

**ORIGINAL ARTICLE****Evaluation of C Reactive protein levels among patients with type 2 diabetes**

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**ABSTRACT:**

**Background:**The present study was conducted for evaluating C Reactive protein levels among patients with type 2 diabetes. **Materials & methods:**A total of 100 patients with presence of type 2 diabetes were enrolled. Pregnant women were excluded from this study. Another set of 100 healthy subjects were enrolled as control group. 5 ml of fasting venous blood was collected from the medial cubital vein using vacutainer and needle from each of the subjects and shared equally into a Sodium fluoride Potassium Oxalate container and Plain container. Enzyme Linked Immunosorbent Assay was used in determining the level of C reactive protein in the serum. Data was collected using self-administered semi structure questionnaire. All the results were analyzed using SPSS software. **Results:**A total of 100 diabetic patients and 100 healthy controls were evaluated. Mean age of the diabetic patients and healthy controls was 45.3 years and 41.8 years respectively. Majority proportion of patients of both diabetic group and control group were males. Mean CRP levels among diabetic subjects and controls was 56.23 ng/ml and 3.9 ng/ml respectively. Significant results were obtained while comparing the CRP levels among diabetic group and control group. **Conclusion:**Serum C-reactive proteins are enhanced in diabetic subjects in comparison to healthy controls.

**Key words:** C Reactive proteins, Diabetes

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**INTRODUCTION**

Type 2 diabetes is an inflammatory atherothrombotic condition associated with a high prevalence of cardiovascular disease. In patients with type 2 diabetes, low grade inflammation is reflected by increased plasma levels of several biomarkers of inflammation such as C-reactive protein (CRP). Small increases in CRP predict the likelihood of developing cardiovascular events both in diabetic and nondiabetic populations. In addition, in apparently healthy subjects, increased levels of CRP predict the risk of developing type 2 diabetes. There is some evidence that CRP, besides its predictive role in determining cardiovascular risk, may represent an active participant in atherogenesis.<sup>1-3</sup>

CRP, the typical inflammatory biomarker produced in the liver, is regulated by adipocyte-derived proinflammatory cytokines, including interleukin 6 (IL-6) and tumor necrosis factor  $\alpha$  (TNF- $\alpha$ ). CRP involved in endothelial dysfunction and atherogenesis and has been associated with macrovascular disease and the nonocular microvascular complications of diabetes. Data on a possible association of CRP with DR, however, are sparse, and results from limited studies have been inconsistent.<sup>4-6</sup> A recent meta-analysis synthesised available data from ten prospective studies and showed a positive association between serum CRP and incident diabetes independently of obesity.<sup>5-7</sup> Hence; the present study was conducted for evaluating C Reactive protein levels among patients with type 2 diabetes.

**MATERIALS & METHODS**

The present study was conducted for evaluating C Reactive protein levels among patients with type 2 diabetes. A total of 100 patients with presence of type 2 diabetes were enrolled. Pregnant women were excluded from this study. Another set of 100 healthy subjects were enrolled as control group. 5 ml of fasting venous blood was collected from the medial cubital vein using vacutainer and needle from each of the subjects and shared equally into a Sodium fluoride Potassium Oxalate container and Plain container. Enzyme Linked Immunosorbent Assay was used in determining the level of C reactive protein in the serum. Data was collected using self-administered semi structure questionnaire. All the results were analyzed using SPSS software. Student t test was used for evaluation of level of significance. P-value of less than 0.05 was taken as significant.

**RESULTS**

A total of 100 diabetic patients and 100 healthy controls were evaluated. Mean age of the diabetic patients and healthy controls was 45.3 years and 41.8 years respectively. Majority proportion of patients of both diabetic group and control group were males. Mean CRP levels among diabetic subjects and controls was 56.23 ng/ml and 3.9 ng/ml respectively. Significant results were obtained while comparing the CRP levels among diabetic group and control group.

**Table 1: Comparison of CRP**

CRP levels	Diabetic group	Control group
Mean (ng/ml)	56.23	3.9
SD	5.32	0.85
p-value	0.001 (Significant)	

## DISCUSSION

Recent studies have shown that under hyperglycemic conditions or upon incubation with leptin or inflammatory cytokines, endothelial cells synthesize and secrete increased levels of CRP. Conversely, adiponectin, which is decreased in type 2 diabetes and coronary artery disease, lowers endothelial CRP synthesis. Induction of endothelial CRP expression is also observed in response to other metabolic factors associated with type 2 diabetes such as hyperuricemia and authors have preliminary results showing that oxLDL significantly increases endothelial CRP gene and protein expression. Finally, diabetes is associated with increased inflammation and interleukin (IL)-1 and IL-6 are potent inducers of both endothelial and vascular smooth muscle cell CRP synthesis.<sup>8-10</sup> Hence; the present study was conducted for evaluating C Reactive protein levels among patients with type 2 diabetes.

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Svensson, E et al examined the prevalence of and modifiable factors associated with elevated C-reactive Protein (CRP), a marker of inflammation, in men and women with newly diagnosed Type 2 Diabetes mellitus (DM). CRP was measured in 1,037 patients (57% male) with newly diagnosed Type 2 DM included in the prospective nationwide Danish Centre for Strategic Research in Type 2 Diabetes (DD2) project. The median CRP value was 2.1 mg/L (interquartile range, 1.0 – 4.8 mg/L). In total, 405 out of the 1,037 Type 2 DM patients (40%) had elevated CRP levels (>3.0 mg/L). More women (46%) than men (34%) had elevated CRP. Among women, a lower risk of elevated CRP was observed in patients receiving statins, whereas a higher risk was seen in patients with central obesity. For men, CRP was primarily elevated among patients with no regular physical activity, previous cardiovascular disease and other comorbidity. For both genders, elevated CRP was 1.4-fold increased in those with weight gain >30 kg since age 20 years. Sensitivity analyses showed consistent results with the full analysis. The linear regression analysis conveyed an association between high CRP and increased fasting blood glucose. Among newly diagnosed Type 2 DM patients, 40% had elevated CRP levels. Important modifiable risk factors for elevated CRP may vary by gender, and include low physical activity for men and central obesity and absence of statin use for women.<sup>12</sup>

## CONCLUSION

Serum C-reactive proteins are enhanced in diabetic subjects in comparison to healthy controls.

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