

A Comparative Study of Hypercorticism Induced Hyperglycemia in MBBS Students

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ABSTRACT

Stress has become a discussing subject among psychologists and professionals of mentalhealth. Therefore, stress creates multi-dimensional effects in human's life. It has proved in different studies by many scientists that stress disturbs human's physical and mental reactions. Cortisol induced hyperglycemia is increased in case of mental stress in men and/or women. In this paper we determined the impact of stress in the quality of life in MBBS students. According to this study mental stress induced hyperglycemic condition in the students.

Keywords: Stress, mental health, cortisol, hyperglycemia

INTRODUCTION

Cortisol is a steroid hormone and belongs to the class of glucocorticoid. It is biosynthesized in human body by adrenal glands. The portion where cortisol produced is called zonafasciculata. Adrenal gland is found at top each kidney. Hypothalamus is a part of brain which controls the secretion of cortisol (Aguilera *et al.*, 2008). Hypothalamus released corticotropinreleasing hormone (CRH) and this hormone stimulated the secretion of another hormone from anterior pituitary called adrenocorticotrophic hormone (ACTH). When this hormone i.e. adrenocorticotrophic enters in to the blood then it reached to the adrenal gland where it stimulates the biosynthesis of cortisol (Corderre *et al.*, 1991). In case of any internal or external stimuli the rate of secretion of steroid hormones increases and in such way different metabolic pathways of the body become disturbed. It is concluded by various studies that during stress the plasma levels of cortisol can increase two to fivefold in humans (Gotlib *et al.*, 2008). Number of researchers also stated that severe mental stress may be a risk factor for diabetes and they claimed that Insulin may decrease during stress.

Stress is defined as any situation which creates a disturbance in the equilibrium between a living organism and its environment (Herman *et al.*, 2003). Now a day humans face number of stressful situations such as stress of work pressure, examinations, psychosocial stress and physical stresses etc. It has observed in most of studies that stressful events may increase cortisol levels in the

blood for prolonged periods. However stress may sometimes unmask diabetes, by causing blood glucose levels to rise (Kahn and Weir, 1996). Mental stress often raises blood glucose levels. It is easy to find out whether mental stress affects glucose control (Honish *et al.*, 2006). This situation may produced the condition i.e. stress induced hyperglycemia.

MATERIALS AND METHODS

This study was carried out at different medical colleges. In the current study 100 students of MBBS first year were selected. Samples were collected into two phases. In the first phase blood samples were collected when all students were preparing their professional examination. While in second phase blood samples were collected when they were free from their examinations. Data of sugar levels were taken randomly and cortisol levels were determined from blood samples which were taken at morning time. SPSS version 16.0 was employed for statistical analysis. Paired sample t-test was used to compare the blood glucose and cortisol levels and P value of 0.05 was considered significant.

RESULTS

In the first phase the blood sugar and cortisol levels were determined in the blood samples of all students. Mostly results were significant when serum blood glucose levels were calculated. Similarly serum cortisol levels of mostly students were also significant. In this study the gender distribution was male 37% and female 63%. In first phase 70 individuals presented high serum glucose levels 190 ± 11.32 whereas 30 individuals showed 136 ± 22.01 respectively. Mean while it was observed that in first phase 70 individuals showed high serum cortisol levels 31.59 ± 14.15 and 30 individuals have near to

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normal 15.59 ± 34.25 . In second phase the serum glucose leaves 125 ± 34.25 and serum cortisol levels 16.21 ± 16.25 of all individuals remain near to normal and all results were non-significant.

Table 1: Gender distribution (n=100)

| Gender | n | %age |
|--------|----|------|
| Male | 37 | 37 |
| Female | 63 | 63 |

Table 2: comparison of Blood glucose in MBBS students

| Individuals | First phase | Second phase |
|-------------|-----------------|-----------------|
| 70 | 190 ± 11.32 | 125 ± 34.25 |
| 30 | 136 ± 22.01 | 130 ± 27.28 |

P<0.05

Table 3: Serum cortisol levels in MBBS students

| Individuals | First phase | Second phase |
|-------------|-------------------|-------------------|
| 70 | 31.59 ± 14.15 | 16.21 ± 16.25 |
| 30 | 15.59 ± 34.25 | 14.69 ± 24.15 |

P<0.05

DISCUSSION

The cortisol levels are correlated to many metabolic activities of the body. In case of mental stress the secretion of cortisol increases which stimulated the process of glycogenolysis. This condition is situated in case of short term stress. Whereas in the case of long term mental stress cortisol enhance the process of Gluconeogenesis. During this period body fat and protein converted into glucose. This along with increase in its antagonistic hormones can contribute to stress-induced hyperglycemia. This study showed same results that during mental stress individuals have high levels of serum glucose 190 ± 11.32 and serum cortisol 31.59 ± 14.15 in first phase. But in the second phase when examination stress was negligible on the individuals they have almost normal serum levels of glucose 130 ± 27.28 and cortisol 16.21 ± 16.25 respectively. The results of this study showed statistically important impact of the level of education on the level of stress and life quality of individuals with diabetes, which was accordance with other studies have confirmed the linear correlation between the level of education and quality of life (Varghese *et al.* 2007, Nejhad *et al.* 2013). Other studies also have got almost similar results (Honish *et al.*, 2006).

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