

Levels of Serum Adiponectin, Glucose and Insulin in Asymptomatic Offspring of Patients with T2DM

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ABSTRACT

Objective: To measure and compare the Adiponectin, glucose and Insulin results of healthy offspring of patients with type 2 diabetes mellitus with healthy offspring of non-diabetics.

Study Design: Case control study

Place and Duration of Study: This study was conducted at the Department of Pathology PGMI, Lahore and Diagnostic Laboratory of UVAS, Lahore for nine months.

Materials and Methods: Healthy non-diabetic subjects which were offspring of previously diagnosed type 2 diabetics, visiting LGH Lahore for treatment, under 30 years female and male, having normal fasting blood glucose values with no diabetic symptoms were included.

Results: In 100 subjects, Insulin and adiponectin were estimated for this ELISA method used, and GOD-PAP method for glucos. Control group had Mean \pm SD of Adiponectin 5.20 ± 2.23 and study group had 4.38 ± 1.38 with insignificant difference of P value 0.14. Insulin in control group had Mean \pm SD 16.80 ± 4.09 and study group had 18.40 ± 13.32 having insignificant difference with P value 0.081. In control group, glucose Mean \pm SD had 80.75 ± 14.21 mg/dl value and 80.92 ± 13.38 mg/dl in study group with insignificant contrast with 0.098 P value.

Conclusion: Adiponectin, glucose and Insulin measured values were normal, having no notable correlation direct or inverse.

Key Words: Type 2 diabetes mellitus (T2DM), Adiponectin, Insulin, Enzyme linked immunosorbent assay (ELISA), Glucose oxidase para amino phenazone (GOD PAP).

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INTRODUCTION

About eighty to ninety percent diabetics have Type 2 diabetes. It is important to identify people with disease due to risk of complications.¹ Before the onset of type 2 diabetes and hyperglycemia more acceptable marker found in plasma is adiponectin. Released from adipocytes in blood, in about 5-10 μ g/ml concentration. Main operation of adiponectin are to lessen formation of glucose.^{2,3} Decreased adiponectin in blood is a risk for type 2 diabetes development. Additionally, reduced risk for type 2 diabetes is associated with increased adiponectin values,⁹ so it is a better therapeutic choice for control of T2DM.⁴

Adiponectin levels are decreased in type 2 diabetes and insulin resistants⁵ and is in inverse proportion to insulin values.⁶ Adiponectin boost insulin sensitivity.⁷ Increased concentrations of adiponectin firmly correspond with decreased risk of hyperglycemia and type 2 diabetes and give superior glucose account.⁸

Glucose metabolism is regulated by insulin, it suppresses directly endogenous glucose production (glycogenolysis; gluconeogenesis). Glucose is used for energy in body cells, here it comes from blood by the action of insulin. Cells receptors of type 2 diabetic subjects, offer resistance to insulin influence.⁹ Insulin acts on "insulin receptors".¹⁰

Depletion of serum adiponectin level happens before insulin resistance, recommending, decreased adiponectin level is important in the pathophysiology of diabetes.¹¹ In healthy insulin-resistant first degree relatives blood adiponectin concentrations were also reduced. Adiponectin is self standing risk prognostic for insulin resistance, hyperglycemia and type 2 diabetes.¹² Offspring of type 2 diabetic subjects can be helped out in the prediction of diabetes by calculating plasma insulin and adiponectin values.

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MATERIALS AND METHODS

50 sex and age matched normal controls were put in group A, reported by normal fasting blood glucose value and having no indication of type 2 diabetes, being siblings of persons having normal fasting blood glucose value and no history of diabetes. In Group B, 50 normal persons under 30 years age, reported by normal fasting blood sugar value and normal history, being siblings of patients with Type 2 diabetes mellitus.

Blood was taken and analysed. Using version 15 of SPSS, the collected statistics was inspected. To detect differences “t” test was used for separate samples. To calculate correlation between inconstants applied test was Pearson test. Level of 0.05 or less of “p” was regarded analytically remarkable.

RESULTS

Sex distribution in Group A and B: Out of 50 controls in group A, females were 19(38%) and males were 31(62%). In group B females were 17(34%) and males were 33(66%) as shown below in figure 1.

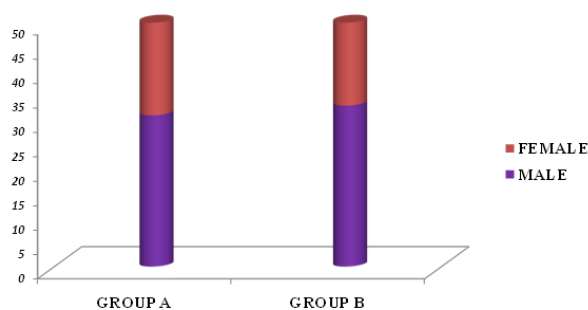


Figure No.1: Sex distribution in Group A & B.

Age Distribution In Group A And B: Mean±SD of age values are 22.2±3.4 years and 23.1±3.5 years in groups A & B ranging between 18 to 29 years (Table 1).

Table No.1: Comparison of Age in Group A and B (in years)

AGE (years)	Group A	Group B
Mean±1SD	22.16±3.42	23.14±3.50
Range	18-29	18-30

A Vs B P=0.0878(Non-significant)

Weight Distribution in Group A and B: Weight related Mean±SD estimations were 58.32±9.16 kg and 63.36±14.54 kg in groups A&B with extents of 47-85 kg and 42-90 kg separately (Table 2).

Table No.2: Comparison of weight in group A and B

Weight (kg)	Group A	Group B
Mean±SD	58.32±9.16	63.36±14.54
Range	47-85	42-90

A Vs B P= 0.25(Non-significant)

Insulin Levels in Group A and B: Insulin fasting blood value of male and females in group B was

18.4±13.32 (95%CI=17.24 – 19.55) μIU/ml and in the controls was 16.8± 4.09 (95% CI = 15.64 – 17.96) μIU/ml (Table 3) having ranges between 10.57-30 μIU/ml and 4.99-28.91 μIU/ml separately (Table 3).

Table No.3: Comparison of insulin levels in group A and B

INSULIN (μIU/ml)	Group A	Group B
Mean±SD	16.80± 4.09	18.40±13.32
95% CI	15.64–17.96	17.24–19.55
Ranges	10.57-30.00	4.99-28.91

AVs B P= 0.081(nonconsequential)

Adiponectin Levels in Group A and B: The fasting adiponectin values of male and female subjects in study group was 4.38±1.38 μg/ml and in control group A was 5.20±2.23 μg/ml (Table 4) with range of 1.69- 6.77 μg/ml and 2.27-12.52 μg/ml, separately. The comparison among groups A&B showed non-significant difference having p value=0.14 (Table 4).

Table No.4: Comparison of adiponectin levels in group A and B

Adiponectin (μg/ml)	Group A	Group B
Mean±SD	5.20±2.23	4.38±1.38
95% CI	4.56-5.83	3.99-4.77
Ranges	2.27-12.52	1.69- 6.77

A Vs B P=0.14(non-significant)

Glucose Levels in Group A and B: The fasting blood glucose value was 80.92±13.38 mg/dl of males and females in study subjects and was 80.75±14.21 mg/dl (Table 5) in control subjects having ranges between 65-112 mg/dl and 60-110 mg/dl, separately. The differentiation between groups A&B had unsequential difference with p value=0.098 (Table 5).

Table No.5: Comparison of Glucose Levels in Group A and B

Glucose (mg/dl)	Group A	Group B
Mean±SD	80.75±14.21	80.92±13.38
95% CI	77.19-85.20	77.79-85.38
Ranges	60-110	65-112

A Vs B P=0.098(nonconsequential)

DISCUSSION

This research was not in harmony with the research of Yamamoto et al and Anthony et al, they revealed in their research that the blood values of adiponectin in women (13.5±7.9 μg/ml) was significantly higher than in men (7.2±4.6 μg/ml).^{13, 14} Our research was in harmony with the research of Yokoyama et al, their research also revealed that blood adiponectin values between two research subjects have no difference mathematically.¹⁵ Our research was in harmony with the research of Tschritter et al, their research revealed that adjustment of sex and waist to hip ratio made the

difference between two classes nonconsequential. In comparison, serum adiponectin values were not very much different between the persons with (10.8±0.3 µg/ml) and without family history of T2DM (11.4±0.3 µg/ml; P=0.27). Serum adiponectin values were remarkably more in female (12.5±0.3 µg/ml) than in male (8.7±0.3 µg/ml; P=0.0001).¹⁶

Regarding insulin Tsou et al gave identical to our values in research which was in non-diabetic siblings, males having age 15–18 years and females having age 11–14 years. Our research was of the same conformation as was the research of Anthony et al who researched in persons aged between 26 to 56 years.¹⁴ Our research was opposite to the research of Yokoyama et al; whom research was in subjects with ages in first group between 6-10 years, in second group 11-14 years and in third group 15-18 years.¹⁶ Our research was contradicting to the research of Ura N et al who revealed consequential contrast in serum insulin values in two groups.¹⁷

Our research was similar to the research of Yamamoto et al (2002)²⁵, whom research on glucose was in the persons aged between 30-65 years. Anthony et al have revealed in their research that male group has more plasma glucose values than females, they conducted research in Hispanics aged between 26 to 54 years and African-American 28 to 56 years.¹⁴ Our research was similar to the research of Ura N et al.¹⁷ Our research was not in compliance with the research of Tschritter et al, who examined obese persons having more disturbed glucose values than persons with normal plasma glucose values.¹⁶

The biostatic data showing association between plasma adiponectin values and insulin values in our research was unimportant arithmetically with p value > 0.05. The correlation coefficient r value was -0.048. It is considered poor negative correlation and is not having any important statistical importance. Our research did not match with the research done by Yamamoto et al (2002) who concluded that serum adiponectin correlated negatively with serum insulin values.¹³ In their research the negative correlation was statistically significant. Tsou et al have also revealed¹⁸ that serum adiponectin values inversely correlated with fasting plasma insulin levels. They studied in boys having age between 15–18 years and girls having age 11–14 years. Our research was in harmony with the research of Ferris et al, who showed in their research that plasma insulin value was not subject to plasma values of adiponectin.¹⁹ Martin et al have also proved in a research that plasma insulin is not related to notably lower values of adiponectin; they conducted research in women of South Asian.²⁰ Abbasi et al also revealed in a research that low concentrations of plasma adiponectin have no link to plasma insulin concentrations.²¹

CONCLUSION

The comparison of plasma glucose concentrations among groups A&B revealed insignificant contrast. The adiponectin values were somewhat beneath in symptomless siblings of type 2 diabetics in contrast to the control group; small distinction was not having analytical importance. In control subjects plasma insulin values were significantly lesser in comparison with asymptomatic siblings of type 2 diabetics. Between plasma adiponectin and insulin concentrations a minor negative statistically not significant correlation was found.

Author's Contribution:

Concept & Design of Study:	Muhammad Jawad Anwar
Drafting:	Muhammad Ejaz Butt, Muhammad Shamim
Data Analysis:	Rabiya Jameel, Ali Afzal, Muhammad Waseem
Revisiting Critically:	Muhammad Jawad Anwar, Muhammad Ejaz Butt
Final Approval of version:	Muhammad Jawad Anwar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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