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To Know the Correlation Between BMI to Dyslipidemia in Adolescent Population

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ABSTRACT

Aims & Objectives: To know the correlation of BMI to dyslipidemia (triglyceride, total cholesterol, High density lipoprotein cholesterol and Low density lipoprotein cholesterol). 150 patients were selected, in that 75 non obese and 75 obese adolescents were selected with respect to body mass index either in-patients or out-patients coming to Shalinitai Meghe institute of medical science and research centre, Nagpur. All the data analysis was done via Statistical packages for Social Sciences software. Frequency distribution and cross tabulation methods are used to prepare the tables. In the present study, out of 124 subjects who had hypertriglyceridemia, 49 were in the non obese and 75 were in the obese group. Out of 82 subjects who had abnormal LDL levels, majority of them were obese (91.5%) and remaining were non obese subjects (8.5%). Out of 65 subjects who had low HDL levels, majority of them were obese (70.8%) and remaining were non obese subjects (29.2%). Out of 8 subjects who had hypercholesterolemia, 5 were in the non-obese and 3 were in the obese group. Deranged lipid profile mainly high Low density lipoprotein and High density lipoprotein was more common in obese subjects. Increase in TG level was observed with increasing BMI.

KEY WORDS: SERUM LDL – SERUM LOW DENSITY LIPID, SERUM HDL – SERUM HIGH DENSITY LIPID , BMI – BODY MASS INDEX , TG – TRIGLYCERIDE.

INTRODUCTION

BMI is a tool that is commonly being used to classify overweight and obesity. It is measured with weight in kilograms divided by the square of height in meters. Obesity and overweight are the result of imbalance of calories in terms of few calories burnt for the amount of calories intake and are affected by various hereditary , lifestyle, and surrounding factors.1,2 In India, studies and reviews have demonstrated that there has been an increase in prevalence of increased LDL cholesterol, decreased HDL cholesterol and the metabolic syndrome in urban population.2 High BMI can lead to raised levels of Low Density Lipoprotein cholesterol, lower levels of High Density Lipoprotein cholesterol, and raised value of triglycerides, type II diabetes mellitus , heart disease, gallbladder disease, slipped capitate femoral epiphysis, obstructive sleep apnea, mental health disorders and an increased risk of death rate compared to those with a person having BMI. We found the need to study the correlation of BMI to associated morbidity as many pediatric patient attending OPD, getting admitted in wards found to be overweight and obese. Correlation of body-mass index (BMI) and other markers of obesity with dyslipidemia have not been well studied in this part of Central India. To know this correlation of obesity and overweight measured in term of body mass index to dyslipedimia, we planned this study.

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MATERIAL AND METHODS

This study included either in-patients or out-patients coming to Shalinitai Meghe Institute of Medical science and research centre, Nagpur. By using simple random method, 150 patients were selected, in that 75 non obese and 75 obese adolescents were selected with respect to body mass. Measurement of height and weight and calculating BMI from it, as per WHO recommendations and plotting on CDC chart. Overnight Fasting serum lipid profiles, total Cholesterol, High Density Lipoprotein-cholesterol and triglyceride measurements were performed by using standard enzymatic techniques. Low Density Lipoprotein - cholesterol was evaluated with formula of Friedewald et al.3 All the data analysis was performed using Statistical packages for Social Sciences software. Frequency distribution and cross tabulation methods were used. Categorical data was analysed using Pearson chi Square test whereas quantitative data was analysed using one way Analysis of variance and independent simple t test.

RESULTS

Result has been made on dividing into 2 groups obese (>=95th centile) and nonobese (<95th centile).

Table 1. Comparing distribution of abnormal total cholesterol between obese and non- obese groups

Total cholesterol		Group		Total	Person Chi square	P value
		Non obese	Obese			
≤200	N	70	72	142	0.582	0.467
	%	49.3%	50.7%	100.0%		
>200	N	5	3	8		
	%	62.5%	37.5%	100.0%		
Total	N	75	75	150		
	%	50.0%	50.0%	100.0%		

Table 2. Comparing distribution of patients as per Triglyceride levels

Triglyceride		Group		Total	Person Chi square	P value
		Non obese	Obese			
≤150	N	26	0	26	31.452	<0.001
	%	100.0%	0.0%	100.0%		
>150	N	49	75	124		
	%	39.5%	60.5%	100.0%		
Total	N	75	75	150		
	%	50.0%	50.0%	100.0%		

Table 3. Comparing patients distribution as per LDL between groups

LDL		Group		Total	Person Chi square	P value
		Non obese	Obese			
≤100	N	68	0	68	124.39	<0.001
	%	100.0%	0.0%	100.0%		
B >100	N	7	75	82		
	%	8.5%	91.5%	100.0%		
Total	N	75	75	150		
	%	50.0%	50.0%	100.0%		

In our study, out of 8 subjects who had hypercholesterolemia, 5 were in the non-obese and 3 were in the obese group. The distribution comparison using person chi square revealed a comparable distribution of TC with Person Chi square value of 0.582 and p value 0.467.

In our study, 124 subjects where hypertriglyceridemia was found, 49 within non obese and 75 within the obese group. The distribution comparison using person chi square revealed a comparable distribution of Triglyceride with Person Chi square value of 31.452 and p value <.001.That means triglyceride levels were markedly increased in obese subjects. Out of 82 subjects who had abnormal LDL levels, majority of them were obese (91.5%) and remaining were non obese subjects (8.5%). The distribution comparison using person chi square revealed a highly significant distribution of LDL with Person Chi square value of 124.39 and p value <0.001. That means LDL levels were markedly increased in obese subjects. Out of 65 subjects who had low HDL levels (<40 mg/dl), majority of them were obese (70.8%) and remaining were non obese subjects (29.2%). The distribution comparison using person chi square revealed a highly significant distribution of HDL with Person Chi square value of 32.839 and p value <0.001. That means HDL levels were markedly low in non-obese subjects.

Table 3. Comparing patients distribution as per LDL between groups

HDL		Group		Total	Person Chi square	P value
		Non obese	Obese			
<40	N	19	46	65	32.839	<0.001
	%	29.2%	70.8%	100.0%		
40-60	N	29	27	56		
	%	51.8%	48.2%	100.0%		
>60	N	27	2	29		
	%	93.1%	6.9%	100.0%		
Total	N	75	75	150		
	%	50.0%	50.0%	100.0%		

Chi square test, P value of <0.05 is considered as significant

DISCUSSION

Obsity affects an estimated 1 billion persons worldwide. In present study we tried to compare the demographic lipid parameters between obese and non obese adolescents as per BMI. Recent studies have shown changing trends with almost doubled incidence of obesity among children, adolescents and young adults.4,5,6 In present study we found that most of the obese adolescents 53.7 percents lie in late adolescent age group. Comparing the age distribution using the Pearson chi square test revealed similar age distribution between both the groups (Pearson Chi square=0.453, p=0.797). Comparing the mean age using one way ANOVA between both the groups, we found that mean age of both the groups was comparable (p=0.242). Majority of the obese adolescents were males (n = 43, 57.33 percentage) (Person Chi square=0.110, p=0.740). Using BMI cut obesity was more common among male (n=43) adolescents as compared to female (n=32). Contrary to present study, findings (Omotoye et al.,) reported that Body mass index was found raised in females than in males.

Abnormal lipid profile is recognized cause for CVD.8 Abnormal lipid profile (American academy of endocrinologist 2017) can be diagnosed as Hyper cholesterolemia (≥ 200 milli gram / decilitre), Hyper triglyceridemia (≥ 150 milli gram / decilitre), Reduced High Density Lipoprotein - Cholesterol (men ≤ 40 milli gram / decilitre ; women ≤ 50 milli gram / decilitre), Low Density Lipoprotein (≥100 milli gram / decilitre) is considered high. Previous studies have shown correlation between Body Mass Index and abnormal lipid profile.9 Abnormal lipid profile and increased body mass index is a risk factor for diabetes mellitus and CVD.9 In present study, out of 8 subjects who had hypercholesterolemia, 5 were in the non obese and 3 were in the obese group (p=0.467). Previous reports have shown an elevated TC levels in children's with10 or without family history of CVD.11 This high levels of Total Cholesterol levels in adolescents may be due to the obesity which starts in childhood. Moreover, its been seen that when many risk factors found in clusters, those are at an increased risk of CVD.

In present study out of 82 subjects who had abnormal LDL levels, majority of them were obese (91.5%) and remaining were non obese subjects (8.5%) (p<0.001). That means LDL levels were markedly increased in obese patients. Out of 65 subjects who had low HDL levels, majority of them were obese (70.8%) and remaining were non obese adolescents (29.5%) (p<0.001). That means HDL levels were found to be low in obese patients. Omotoye et al. conducted the study to know effect of Body mass index on serum lipid profile in diabetes mellitus patients and found that Body mass index increases Low density lipoprotein, total cholesterol, and triglyceride levels. Our study results are similar to the Bayram et al report.14 which showed that abnormal lipid profile increased with Body mass index. The abnormal lipid profile in obese is likely a consequence of peripheral resistance to insulin. Similar results were revealed in the

present study. Another case control study of adolescents done by Gilles Plourde on Caucasian adolescents also revealed that overall abnormal glucose and lipid profile were significantly associated with obesity.

CONCLUSION

Obesity prevalence increases as the adolescence age group rises and was found to be more prevalent in male subjects. Deranged lipid profile mainly high LDL and low HDL was more common in obese subjects. Increase in TG level was observed with increasing BMI. To conclude, we found abnormal lipid profile among obese adolescents.

REFERENCES

A.J. Garber, M.J. Abrahamson, J.J. Barzilay, L. Blonde, Z.T. Bloomgarden, M.A. Bush, et al ((2018)). Consensus Statement By The American Association Of Clinical Endocrinologists And American College Of Endocrinology On The Comprehensive Type 2 Diabetes Management Algorithm-2018 Executive Summary Endocr Pract, 24, Pp. 91-120

Bajaj JS (2002). Cellular And Molecular Biology Of Adiposity And Adipogenesis, Chapter 68 In Medicine Update, Ed. S.B. Gupta, India: Vol.12, 459 Pp.

Bayram F, D Kocer, K Gundogan, A Kaya, O Demir, R Coskun, et al (2014). Prevalence Of Dyslipidemia And Associated Risk Factors In Turkish Adults. J Clin Lipidol, 8(2), 206–16.

Berenson GS, Srinivisan SR, Bao W, Newman WP, Tracy RE, Wattingney WA (1998). Association Between Multiple Cardiovascular Risk Factors And Atherosclerosis In Children And Young Adults. The Bogalusa Heart Study. N Engl J Med; 338 (23): 1650-6.

Burstein M, Scholnic HR, Morfin R (1970). Rapid Method For The Isolation Of Lipoproteins From Human Serum By Precipitation With Polyanions. J Lipid Res;11(6):583-95.

Hubert Hb, Feinleib M., Mcnamara Pm, Castelli Wp (1983). "Obesity As An Independent Risk Factor For Cardiovascular Disease: A 26 Year Follows Up Of Participants In The Framingham Heart Study: Circulation; 67:968-977pp.

Kalra S, Unnikrishnan AG (2012). Obesity In India: The Weight Of The Nation.J Medic Nutri Nutra;1(1):37.

Kayode JA, AO Sola, AS Matthew, BO Adesola, I Ademola, AT Adedeji And As Adelani (1983). Lipid Profile Of Type 2 Diabetic Patients At A Rural Tertiary Hospital In Nigeria. Journal Of Diabetes And Endocrinology, 1(4), 2010, 46-51.

Mendes GA, Martinez TI, Izar MC, Amâncio OM, Novo NF, Matheus SS et al (2006). Perfillipídico E Efeitos Da Orientação Nutricionalem Adolescentes Com História Familiar De Doença Arterial Coronariana Prematura. Arq Bras Cardiol; 86 (5): 361-5.

Omotoye FE, Fadupin GT (2016). Effect Of Body Mass Index On Lipid Profile Of Type 2 Diabetic Patients At An Urban Tertiary Hospital In Nigeria. Journal Of Dental And Medical Sciences. Volume 15, Issue 9 Ver. Viii Pp 65-70.

Omotoye FE, Fadupin GT (2016). Effect Of Body Mass Index On Lipid Profile Of Type 2 Diabetic Patients At An Urban Tertiary Hospital In Nigeria. Journal Of Dental And Medical Sciences. Volume 15, Issue 9 Ver. Viii, Pp 65-70.

Pomerleau J, Mckee M, Lobstein T, Knai C (2003). The Burden Of Disease Attributable To Nutrition In Europe. Public Health Nut;(6): 453-61.

Romaldini CC, Issler H, Cardoso Al, Diament J, Forti N (2004). Fatores De Risco Para Ateroscleroseemcrianças E Adolescentes Com História Familiar De Doença Arterial Coronarianaprematura. J Pediatr; 80 (2): 135-40.

Sandhu HS, S Koley And KS Sandhu (2008). A Study Of Correlation Between Lipid Profile And Body Mass Index (Bmi) In Patients With Diabetes Mellitus. J. Hum. Ecol. 24(3), 227-229.

Strauss RS (2002). Childhood Obesity. Pedi Clin North Am; 49(1): 175-201.

Strauss RS (2002). Childhood Obesity. Pedi Clin North Am; 49(1): 175-201.