the children was obtained from the school records. The height was measured by making the child to stand upright, barefoot on the ground with heels, buttocks and shoulder touching the wall and head facing ahead. The height was measured using stadiometer with an accuracy of 0.1mm.Weight was recorded using a weighing machine, calibrated to 0.5 kg accuracy. Body Mass Index (BMI) was calculated based on the formula. Children were categorized based on BMI as per NCHS guidelines with respect to their age and sex. 25 children out of 50 students with BMI> 95th % for their corresponding age and sex were considered as obese. Out of 25 obese children 15 students are males and 10 students are females so we considered 25 students under normal children 15 students are males and 10 students are females for better correlation. Obese were asked not to take fat rich food and be on fasting for 12 hours (overnight fast). Then fasting blood samples were collected in the morning under aseptic conditions for the estimation of lipid profile. Lipid profile was estimated in Central Clinical Laboratory of Government General Hospital Kurnool with the semi-auto analyzer using the CHOD POD method. Total cholesterol, HDL cholesterol, and serum triglycerides

(TGs), LDL cholesterol parameters were analysed and recorded.

Results

Total Cholesterol (TC), Serum Triglycerides (S.TG), High Density Lipoproteins (HDL–C), Low Density Lipoproteins (LDL-C) and TC/HDL ratio levels are significantly higher in male obese children when compared to normal male children was noted in the present study (Table 1). Total Cholesterol (TC) levels are lower in Female Obese Children when compared to normal female children. Serum Triglycerides (S.TG), High Density Lipoproteins (HDL –C), Low Density Lipoproteins (LDL-C) and TC / HDL ratio levels are higher among Obese children compared to normal Female children showing statistical significance in the present study (Table 2).The Lipid profile parameters levels are significantly higher in obese children compared to normal children in the present study was noted (Table 3).

Table 1: Lipid profile, t value and P values in male children

Males		T.C	S.TG	HDL-C	LDL-C	TC/HDL Ratio
Obese	Mean	137.3333	117.1333	37.06667	76.73333	3.727333
	SD	12.57359	22.70892	2.737743	10.28498	0.499692
Normal	Mean	124.7333	101.4	42.6	61.53333	2.932
	SD	15.30857	11.13425	3.018988	12.97176	0.331774
t value		2.463345	2.409292	5.258403	3.556118	5.135519
P value		0.020173	0.022806	0.00001	0.001361	0.00001
		Significant	Significant	Significant	Significant	Significant

Total Cholesterol (TC), Serum Triglycerides (S.TG), High Density Lipoproteins (HDL–C), Low Density Lipoproteins (LDL-C)

Table 2: Lipid profile, t value and P values in female children

Females		T.C	S.TG	HDL-C	LDL-C	TC/HDL Ratio
Obese	Mean	133.4	117.2	35	74.9	3.817
	SD	11.31567	18.53405	3.126944	9.971626414	0.335594
Normal	Mean	120.5	93.3	42.6	58.9	2.816
	SD	18.95169	8.056054	2.270585	18.39353751	0.398893
t value		1.848124	3.739806	6.219209	2.418266443	6.07236935
P value		0.081083	0.001499	0.000001	0.026416422	0.000001
		No Significant	Significant	Significant	Significant	Significant

Total Cholesterol (TC), Serum Triglycerides (S.TG), High Density Lipoproteins (HDL–C), Low Density Lipoproteins (LDL-C)

Table 3: Lipid profile, t value and P values in overall children

Overall		T.C	S.TG	HDL-C	LDL-C	TC / HDL Ratio
Obese	Mean	135.76	117.16	36.24	76	3.7632
	SD	12.00444	20.72776	3.017725	9.99166	0.435772
Normal	Mean	123.04	98.16	42.6	60.48	2.8856
	SD	16.60944	10.63281	2.692582	15.0585	0.35671
t value		3.103436	4.077979	7.862845	4.29396	7.79185
P value		0.003203	0.000170	0.00001	0.00001	0.00001
		Significant	Significant	Significant	Significant	Significant

Total Cholesterol (TC), Serum Triglycerides (S.TG), High Density Lipoproteins (HDL–C), Low Density Lipoproteins (LDL-C)

Discussion

The atherogenicity of the combined dyslipidaemia seen with childhood obesity manifests in structural and functional vascular changes. The components of the dyslipidemia, including higher triglycerides, decreased HDL levels, and increased small, dense LDL particles, have been shown to be atherogenic and plays major role in development of cardiovascular disease.

The higher levels of TC, TG, LDL, and TC/HDL ratio and the decrease in HDL concentrations in Obese children in the present study are strongly correlated with previous studies.[6,7] Obese children had significantly higher total TG and lower high density lipoprotein and is frequently found in association with the metabolic syndrome, including increased central adiposity, increased insulin resistance, and elevated blood pressure correlating with our study.[8,9] Increased HDL-C and decreased LDL-C in females due to

oestrogen levels in pubertal girls. Our study showed a significant increase HDL-C and significant decrease in LDL C in normal group female children whereas considerable decrease in HDL-C and increase in LDL-C in Obese Female children.[10] The Total Cholesterol in male Obese children is increased when compared to the female Obese Children and Total Cholesterol in the Obese Children is significantly higher when compared to Normal Children in the Present study correlates with previous literatures.[11,12] Significant increase in TG, and Low HDL in Obese Children may increase in chances of future T2DM and CVD in these Obese Children.[13-15] The results in the present study showing higher frequency of dyslipidaemia in obese children than normal children which may leads to cardiovascular disease if not controlled were in agreement with previous literatures.[16,17]

Conclusion

The present study suggests that school children should take a balanced diet, try to avoid intake of fat rich food and increase their physical activity by playing outdoors to get rid of childhood obesity.

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Conflict Interest: Nil

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