

ORIGINAL ARTICLE

SERUM TESTOSTERONE LEVELS IN DEPRESSIVE MALE PATIENTS

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Background: Testosterone exerts a wide range of functions in males including behavioural traits like aggression, libido and sexual motivation. The objective of this study was to estimate serum Testosterone levels in Depressive male patients. **Methods:** This was a case control study performed at Islamic International Medical College, and Armed Forces Institute of Mental Health, Military Hospital Rawalpindi. The study comprised a total of 96 male participants having age of 18–60 years. They were divided into two groups: Group A consisted of 24 adult healthy males and Group B consisted of 72 male depressive patients diagnosed on the basis of Siddiqui Shah Depression Scale. Serum Testosterone of Group A was compared with that of Group B. **Results:** Serum Testosterone (7.98 ± 1.03 ng/ml) levels of Group A have shown no significant differences as compared to serum Testosterone levels (8.92 ± 0.56 ng/ml) of Group B. **Conclusion:** Serum testosterone levels were not found to be low in depressive patients.

Keywords: Depression, Libido, Testosterone

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INTRODUCTION

Depression is a state of low mood along with disturbances in biological and cognitive activities.¹ It is a psychiatric illness with prevalence of 10–15% worldwide and 10–34% in Pakistan.² A variety of biological and social factors can lead to development of depression which includes genetic susceptibility, disrupted mood regulation by brain, medications, medical problems, familial environment, cultural norms, poor coping ability and stressful life events.³ Chemical disturbances in levels of serotonin, cortisol, inflammatory mediators, vitamin D and neurotrophic factors also predispose an individual to develop depressive illness.⁴

It is a psychiatric disease that negatively affects the person's thoughts, feelings and behaviour. In addition to cognitive and behavioural abnormalities, difficulty in maintaining intimate sexual relationships and loss of sexual desire is an important manifestation of depression which compromises the family life of an individual.⁵ Reduced sexual activity further complicates the severity and management of depressive illness. Sexual activities are regulated by hormones secreted by hypothalamic pituitary testicular axis which is a complex neuroendocrine network.⁶ In this axis, Gonadotropin Releasing Hormone (GnRH) secreted from hypothalamus in a pulsatile manner is responsible for secretion of Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) from the pituitary gland.⁷ FSH acts on the Sertoli cells of testes thus, releasing Androgen-binding protein (ABP), P-450 aromatase, Growth factors, Inhibin and Anti-mullerian hormone which are considered essential for synthesis and action of steroid hormones.⁸ But the LH released

from pituitary gland is the primary source of testosterone production in males which principally targets the interstitial Leydig cells of testes.⁹ Testosterone exerts a wide range of functions in males which include development of secondary sexual characteristics, spermatogenesis and behavioural traits like aggression, libido and sexual motivation.¹⁰

In depression, researches have demonstrated the disruption of neurogenesis and neuroserpin expression causing the shrinkage of various brain areas such as hippocampus, amygdala, thalamus, prefrontal areas, parietal lobe and striatum.¹¹ Among all these areas, hippocampus undergoes remarkable volume reduction which is an important site for the presence of androgen receptors.¹² At the level of these androgen receptors, activity of the hypothalamic-pituitary-gonadal axis and hypothalamic-pituitary-adrenal axis can influence each other thus affecting gonadotropins (FSH and LH) and ultimately testosterone levels.¹³

This study is intended to estimate serum testosterone levels in depressive male patients which may help in the management of loss of sexual functions in depressive patients.

SUBJECTS AND METHODS

It was a case control study conducted from April 2016 to March 2019 after approved by Ethics Review Committee of Riphah International University Islamabad. The study was conducted at the Department of Physiology and Multidisciplinary Research Laboratory, Islamic International Medical College, in collaboration with Armed Forces Institute of Mental Health, Military Hospital Rawalpindi.

Total participants of our study were 96 males having age 18–60 years which were divided into two

groups. Group A (control) comprised of 24 normal healthy males. Purposive sampling method was used to include 76 cases of depression in Group B (cases) which were diagnosed on the basis of Siddiqui Shah Depression Scale with a body mass index (BMI) of <30 and no physical deformity or chronic illness. Patients undergoing Electroconvulsive Therapy (ECT), drug and alcohol abusers, and those suffering from chronic illness and obvious physical deformities were excluded from the study.

Age and BMI of the participants were recorded and duration of illness of the cases in Group B was noted. Blood samples were taken and serum was separated after centrifugation of samples at 3,000 RMP for 10 minutes and stored at -20 °C. Serum testosterone levels were estimated using ELISA Kit manufactured by Bios USA.

Data was statistically analyzed using SPSS-21. All results were documented as Mean±SEM. Comparison of serum testosterone levels between Group A and Group B were done using independent sample *t*-test, and *p*<0.05 was considered as significant.

RESULTS

Ninety-six (96) male participants were divided into 2 different groups: Group A and B. Group A served as the control group while Group B comprised of diagnosed cases of depression.

Comparing Mean±SEM of ages, Group A (34.12±1.49 years) showed no significant difference as compared to Group B (35.19±1.18 years). On comparing Mean±SEM of BMI of Group A (25.02±0.23) and Group B (23.85±0.25), no significant difference was observed. Duration of depressive illness of group B was 1.60±0.17 years.

On comparison of Mean±SEM of serum testosterone level of group A (7.98±1.03 ng/ml) with that of Group B (8.92±0.56 ng/ml), no significant differences (*p*=0.41) were observed (Table-1).

Table-1: Age, BMI, duration of depressive illness and serum testosterone levels of Group A and B

Parameter	Group A (Controls) (n=24)	Group B (Patients) (n=72)
Age (Years)	34.12±1.49	35.19±1.18
Body Mass Index (BMI)	25.02±0.23	23.85±0.25
Duration of illness (Years)	-	1.60±0.17
Serum testosterone level (ng/ml)	7.98±1.03	8.92±0.56

DISCUSSION

We compared serum testosterone levels between depressive and healthy individuals as testosterone is associated with sexual desire which is affected in case of depression.¹⁴ Our results have shown no significant difference of serum testosterone levels between depressive and healthy individuals. Monteagudo *et al*¹⁵

conducted a study on obese male patients having age of 19–60 years. An association was observed between more severe depressive symptoms and low testosterone levels with no significant correlation between these parameters. Our findings are in agreement with their results but we included participants with normal body mass index (BMI).

In a study conducted by Delhez *et al*¹⁶ on males aged 50–70 years it was observed that free testosterone was associated with more depressive symptoms. They concluded that correlation between depression and testosterone should be interpreted with caution as it was weak, and old age was a confounding factor present in their study. Contrary to our findings, it was observed in a study conducted by Westley *et al*¹⁷ that men referred for borderline testosterone levels to endocrinologists had higher rates of depressive symptoms and depression Monteagudo *et al*¹⁵ came up with correlation of depression with low testosterone levels in elderly having controversial results. Old age is associated with decrease testosterone synthesis. We have chosen relatively younger age group and patients who were under treatment and this could be the reason of different outcome of current study.

CONCLUSION

Testosterone levels were high in depressed patients as compared to healthy subjects but the difference was insignificant.

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