

Comparison of High Sensitivity C-Reactive Protein Level Between Obese and Non-Obese Pregnant Women

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ABSTRACT

Objective: To find out whether obesity is associated with low grade systemic inflammation as measured by serum c-reactive proteins (CRP) levels.

Study Design: Cooperative Observational Study

Place and Duration of Study: This was conducted in the department of Physiology BMSI, JPMC with the collaboration of gynecology & obstetric department of JPMC Karachi from October 2008 to May 2009.

Materials and Methods: This study includes thirty obese pregnant women and thirty normal weight pregnant women as a control group of similar age, sex, height and gestational age. Subjects were randomly selected from gynae OPD of JPMC Karachi.

Results: The mean values of C – reactive protein concentration was higher in obese pregnant women as compared with control group (4.3 ± 0.16 mg/L vs 9.0 ± 12 mg/L). It showed statistically significant positive correlation with body mass index (BMI).

Conclusion: Higher BMI was associated with higher C-Reactive proteins concentration. These findings suggest a state of low-grade systemic inflammation in obese pregnant women.

Key Words: Obesity, C-reactive proteins, Pregnancy, Adipose tissue, Inflammation.

INTRODUCTION

Adipose tissues primarily was considered a reservoir for excess calories that were stored in the adipocyte as triglycerides, in times of caloric deprivation these stored lipids were mobilized as free fatty acids. It is now clear that in humans the expansion of adipose tissues seen in the obesity results in more blood vessels and more connective tissue fibroblast and especially more macrophages. There is an enhancement in the secretion of some interleukins and inflammatory cytokines in adipose tissue of obese which produce inflammation¹. Among the recently discovered compound expressed in human adipose tissue is the pro-inflammatory cytokine interleukin 6 (IL6)^{2,3}. Moreover, IL -6 produce in the adipose tissue of healthy humans is released in to the circulation⁴. Because of the inflammatory properties of IL – 6, including the stimulation of acute phase protein production in the liver^{5,6}, the release of IL - 6 from adipose tissue may induce low - grade systemic inflammation in persons with excess body fat.

A sensitive marker for systemic inflammation is acute phase C - reactive protein (CRP). Elevated C-reactive protein concentration was shown to predict future risk of coronary heart disease⁷. The purpose of present study was to find out whether obesity is associated with low-grade systemic inflammation as measured by C - reactive protein.

MATERIALS AND METHODS

This study was carried out in department of Physiology, basic medical science institute, Jinnah post graduate medical centre, Karachi. This was a cooperative and observational study performed during the period of October 2008 to May 2009. Patients were selected for the study with the collaboration of gynae/ obs: department JPMC Karachi. A total number of 60 subjects in the age range of 20 – 40 years and gestational age was third trimester were included in the study. Subjects were divided into two groups: A - non obese pregnant women (n = 30) and B - obese pregnant women, (n = 30).

Venous blood of 5ml was drawn under all aseptic measures then transferred to a gel centrifuge tube. After 30-60 minutes the blood was centrifuge for 5-10 minutes at a speed of 2500-3000 rpm. Serum obtained was transferred to clean and dry plastic cups, then cups were properly covered and stored at -50°C till analyzed. Before analyzing serum was thawed and allowed to attain room temperature. Weight and height of all subjects were measured in kilograms and centimeters respectively, using weighing with height - scale machine (MIC health scale machine made in china) height in centimeter was converted into meters for calculation of body mass index (BMI). BMI was calculated by applying following formula

Body mass index = $\frac{\text{weight in kilograms}}{(\text{Height in meter})^2}$

Serum C - reactive protein was estimated by enzyme linked immunosorbant assay (ELISA) using kit – Cat No. BC – 1119 manufactured by Biocheck, Inc USA. Data was analyzed on SPSS version to mean and standard divisions (SD) were used to describe the numeric variables like age and inflammatory markers. Person's co-relation co-efficient (r) values were calculated to check the linear co-relation between C-Reactive proteins and BMI. Only P-value (<0.05) are considered Significant. P-value (<0.001) are considered highly significant.

RESULTS

The mean weight in obese was 75.1 ± 0.44 percent, while in control it was 57.9 ± 0.40 percent. Mean BMI in obese was 31.4 ± 0.15 , while in control it was 24.2 ± 0.11 . The mean C-Reactive proteins level in obese was 9.0 ± 0.12 percent, while in control it was 4.3 ± 0.16 percent.

Table No.1: Comparison of the Age and Gestational Age Between Group A And Group B

Parameter	Group A Normal weight pregnant women (n=30)	Group B Obese pregnant women (n=30)	P-Value
Age	22.6 ± 0.29	22.6 ± 0.26	0.405
Gestational Age	31.2 ± 0.18	31.2 ± 0.18	1.00

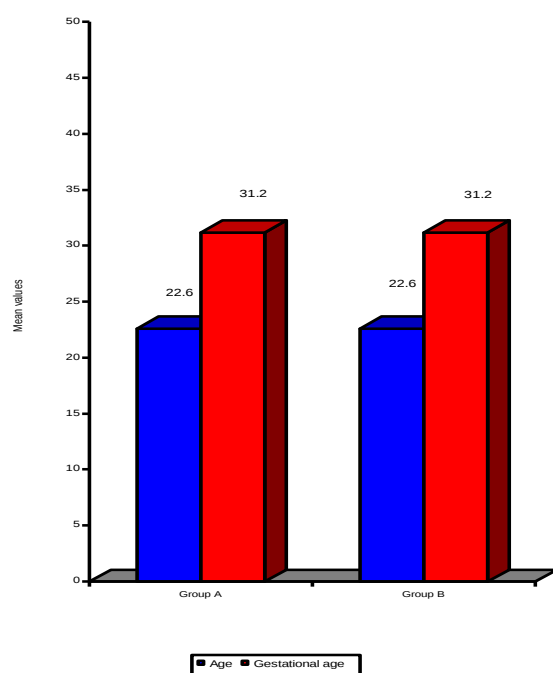


Table No.2: Comparison of the Height Weight and Body Mass Index Between Group A and Group B

Parameter	Group A Normal Weight Pregnant Women	Group B Obese Pregnant Women	P-Value
Height (m)	1.5 ± 0.01	1.50 ± 0.02	0.62
Weight (Kg)	57.9 ± 0.40	75.1 ± 0.44	0.001
BMI (kg/m ²)	24.2 ± 0.11	31.4 ± 0.15	0.001

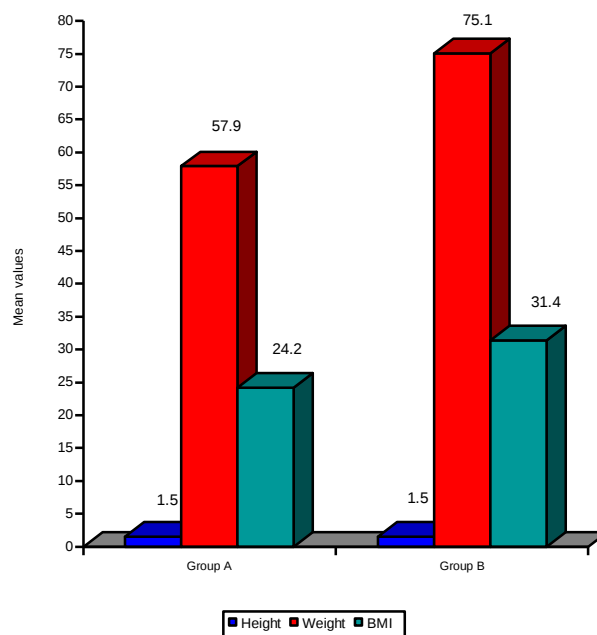


Table No.3: Comparison of the C - Reactive Protein between Group A and Group B

Parameter	Group A Normal Weight Pregnant Women (n=30)	Group B Obese Pregnant Women (n=30)	P- Value
C - reactive protein	4.3 ± 0.16	9.0 ± 0.12	0.001

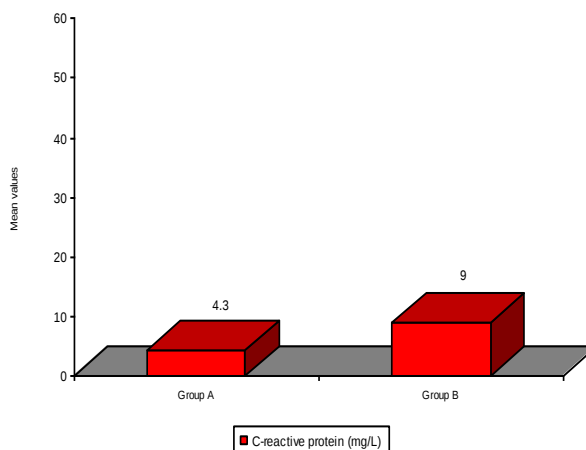


Table No.4: Correlation Coefficient of Serum C - Reactive Protein Versus BMI

Parameter	Group A	Group B	P-Value
Serum CRP versus BMI	0.39	0.42**	0.001

DISCUSSION

Koenig et al⁷, Mendall et al⁸, and Tracy et al⁹ studied in middle aged and elderly persons have reported a positive association between BMI and CRP concentration. In present study we demonstrate that maternal serum CRP levels were higher in obese pregnant women than non-obese pregnant women in the third trimester of pregnancy. However the association may have been confound by diseases like Diabetes Mellitus and Cardio Vascular disease, as these prevalent diseases are associated with obesity and increased CRP concentration^{10,11}. A higher prevalence of low grade systemic inflammation was observed in obese pregnant women compared with normal weight pregnant women. Marjolein et al¹² observed that higher body mass index is associated with higher C-Reactive protein concentration that could not be explained by inflammatory disease or other factor known to increase C-Reactive protein concentration. The data of above study suggest that state of low grade systemic inflammation is present in over weight and obese persons. The results of our study are similar to this study. Verhaeghe et al¹³ has been recently reported that plasma concentration of C-Reactive protein measured in gravidas, measured at 24-29 weeks, of gestational age were strongly related to body mass index. The results of our study are in agreement with this study. In the study of Rexrode et al¹⁴ that body mass index was the strongest predictor of elevated inflammatory markers. The associations with BMI were dramatic. Women in the highest BMI quartile (BMI=28.9kg/m²) have more their twelve fold increase risk of having elevated CRP levels. Our results are in total agreement with this study.

CONCLUSION

The result of our study shows that higher BMI is associated with higher C - reactive protein levels that could not be explained by inflammatory disease or other factor or disease known to increase C - reactive protein concentrations.

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