with a chronic disease course.

In conclusion, there was no difference between the patients with FEP and the control group in terms of oxidative stress and DNA damage; and furthermore, no relationship was identified between symptom severity, oxidative stress, and DNA damage. Future studies should evaluate more comprehensively the factors that contribute to the development of oxidative stress, as the present study revealed no change in the levels of oxidative stress in the early periods of disease, and there are studies that have reported higher oxidative stress in later disease stages.

**Keywords:** DNA damage, early onset schizophrenia, oxidative stress

**References:**

**Bulletin of Clinical Psychopharmacology 2015;25(Suppl. 1):S25-S7**

**[Abstract:0291] Post-traumatic stress disorder**

Examining the levels of BDNF and cortisol in children and adolescent victims of sexual abuse

Seref Simsek1, Tugba Yuksel1, Ibrahim Kaplan2, Cem Uysal3, Rumeysa Aktas1

1Department of Child Psychiatry, Dicle University, Faculty of Medicine, Diyarbakir-Turkey
2Department of Biochemistry, Dicle University, Faculty of Medicine, Diyarbakir-Turkey
3Department of Forensic Medicine, Dicle University, Faculty of Medicine, Diyarbakir-Turkey

e-mail address: drserefisimsek@gmail.com

**INTRODUCTION:** Glucocorticoids act through glucocorticoid receptors (GR) found in high concentrations in the amygdala and the hippocampus. In GR-mediated molecular activation, the brain-derived neurotropic factor (BDNF)-mediated signal pathway is required for memory consolidation. BDNF expression in the central nervous system is modified by various brain traumas including stress, ischemia, epileptic seizures, and hypoglycemia. Glucocorticoids play a role in the regulation of BDNF. In the rat hippocampus, stimulation of mineralocorticoid receptors (MR) increases the level of BDNF, while stimulation of glucocorticoid receptors (GR) decreases the BDNF levels. As mentioned above, trauma affects growth factors and the HPA axis. There are limited studies in the literature that have investigated the relationship between cortisol and BDNF levels in child and adolescent victims of sexual abuse. The present study compares the levels of BDNF, cortisol, and ACTH between child and adolescent victims of sexual abuse with those who have no trauma history.

**METHOD:**

**Study Sample:** The study was conducted in the Department of Child Psychiatry at Dicle University. The study included a total of 44 children (M/F: 12/32) between the ages of 8 and 17 years who had experienced child sexual abuse and 42 age- and gender-matched children (M/F: 12/30) as control group. The study data were collected between December 2011 and April 2012. Children who achieved an intelligence score below 70 points, who had significant neurological or medical disorders, who received oral contraceptives, had previous or current cortisol therapy, vitamins, and those who showed morbid obesity or active infection were excluded in order to prevent interference with the biochemical parameters. The patients were evaluated by two psychiatrists. The parents provided informed consent in order for their children to participate in the study. Approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee at Dicle University Faculty of Medicine. Sociodemographic features of the participants were obtained and a clinical data form was completed. This was followed by collection of a 2 ml venous blood sample for biochemical tests.

**Sociodemographic Data and Clinical Data Form:** This form included questions about age, gender, education level, age of the parents, number of siblings, history of psychiatric disorders or substance abuse in the relatives, height, weight, and body mass index (BMI), type of abuse, duration and frequency of abuse, relationship with the abuser, and abuse history.

**Biochemical Analysis:** The blood samples were obtained in the morning between 10:00 and 12:00 AM. Cortisol, ACTH, and BDNF levels were evaluated using the ELISA.

**Statistical Analysis:** The statistical analysis was performed using SPSS 15.0 software package. A p-value below 0.05 was considered statistically significant.

**RESULTS:** The mean age was 13.1±2.7 years (range: 8-17 years) among the victims of sexual abuse. In the control group, the mean age was 13.8±2.9 years (range: 8-17 years). The sexual abuse group consisted of 12 males and 32 females, and the control group consisted...
of 12 males and 30 females. The duration of education was lower and the mean number of siblings was higher in the victims of sexual abuse and their parents compared to the control group (p=0.02, p<0.001, p<0.001, and p<0.001, respectively). There was no significant difference between the groups in terms of height, weight, and BMI (p>0.05).

Regarding the parameters related to sexual abuse, 64% (n=28) of the victims had experienced sexual abuse involving penetration. Of the victims, 52% (n=23) had experienced a single assault and 48% (n=21) multiple assaults. 23% (n=10) had experienced sexual abuse within the family (incestuous) and 77% (n=34) sexual abuse committed by non-related persons. Of all cases, 82% (n=36) were smokers and 18% (n=8) were non-smokers.

Cortisol levels were significantly higher in the sexual abuse group compared to the control group (p<0.001). Albeit statistically insignificant, ACTH levels were higher in the sexual abuse group compared to the control group (p=0.10). Consistent with these findings, the ACTH/Cortisol ratio was lower (p<0.001). BDNF levels were significantly lower in the sexual abuse group compared to the control group (p=0.04). The mean time that elapsed from the first sexual abuse until the date of examination was 22.72±21.72 months (range: 2-120 months). The evaluation of the relationship between this time span and cortisol levels revealed that cortisol levels decreased as this time interval increased (r=-0.271, p=0.03).

In the sexual abuse group, there was no relationship between the presence of penetration and cortisol, ACTH, and BDNF levels. Cortisol and BDNF levels were lower in the victims of multiple sexual assaults (p=0.03 and p=0.04, respectively). Cortisol and ACTH levels were lower in the victims of sexual abuse within the family; however, BDNF did not show a significant difference (p=0.03, p=0.049, p=0.11).

DISCUSSION: One of the most important findings of the present study was that high cortisol levels were observed in the sexual abuse group. Furthermore, cortisol levels decreased as time elapsed, while trauma increased. The majority of the studies conducted on child and adolescent victims of trauma were found to have elevated non-stress cortisol levels. However, a meta-analysis of retrospective studies in patients that experienced chronic stress was found them to have decreased non-stress cortisol levels. This decrease in cortisol levels over time is referred to as the “attenuation hypothesis”.

The second most important finding of the present study was lower BDNF levels observed in the sexual abuse group. In human studies, BDNF levels were lower in depressed women who were survivors of childhood physical abuse. BDNF levels were also lower in bipolar patients who had a history of trauma in childhood. The inverse relationship between memory performance and childhood sexual abuse was found to be associated with apolipoprotein E gene alleles.

There are studies that implicated BDNF in the relationship between trauma and schizophrenia, bipolar disorder, PTSD, and depression. In animal studies, stress was suggested to be associated with changes in the functions and structure of the hippocampus through decreased neurogenesis, increased glucocorticoids, and/or decreased BDNF. In general, studies conducted on patients with PTSD have found lower BDNF levels compared to the control group. There are also studies suggesting no change or even an increase in BDNF levels.

In the sexual abuse group, the presence of penetration had no effect on cortisol and BDNF levels. However, both cortisol and BDNF levels were lower in victims that experienced multiple sexual assaults. Cortisol levels were lower in victims of sexual abuse within the family. The effects of stress on cognitive functions and psychopathological processes are related to gender, type of stress, frequency, controllability, and predictability.

In conclusion, the present study found elevated cortisol levels and decreased BDNF levels in child and adolescent victims of sexual abuse. Interestingly, cortisol levels decreased with increasing time after trauma. Furthermore, some factors related to trauma such as sexual abuse within the family and multiple assaults were found to have affected cortisol and BDNF levels. The results of the present study suggest that cortisol and BDNF could be biological molecular mediators of trauma on biological and psychological systems. While this is the first report on the effects of cortisol and BDNF-induced trauma in child and adolescent victims of sexual abuse, longitudinal studies with larger samples size are required to validate the findings of the current study.

Keywords: BDNF, HPA axis, sexual abuse

References: