

# A Comparative Biochemical and Physiological Variations of Lipid Profile by Stress Induced Diabetics in Medical Students

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## ABSTRACT

**Aims:** To investigate the effects of stress on beta cells of pancreas in medical students.

**Methods:** They remained in mental stress due to their studies.

**Results:** High fasting and random glucose levels were observed in Group C, as compared to the Group B, and Group A, (106.73±1.26, 96.23±1.46, 76.43±2.66), (360.23±22.10, 245.33±12.26, 80.11±2.45) due to statistical significant (P<0.05) changes in their serum cortisol levels (30.11±4.26, 18.43±2.81, 14.10±3.13) respectively. While serum cholesterol, triglyceride, LDL and HDL levels (269.33±12.13, 246.21±11.18, 106.43±1.14), (184.12±13.14, 168.20±10.12, 94.10±10.12), (96.10±10.12, 182.00±12.10, 82.00±15.10), (56.04±21.23, 44.02±11.33, 22.02±1.3) have statistically significant (P<0.05) changes in Group C as compared to Group B and Group A.

**Keywords:** Diabetes, lipid profile, stress

## INTRODUCTION

Diabetes mellitus is a metabolic disorder produced by any mutational changes in template formation due to which the Beta cells of pancreas do not to produce completely or proper amount of insulin required for the utilization of glucose in the body Jotkowitz et al (2008). Insulin helps glucose get into the cells. Without insulin digested carbohydrates i.e. glucose does not enter into the cells for father metabolism and ultimately damage and failure of various organs and tissues. Each nutrient has its own glycemic index. Diabetic hyperglycemia directly related to the increase in daily glycemic profiles as compared with that observed in persons with normal carbohydrate metabolism Gul-e-Raana and Shah Jehan(2000).

It has seen that different researchers they classified people as normal and diabetic by considering 2-hour post food intake and impaired glucose tolerance. Stress is a feeling of emotional or physical tension. It is caused by different events or thoughts which make us frustrated or angry and nervous Dumitrescu et al (2011). In biological system stress creates number of changes and stimulates to release various hormones. It was proved in various studies through different researchers that cortisol which is a hormone released during stress conditions. This hormone increased the blood glucose levels in the body during stress conditions. Sometime in case of high stress conditions cortisol may convert deposited fat and protein into glucose the body Nordestgaard et al (2010).

Researchers claimed that Stress is a response of body which is produced by cellular toxicity as well as genotoxicity in the body. Reactive oxygen species and reactive nitrogen species are the main cause of stress in biological system. Stress may be negative and sometime it can be positive, when it helps to avoid danger or meet a deadline Finkielman et al (2005). Different human studies on the role of stress described that hyperglycemic

conditions are produced in type II diabetics by oxidative stress which damages metabolic pathways. In stress conditions sympathetic nervous system i.e. hypothalamic, pituitary and adrenal axis release of stress hormones, such as adrenaline and cortisol Ali Abdel Hamid et al (2016).

## MATERIALS AND METHODS

The present study was conducted in different medical colleges to test the damaging of  $\beta$ -cells by oxidative stress in medical students. Total 250 students were selected and divided them into three different groups. In Group A, 50 students whereas 100 in Group B and 100 in Group C. It has seen that students of Group B and Group C were non diabetic but sudden show very high glucose levels as compared with control Group A. 100 students were in low levels of glucose. Different parameters such as serum glucose, serum Cholesterol, and Triglyceride, LDL, HDL and serum cortisol levels were evaluated by standard glucometer (Accu-check) and ELISA technique, respectively.

## RESULTS

In this study medical students high fasting and random glucose levels in Group C, as compared to the Group B, and Group A were seen, (106.73±1.26, 96.23±1.46, 76.43±2.66), (360.23±22.10, 245.33±12.26, 80.11±2.45) due to statistical significant (P<0.05) changes in their serum cortisol levels (30.11±4.26, 18.43±2.81, 14.10±3.13) respectively. While serum cholesterol, triglyceride, LDL and HDL levels (269.33±12.13, 246.21±11.18, 106.43±1.14), (184.12±13.14, 168.20±10.12, 94.10±10.12), (96.10±10.12, 182.00±12.10, 82.00±15.10), (56.04±21.23, 44.02±11.33, 22.02±1.3) have statistically significant (P<0.05) changes in Group C than Group B and Group A.

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Table A: Comparison of serum glucose and cortisol levels among students of Group A and Group B.

Parameters	Group A(Control) (Mean ± SD)	Group B (Mean ± SD)	Group C (Mean ± SD)	P value
Glucose levels Fasting (mg/dL)	76.43±2.66	96.23±1.46	106.73±1.26	0.000
Glucose levels Random (mg/dL)	80.11±2.45	245.33±12.26	360.23±22.10	0.000
Cortisol (µg/dL)	14.10±3.13	18.43±2.81	30.11±4.26	0.000

Table B: Comparison of serum Cholesterol, Triglyceride, LDL and HDL levels among students of Group A and Group B.

Parameters	Group A(Control) (Mean ± SD)	Group B (Mean ± SD)	Group C (Mean ± SD)	P value
Cholesterol (mg/dL)	106.43±1.14	246.21±11.18	269.33±12.13	0.000
Triglyceride (mg/dL)	94.10±10.12	168.20±10.12	184.12±13.14	0.000
LDL(mg/dL)	82.00±15.10	182.00±12.10	196.10±10.12	0.000
HDL(mg/dL)	22.02±1.3	44.02±11.33	56.04±21.23	0.000

## DISCUSSION

A study stated that due to stressful conditions levels of blood glucose and hormone are changed than the normal levels Dellinger et al (2004). Different researchers claimed in their studies that blood glucose levels are increased because of mental stress caused by stress induced diabetes syndrome Nordestgaard et al (2010). In case of stress induced diabetes the biosynthesis of insulin reduced which is responsible for the management of blood glucose in biological system. Ultimately the hyperglycemic conditions developed which may produce any life threatening situations in the body by damaging any vital organ Dumitrescu et al (2011).

In has seen in different studies that at cellular level oxidative stress produced hyperglycemia in vascular tissues in diabetic condition and ultimately cell membrane lipids undergo peroxidation and genotoxic effect creates mutation in DNA Finkielman et al (2005). In this study a significant (P<0.05) changes have observed in serum cholesterol, triglyceride, LDL and HDL levels (269.33±12.13, 246.21±11.18, 106.43±1.14), (184.12±13.14, 168.20±10.12, 94.10±10.12), (196.10±10.12, 182.00±12.10, 82.00±15.10), (56.04±21.23, 44.02±11.33, 22.02±1.3) in Group C than Group B and Group A. serum glucose and cortisol levels are also have a remarkable changes because of stressful conditions in medical students.

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