

## Early Stress and Harmful Use of Psychoactive Substances in Adult Life: Case Report

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### Abstract

**Introduction:** Events as early stress may be able to alter the Central Nervous System through mechanisms such as gene-environment interaction, resulting in pathologies in adulthood.

**Objective:** Correlate early stress and its impact on the development of mental disorders associated with the harmful use of multiple psychoactive substances, risky behavior, and clinical comorbidity, such as alcoholic pancreatitis.

**Methodology:** A case report.

**Results:** In this study, the patient suffered physical, emotional, and sexual abuse, emotional neglect, in addition to the harmful use of alcohol and other psychoactive substances which generated alcoholic pancreatitis.

**Conclusion:** The early stress is intimal related to the gene expression, resulting in neuroendocrine changes, changes in the Immune System, and the stimulation of the Hypothalamic-Pituitary-Adrenal axis. These alterations result in neuro-structural changes, which can impact adult life.

**Keywords:** *Physical Abuse; Substances Abuse; Early Stress; Mistreatment; Bipolar Disorder*

### Introduction

Stresses experienced during development can damage the human organism in neurobiological and neuroendocrine aspects. Mechanisms such as gene-environment interaction and epigenetic regulation can lead to permanent consequences. As examples of stresses experienced, it can be included the physical, emotional, and sexual abuses, loss of parents, divorce, serious illness and family violence. Moreover, the physical, emotional and educational neglect, as the lack of basic care, abandonment, deprivation of food, shelter or education and lack of affection can cause harmful damages in human life.

The exposure to Early Stress (ES) generates an immediate response; the body triggers the sympathetic autonomic nervous system (SANS) and activates the fight and flight mechanisms. Consequently, it generates genotypic and phenotypic changes.

The gene-environment interaction promotes the synthesis of pro-inflammatory factors, changes in the immune system, and stimulation of the Hypothalamus-Pituitary-Adrenal (HHA) axis [1-3].

These physiological changes in the protein synthesis modify the CNS, which end up acting directly on gene expression, and so, they alter the organism's functioning. It leads directly affecting child development in cognitive, behavioral, emotional, physical, and social aspects.

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On the other hand, other children can develop depressive symptoms, guilt, anger, loss of innocence, impoverished social skills, repressed hostility, compromised intellectual capacities, pseudo-maturity, problems with limits, difficulty to understand the social roles, and problems with emotional self-control [4].

We observed changes such as the appearance of Mental Disorders and their clinical and behavioral effects. Among them, stand out the altered mood symptoms, behavior problems, harmful use of psychoactive substances, academic or professional damage, risky behavior, and clinical comorbidities.

In this reported case, some psychological and behavioral changes will be allowed aiming to correlate them with the influence of the history of early stress, environmental factors, and the damage caused in the adult life of the patient P.M.

### Case Report

P.M., male, 23 years old, single, born in Porto Alegre, Law student, started the outpatient monitoring in November 2017. He reported depressive symptoms, such as irritability, deep sadness, and episodes of anhedonia and harmful use of alcohol. It is reported that these symptoms started at age 12, without trigger factors when he started drinking with his school friends. He says to be concerned about his health and asks for help to stop drinking alcohol, in addition to filling the void he feels and makes him drink (approximately 2.5 liters of beer daily). The drink abuse led him to lose his job, relationships, and caused academic losses.

In a medical consultation, he describes episodes of hypomania: high mood, excessive energy, poorly managed debts, impulsivity, insomnia, risky behavior, such as motorcycle racing.

He denies auditory or visual hallucinations, persecutory delusions, and suicidal ideation. Healthy, he denies attempted suicide and previous psychiatric hospitalizations. He has a clinical admission at a University Hospital, in Porto Alegre, in March 2019, due to alcoholic pancreatitis confirmed by alterations in laboratory and imaging tests (Lipase 1.571 and mild hepatic steatosis).

Among his personal history, it should be noted that pregnancy and childbirth occurred without complications, the neuro-psycho-motor development was adequate. At school, he suffered and practiced Bullying through physical aggression. However, this fact did not prevent him from having an excellent school performance. He reports the use of multiple psychoactive substances: LSD, cocaine, and marijuana. He is sex arche at the age of 14 with a 30-year-old woman, which characterizes the sexual abuse suffered. He refers to a troubled childhood and adolescence. P.M. witnessed countless physical and verbal conflicts between the parents, associated with an emotional detachment. The patient reinforces the fact that he did not receive hugs and praise from his parents, only criticism and cursing.

On the other hand, the family history reported cases of depression, the reality of physical and verbal abuse, and the harmful use of alcohol. Family suicide history was denied.

Weekly consultations were held of psychotherapy, psychoeducation, motivational interview, and decision scales. The patient was oriented about behavioral measures, as avoidant behavior against people, places, and situations, in order to mitigate the harmful use of alcohol. The patient was medicated with Quetiapine 400mg and Lithium Carbonate 900 mg, both at night. Regarding the drug management during the treatment period, the psychopharmacological therapeutic plan remained unchanged, due to the poor adherence to treatment presented by the patient.

Despite the resistance to psychiatric treatment, proved by the absences from appointments and irregular pharmacological treatment, the patient has maintained a stable clinical condition. He has realized regular and simultaneous monitoring with the medical clinic to control pancreatitis.

### Discussion

The organism triggers physiological reactions (Sympathetic Autonomic Nervous System/SANS and HHA) when the individual is exposed to a stressful situation. HHA acts in the regulation of responses to adverse circumstances, modulating the metabolism of carbohydrates, proteins, and lipids. In this way, the HHA provides the excitability of the cerebral cortex, besides regulates the anti-inflammatory effects and immune response.

At first, these mechanisms are correlated with individual protection, adaptation and survival. However, it can be harmful to the body, once the Early Stress (ES) and chronic stress can trigger neurophysiological changes.

The neuroimage article of Kitayama, *et al.* [5] suggests that exposure to an early trauma can lead to a decrease in the corpus callosum.

Besides the Cortisol and the catecholamines, there is evidence that individuals exposed to early and chronic stress, associated with Mental Disorders may have a decrease in the number of leukocytes. Moreover, they may present an increase in the CD4+ and CD8- ratio, an increase in C-reactive protein, and a reduction in the lymphocyte number and a reduction in cells' natural killer. Blood levels of pro-inflammatory cytokines and their receptors such as interleukins 1 and 6 (IL-1 and IL-6) and TNF-alpha (tumor necrosis factor) are observed. In this way, we observed a direct relationship between the innate (or natural) and adaptive (acquired) inflammatory response in the pathophysiological process of depressive symptoms [1-3].

Miller, *et al.* [6] showed the correlation between chronic stress, inflammatory cytokines, and depressive symptoms, based on communication between the nervous, endocrine, and immune systems. As the neurotransmitters and hormones regulate the immune system, the inflammatory cytokines can influence SNC regulation through the activation and stimulation of SANS, as well as HHA [3].

Pro-inflammatory cytokines in the Central Nervous System can also reduce the synthesis of Serotonin. According to Moylan, *et al.* (2014), the appearance of depressive symptoms and behavioral changes seem to be justified by the increase in pro-inflammatory concentrations, reduction in serotonin levels, increase in glutamate in the striatum, and increase in concentration in the cortex.

Stahl, *et al.* [7] suggest that the alterations could modify the genes responsible for encoding DNA synthesis, which alter the protein synthesis and would cause damage in several substances that mediate mental functioning.

Brain maturity and cognitive functions are affected at the time of environmental experience. Based on this premise, the exposure time of these factors becomes a key center to understand the impact on the neurocognitive environment, affecting the development of the brain functions and underlying functions [8].

Epidemiological studies and clinical trials on childhood trauma [9-11] associate this experience to several mental disorders in all stages of human development. As an example, it can be including Bipolar Disorder (BD), Major Depressive Disorder, Posttraumatic Stress Disorder, substance abuse, affective problems, Generalized Anxiety Disorder, Panic, misconduct, and violent behavior, especially in adolescence, which consists in a period of great vulnerability. Moreover, patients that suffered early trauma presented a major risk of attempting suicide and may demand more from health services in adulthood, thus increasing public health spending. These individuals show difficulties in interpersonal relationships, tend to maintain a behavioral pattern of social isolation, and be more resistant to treatment.

It is observed that individuals exposed to trauma in childhood show higher rates of clinical disorders compared to individuals without a traumatic background [12,13].

Patients diagnosed with Bipolar Disorder (BD) are particularly vulnerable to traumatic experiences. Approximately 30% to 50% of these patients report traumatic events in childhood, especially and most common emotional abuse. It is observed that childhood trauma in patients with BD is associated with recurrent depressive symptoms in adulthood, besides to less adherence to drug treatment [10,14-17].

According to Deoni, *et al.* [18] children with BD are prone to have a greater number of family members who consume alcohol abusively. It is closely related to the disorganization of their parents, as well as the increased risk of childhood trauma.

### Conclusion

Summarily, the investigated works in this case report suggest that early stress is correlated with the appearance and increased severity of symptoms in mental disorders in adulthood.

The early and chronic stresses generate neuroendocrine stimuli, interfering in gene expression. As a consequence, the genotype change occurs and can lead to a persistent impact on the lives of individuals, such as the difficulty of social interaction, conflicts, mood symptoms, and addict behavior that results in clinical comorbidities.

In the Epidemiology context, it is important to understand the plurality of the etiopathogenic mechanisms of mental disorders, and addict disorders. The greater knowledge of genetic and environmental factors plays a key role in expanding the mechanisms to protect individuals from exposure to early stress and its consequences in adult life.

### Disclosure

The authors report no conflicts of interest.

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