

Lipid profile in Obesity among an adult caste population (Paundra Kshatriya) living in a peri-urban setting, West Bengal, India

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ABSTRACT

Background and objectives: Association of obesity with elevated blood lipids is well documented in many studies. Obesity in general considered as an important risk factor for cardiovascular disease. This study examines obesity and lipids in an adult peri-urban caste population namely the Paundra Kshatriya of Sonarpur, South 24 Parganas, West Bengal.

Material and Methods: Altogether 240 adults Paundra Kshatriya (male:98; female: 142) were examined. Male and female samples were further divided into two groups, namely obese (male: 29; female: 61) and non-obese (male:69; female: 81). Following BMI classification for Asia-Pacific (WHO 2000) individuals with BMI value of 25 or above was considered as obese and individuals with BMI value below 25 was considered as non-obese. Twelve hours fasting blood was analyzed by Semi Auto Analyser, Minitechno, derived by Logotec India Pvt. Ltd.

Results: In case of LDL cholesterol (mg/dl)/ HDL cholesterol (mg/dl), TC (total cholesterol)/HDL, TG (triglyceride)/HDL and VLDL/HDL ratio, the obese individuals show more values than that of the non-obese in males while, among females a reverse trend is perceptible. In both the genders, total lipids (mg/dl) are considerably higher among the obese individuals than that of the non-obese (males: non-obese = 632.33±115.71 mg/dl, obese = 657.30±123.49 mg/dl; females: non-obese = 621.89±106.39 mg/dl, obese = 657.84±111.68 mg/dl).

Conclusion: High levels of cholesterol and triglycerides among the obese than that of the non-obese have been reported by many studies in different parts of the globe. In the studied population in both the genders total lipids is comparatively higher among obese than the non-obese. Residing place of the Paundra Kshatriya i.e., Sonarpur of 24-Parganas district, West Bengal is well connected by bus as well as rail with the nearby city Kolkata. This population is undergoing changes in their lifestyle and dietary

pattern due to close contact of urban centre, Kolkata. This may have indirect effect on obesity and high level of lipids among them.

Keywords: *Triglycerides (mg/dl), Cholesterol (mg/dl), Lipids. Peri-urban population. Paundra Kshatriya. West Bengal.*

INTRODUCTION

Obesity is independently associated with the risks for coronary heart disease, atrial fibrillation, and heart failure; obesity can also exacerbate cardiovascular disease through a variety of mechanisms including systemic inflammation, hypercoagulability, and activation of the sympathetic and renin angiotensin systems (Zalesin et al. 2008). Obesity is quite simply the result of calorie intake in excess of necessary adequate bodily requirements, which usually begins in childhood or adolescence and the longer it is allowed to persist the less likely it can be controlled. It is important that obesity is not necessarily the result of over consumption of not only fat but also it can result from excess calorie intake from any source whether carbohydrates or proteins (Bhatti et al. 2001).

Obesity is associated with social and medical risks that especially make it a problem in day-to-day survivals (Kannel 1987). Role of obesity in prediction of cardiovascular disease has been the subject of long-standing debate (Bhatti et al. 2001). Framingham study (1986) found that weight gain leads to rise in atherogenic trait and weight loss to decline. According to Truswell (1985) obesity increased the risk of coronary artery disease 35% more than in non-obese subjects. Association of obesity with elevated blood lipids and lipoproteins was well-documented (Garden and Castelli 1977). The present study examines obesity and lipids in an adult peri-urban caste population namely the Paundra Kshatriya of South 24 Parganas, West Bengal, India.

MATERIAL AND METHODS

Subjects were chosen following cross-sectional method among unrelated (from different lineage, biologically different) adult individuals belong to the Paundra Kshatriya caste of Sonarpur area of South 24-Parganas district, West Bengal, India. Altogether 240 adults (male: 98; female: 142) were examined. Male and female samples were further divided into two groups, namely obese (male: 29; female: 61) and non-obese (male: 69; female: 81). Body mass index (BMI) was calculated by dividing body weight (kg) by body height in square meter. Anthropometric measurements were taken following Weiner and Lourie (1969). In the present

study BMI classification for Asia Pacific (WHO 2000) was followed. Following this classification individuals with BMI value of 25 or above were considered as obese and individuals with BMI value below 25 were considered as non-obese. Blood samples were collected from the subjects who were prior to 12 hours fasting. The blood samples were transported soon after collection and analyzed in the laboratory of Anthropological Survey of India, Kolkata. Analysis was done by Semi Auto Analyzer, Minitechno, derived by Logotech India Pvt. Ltd. Approval from Anthropological Survey of India Ethics Committee was obtained. All participants were enrolled after obtaining written informed consent.

The Paundra Kshatriya or Pod (caste) forms the largest segment of the heterogenous population in the studied area. They are considered as disadvantaged population in terms of overall socio-economic development. The community is a combination of landowning and landless people (Singh 2008). Paundra Kshatriya residing in this area is largely dependent on various kinds of self-engaged occupation for their subsistence economy.

RESULTS

Means of age, BMI and lipids were shown in Table 1. Mean serum cholesterol in non-obese males was 197.84 ± 47.53 mg/dl, while in obese males was 204.06 ± 45.65 mg/dl. Side by side, the same in non-obese females was 194.26 ± 43.27 mg/dl and in obese females was 210.70 ± 43.68 mg/dl. Like serum cholesterol, LDL cholesterol was also more in obese males and females than that of non-obese males and females (males: non-obese = 106.41 ± 22.63 mg/dl, obese = 112.36 ± 28.79 mg/dl; females: non-obese = 105.70 ± 26.66 mg/dl, obese = 109.63 ± 24.76 mg/dl). However, a reverse trend was perceptible in case of HDL cholesterol. Both males and females showed more values in non-obese individuals than that of obese individuals in this category (males: non-obese = 47.20 ± 12.40 mg/dl, obese = 45.28 ± 14.50 mg/dl; females: non-obese = 48.15 ± 13.16 mg/dl, obese = 46.62 ± 11.55 mg/dl). Though serum triglyceride was more in obese males (131.97 ± 46.66 mg/dl) than that of the non-obese males (120.92 ± 40.28 mg/dl) it was more in non-obese females (118.61 ± 41.09 mg/dl) than that of the obese females (105.53 ± 26.08 mg/dl). Like serum triglyceride, VLDL also showed a similar trend.

In case of LDL/HDL, TC/HDL, TG/HDL and VLDL/HDL ratio, the obese individuals showed more values than that of the non-obese in males. However, among females a reverse

trend was perceptible in case of these ratios. However, total lipids was considerably higher among the obese individuals than that of the non-obese. This was true for both the genders (males: non-obese = 632.33 ± 115.71 mg/dl, obese = 657.30 ± 123.49 mg/dl; females: non-obese = 621.89 ± 106.39 mg/dl, obese = 657.84 ± 111.68 mg/dl). On application of t-test it was found that there exists statically significant difference between non-obese and obese females in terms of serum cholesterol ($t=2.23$) and serum triglyceride ($t=2.31$).

Table 1: Mean and SD values of age, BMI and lipids

Variables	Male (n=98)					Female (n=142)				
	Non-obese (n=69)		Obese (n=29)		t value	Non-obese (n=81)		Obese (n=61)		t value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Age	47.62	± 15.52	46.10	± 11.74	-	38.16	± 12.23	38.82	± 11.50	-
BMI	21.39	± 2.59	27.05	± 1.73	-	21.31	± 2.42	27.88	± 2.63	-
Serum cholesterol (TC) (mg/dl)	197.84	± 47.53	204.06	± 45.65	0.61	194.26	± 43.27	210.70	± 43.68	2.23*
Serum triglyceride (TG) (mg/dl)	120.92	± 40.28	131.97	± 46.66	1.11	118.61	± 41.09	105.53	± 26.08	2.31*
LDL cholesterol (mg/dl)	106.41	± 22.63	112.36	± 28.79	0.99	105.70	± 26.66	109.63	± 24.76	0.91
HDL cholesterol (mg/dl)	47.20	± 12.40	45.28	± 14.50	0.62	48.15	± 13.16	46.62	± 11.55	0.74
VLDL cholesterol (mg/dl)	24.18	± 8.41	26.87	± 11.58	1.13	25.53	± 7.84	23.12	± 8.56	1.72
Total lipids (mg/dl)	632.33	± 115.71	657.30	± 123.49	0.93	621.89	± 106.39	657.84	± 111.68	1.97
LDL/HDL ratio	2.38	± 0.60	2.63	± 0.86	-	2.29	± 0.62	2.11	± 0.64	-
TC/HDL ratio	4.38	± 1.24	4.63	± 1.73	-	4.30	± 1.34	4.27	± 1.44	-
TG/HDL ratio	2.72	± 1.06	3.18	± 1.48	-	2.68	± 1.28	2.38	± 1.06	-
VLDL/HDL ratio	0.55	± 0.22	0.66	± 0.36	-	0.53	± 0.24	0.47	± 0.22	-

*Significant at $p < 0.05$

DISCUSSION

Obesity could be considered as one of the prime rationales for elevated blood pressure, blood lipids and blood glucose levels. This also increases the risk of coronary heart disease in obese persons (Kennel 1987). Among the lipid components considerable stress has been made on estimation of total cholesterol, HDL and triglycerides, however other components like total

lipids, LDL and VLDL have also been a point of interest for many researchers (Bhatti et al. 2001).

This study examines the effect of obesity on various lipid components among a peri-urban population namely the Paundra Kshatriya of West Bengal. Means of total lipids depicts a much higher level in obese persons compared to non-obese. This is true for both the genders of the study population. This corroborates with the findings of Garden and Castelli (1977) and Bhatti et al. (2011).

High levels of cholesterol and triglycerides have been reported in obese persons by Framingham (1986) and Bhatti et al. (2011). Side by side, HDL estimation showed decreased level and LDL estimation showed increased levels among the obese in many study [Framingham (1986), Bhatti et al. (2011) and many others]. However, present study shows no uniform trend with above-mentioned studies. In case of LDL/HDL, TC/HDL, TG/HDL and VLDL/HDL ratios the obese males show more values than the non-obese, whereas a reverse trend is perceptible in case of the females in this respect. Thus, no definite trend is discerned in case of these ratios.

Bhatti et al. (2011) are of the opinion that increased lipid level may contribute its role towards atherosclerosis indirectly having connection with coronary heart disease. There might be various reasons for findings higher levels of total lipids and lipoproteins in obese persons. The obese subjects seem of having the habit of overeating and less consumption of proper balanced diet enriched with all nutrients and calories and also have sluggish pattern of life. It is interesting point to note down in the studied population, Paundra Kshatriya residing in Sonarpur of 24-Parganas district, West Bengal. This place is well connected by bus as well as rail with the nearby city Kolkata. This population is undergoing changes in their lifestyle and dietary pattern due to close contact of urban centre, Kolkata. This may have indirect effect on obesity and high level of lipids among them.

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