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ASSOCIATION BETWEEN BODY MASS INDEX AND LIPID PROFILE AMONG PATIENTS ATTENDING A RURAL HOSPITAL.

Physiology

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ABSTRACT

Background: Obesity has become much prevalent now and is an important risk factor for dyslipidemia. Body mass index (BMI) is associated with serum cholesterol, triglycerides and lipoproteins. **Objectives:** This study was conducted to determine the association between body mass index and lipid profile. **Methods:** Data regarding body mass index and lipid profile of 100 patients attending the medicine department of a rural hospital was collected. The same was analysed in SPSS version 20. One way ANOVA was applied to determine the association of Total Cholesterol, triglycerides, HDL, LDL and VLDL with body mass index. Pearson's correlation coefficient was also calculated. **Results:** The mean age, BMI, total cholesterol, triglycerides, LDL, HDL and VLDL levels were 54.6 ± 12.6 years, 24.2 ± 3.8 kg/m2, 176.5 ± 33.2 mg/dl, 139.6 ± 45.7 mg/dl, 105.1 ± 35.3 mg/dl, 35.1 ± 9.3 mg/dl and 29.7 ± 10.7 mg/dl respectively. Among the lipid profile parameters, only the cholesterol and HDL was significantly associated with BMI. The mean total cholesterol levels increased (p=0.028) and mean HDL levels decreased (p=0.014) significantly with increasing BMI. Also, a significant positive correlation of BMI with total cholesterol (r=0.324, p=0.026) and a significant negative correlation of BMI with HDL (r=-0.254, p=0.031) was observed. **Conclusion:** Body mass index is significantly associated with lipid profile with obese subjects showing the highest mean total cholesterol and lowest mean HDL values. Total cholesterol is positively correlated with HDL and shows negative correlation with BMI.

KEYWORDS

Body mass index, cholesterol, triglycerides, correlation

INTRODUCTION

With the modernization and changes in lifestyles, obesity has become an emerging health issue nowadays. Body mass index and waist-hip ratio are frequently used for measuring obesity. High body mass index has been reported to be affect the wellbeing of individuals. [1] It is associated with many non-communicable diseases like cardiovascular diseases, diabetes mellitus, dyslipidemia, cancers, etc. [2-5]

Body mass index is the most widely used indicator of obesity. A high BMI value of more than 25 kg/m^2 is considered to be a risk factor for many non-communicable diseases and values above 30 kg/m^2 is associated with higher mortality. [6] Elevated total cholesterol, triglycerides and LDL or reduced HDL levels in youth and adulthood is associated with cardiac events like acute myocardial infarction later in life. [7]

Evidence is growing about the high body mass index as a major risk factor for deranged lipid profile. [3,8-11] This study was conducted to determine the association and correlation between body mass index and lipid profile among patients attending the rural hospital of Haryana.

METHODS

The study was conducted among 100 patients attending the medicine department of MMIMSR, Haryana. All the individuals who participated in the study gave informed consent. Data about socio-demographic profile was obtained and the height and weight of the respondents were measured.

Body mass index was calculated and on the basis of BMI classification for Asian Indians, subjects were categorized into 4 categories – underweight (BMI<18.0 kg/m^2), normal (BMI=18.0-22.9 kg/m^2), overweight (BMI=23.0-24.9 kg/m^2) and obese (BMI≥25 kg/m^2). [12]

After recording history and body measurements, all the respondents were asked to provide a blood sample for lipid profile if they were fasting. In case of non-fasting, they were asked to provide a fasting blood sample the next day. The results for total cholesterol, triglycerides, HDL, LDL and VLDL were obtained.

The data collected was entered into Microsoft Excel and analysed in SPSS version 20. Pearson's correlation coefficient was used to determine any correlation between body mass index and lipid profile parameters.

Ethical approval for conducting the study was obtained from the institutional ethics committee.

RESULTS

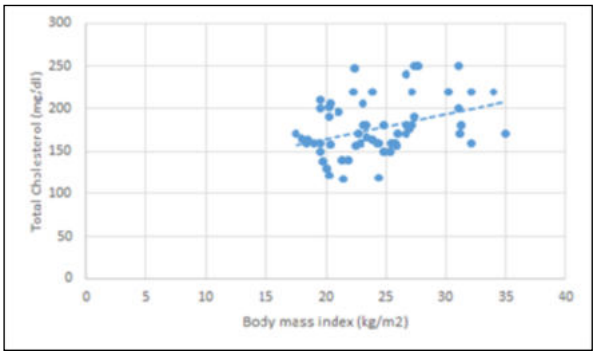
Out of 100 subjects, 58 were males and 42 were females. The subjects were aged between 35 and 85 years with a mean age of 54.6 ± 12.6 years and their mean BMI was 24.2 ± 3.8 kg/m^2. The mean total cholesterol, triglycerides, LDL, HDL and VLDL levels were 176.5 ± 33.2 mg/dl, 139.6 ± 45.7 mg/dl, 105.1 ± 35.3 mg/dl, 35.1 ± 9.3 mg/dl and 29.7 ± 10.7 mg/dl respectively.

Table 1 shows that mean total cholesterol levels increased significantly and mean HDL decreased significantly with increasing BMI. However, we could not find any significant association of BMI with triglycerides, LDL and VLDL.

Table 1: Mean Lipid Profile Parameters According To Body Mass Index

	Body mass index (kg/m^2)				p value
	<18.0 (n=4)	18.0-22.9 (n=38)	23.0-24.9 (n=22)	≥25 (n=36)	
TC (mg/dl)	164.8 ± 4.1	168.3 ± 35.6	171.5 ± 26.4	189.6 ± 32.8	0.028
TG (mg/dl)	131.0 ± 18.8	138.2 ± 46.7	136.4 ± 33.8	144.1 ± 53.3	0.893
LDL (mg/dl)	100.3 ± 25.5	106.4 ± 3.9	107.0 ± 38.5	105.9 ± 39.3	0.911
HDL (mg/dl)	43.8 ± 7.5	37.8 ± 8.8	33.0 ± 10.2	32.6 ± 8.4	0.014
VLDL (mg/dl)	25.9 ± 7.2	30.8 ± 13.6	26.2 ± 7.0	31.0 ± 9.1	0.278

Table 2 and Figure 1 depict a significant positive correlation of BMI with total cholesterol (r=0.324, p=0.026) and a significant negative correlation of BMI with HDL (r=-0.254, p=0.031). However, no correlation was observed between BMI and other lipid profile parameters.



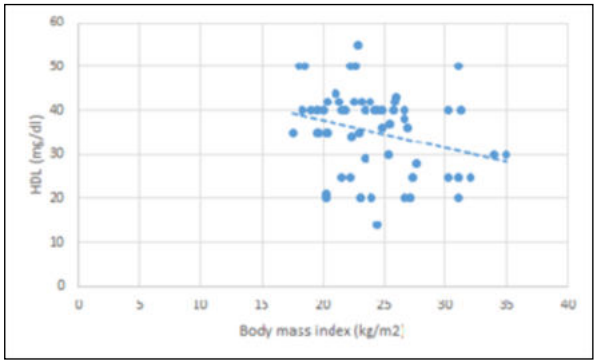


Figure 1: Scatter Diagram Showing Correlation Of Body Mass Index With Total Cholesterol And HDL

Table 2: Correlation Between Lipid Profile Parameters And Body Mass Index

BMI	TC	TG	LDL	HDL	VLDL
Pearson Correlation (r)	0.324	0.072	-0.065	-0.254	0.149
p value	0.026	0.478	0.520	0.031	0.140

DISCUSSION

Obesity is nowadays considered one of the major health problems globally. It is an important non-communicable disease and is itself a risk factor for other non-communicable diseases like cardiovascular diseases, diabetes, dyslipidaemia etc. [2-4] Body mass index is used as a simple measurement of obesity. This hospital-based study was designed to determine the association and correlation of BMI with lipid profile among patients attending the hospital.

We observed an increase in the mean total cholesterol, triglycerides, LDL and VLDL values and decrease in mean HDL values with increasing BMI of the subjects. However, only total cholesterol increased significantly (p=0.028) and HDL levels reduced significantly (p=0.014) with the increase in the BMI of the respondents.

Many studies have reported a significant association between body mass index and lipid profile. Mallick AK et al [13] in their study reported findings similar to our study with significantly increasing mean cholesterol and decreasing mean HDL levels across normal to obese individuals. However, they also reported a significant increase in triglyceride levels with increasing BMI in contrast to our study.

Shamai L et al [11] reported no significant association between total cholesterol and BMI which may be due to categorization into BMI<30kg/m2 and BMI>30 kg/m2. However, they reported significantly lower mean HDL levels in subjects with BMI>30 kg/m2 compared to BMI<30kg/m2. Archana et al [9] also found higher mean total cholesterol, triglycerides, LDL and VLDL levels and lower mean HDL level in subjects with BMI above 25 kg/m2 compared to those below 25 kg/m2.

In our study, we observed a significant positive and negative correlation of BMI with total cholesterol and HDL respectively. Similar findings have been reported in many studies. Humaera Z et al [10] and Cugneto ML et al [14] in their studies reported a significant positive correlation of BMI with total cholesterol, triglyceride and LDL and a significant negative correlation with HDL. Mallick AK et al [13] observed a significant positive correlation of BMI with total cholesterol and triglyceride and a significant negative correlation with HDL although no correlation of BMI with LDL was reported. On the contrary, Bansal P et al [15] could not find any significant correlation between BMI and any of the five lipid profile parameters.

CONCLUSION

The lipid profile is significantly associated with BMI and is most deranged among obese individuals. HDL shows an inverse relationship with BMI and obese subjects show the lowest mean HDL values.

Conflict Of Interest: None.

REFERENCES

1. Brown WJ, Mishra G, Kenardy J, Dobson A. Relationships between body mass index and well-being in young Australian women. Int J Obes Relat Metab Disord. 2000;24(10):1360-8.
2. Santi-Canoo MJ. Obesity and Cardiovascular Risk Factors. Obes Control Ther 2014;1(1):1-9.
3. Rana G, Kafle D, Adhikari P, Sharma A, Sharma D.The global problem: Obesity and dyslipidemia. Int. Res J Pharm App Sci 2013;3(5):69-73.
4. Wild SH, Byrne CD. ABC of obesity. Risk factors for diabetes and coronary heart disease. BMJ. 2006;333(7576):1009-11.
5. De Pergola G, Silvestris F. Obesity as a major risk factor for cancer. J Obes. 2013;2013:291546.
6. Chehrei A, Sadrnia S, Keshteli AH, Daneshmand MA, Rezaei J. Correlation of dyslipidemia with waist to height ratio, waist circumference, and body mass index in Iranian adults. Asia Pac J Clin Nutr.2007;16(2):248-53.
7. Grundy SM, Bazzarre T, Cleeman J, D'Agostino RB, Hill M, Houston–Miller N, et al. Beyond secondary prevention: Identifying the high-risk patient for primary prevention. Medical office assessment. Circulation 2000:101:e3–e11.
8. Denke MA, Sempos CT, Grundy SM. Excess body weight. An under-recognized contributor to dyslipidemia in white American women. Arch Intern Med 1994;154:401–10.
9. Archana, Agarwal V, Ahmad N, Gupta A. Study of body mass index (BMI) and serum lipid profile of patients at a tertiary hospital: a cross sectional study. Int J Res Med Sci 2018;6:2060-2.
10. Humaera Z, Sukandar H, Rachmayati S, Sofiatin Y, Roesli RMA. Body Mass Index Correlates With Lipid Profile In Jatinangor Population. Journal of Hypertension 2017;35(e-Suppl 3):e10
11. Shamai L, Lurix E, Shen M, Novaro GM, Szomstein S, Rosenthal R, et al Association of Body Mass Index and Lipid Profiles: Evaluation of a Broad Spectrum of Body Mass Index Patients Including the Morbidly Obese. Obes Surg 2011;21:42-7
12. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, et al. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. J Assoc Physicians India 2009;57:163-70.
13. Mallick A. K, Ahsan M, Das B, Rai S. A correlation study of lipid profile with body mass index and waist hip ratio in Rohilkhand region. Int J Med Res Rev 2018;6 (03):186-91.
14. Cugnetto ML, Saab PG, Llabre MM, Goldberg R, McCalla JR, Schneiderman N. Lifestyle Factors, Body Mass Index, and Lipid Profile in Adolescents. Journal of Pediatric Psychology 2008;33(7):761–71.
15. Bansal P, Upadhyay HP, Jha R. Correlation Between Body Mass Index and Lipid Profile in a Diabetic Population of Central Nepal. JCMS Nepal. 2018;14(4):184-8.