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Suicide prevention: a brief introduction to suicidal behavior, the neurobiology behind, and the treatments used to prevent it

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IMPACT OF SUICIDE IN SOCIETY: WHO IS AT RISK?

Suicide is one of the main causes of death between the ages of 10 to 34 years and the third among the ages of 15 to 19 years.

Close to 800,000 people die by suicide each year.

Major depression disorder is the most prevalent mental health condition related to suicide and suicide attempts.

- This condition is associated with high levels of morbidity and mortality with patients prone to several psychiatric and medical conditions, resulting in a shortened life expectancy.

A model for suicidal behavior must include two major observations.

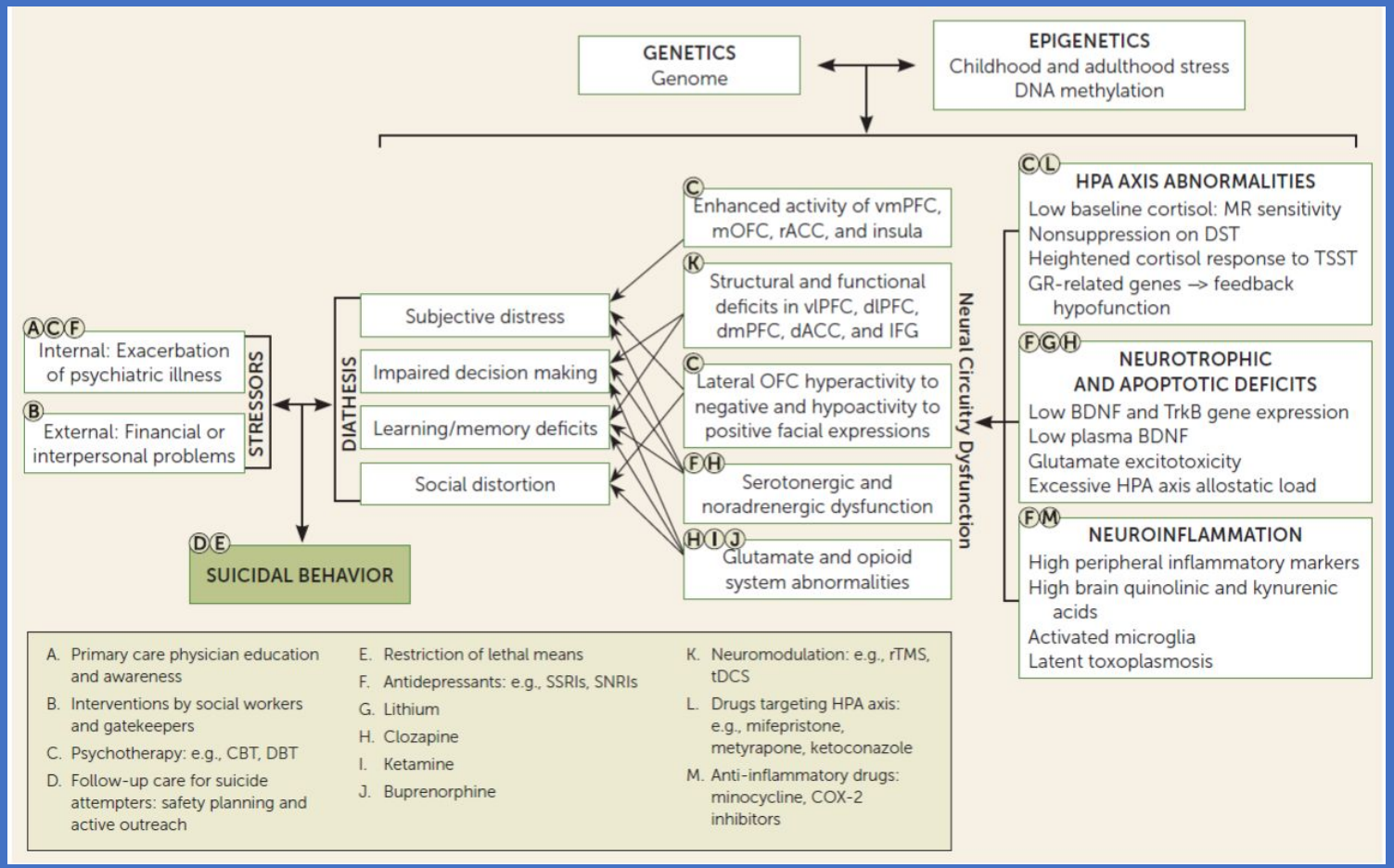
- Suicide behavior is found in many psychiatric disorders.
- Only a minority of psychiatric patients make suicide attempts.

Table Risk Factors for Suicide in Depressed Patients (Kielholz, 1974)[2)]

A) Signs of suicide risk and selection of means
1) Prior history of attempted suicide or implication of suicide
2) Family history of suicide
3) Verbal threats of suicide
4) Concrete disclosures as to preparation and implementation of suicide
5) Unnaturally calm behavior after having been in an unstable state
6) Dreams of self-destruction

B) Specific symptoms
1) Severe anxiety/irritability
2) Persistent insomnia
3) Uncontrollable aggressiveness
4) Initial, convalescent, and mixed stages of depression
5) Age periods associated with biological crisis (adolescence, pregnancy, puerperium, climacterium)
6) Severe self-guilt feelings
7) Incurable illness, hypochondriacal delusion
8) Concomitant alcohol dependency

C) Environmental factors
1) Broken family
2) Loss of someone or something important
3) Occupational and financial difficulties
4) Failure to carry out tasks or reach life goals
5) Loss of religious affiliations



NEUROBIOLOGY OF SUICIDAL BEHAVIOR

I. Genetics of Suicide

Several genes have been found to be potentially related to suicide death with a heritability

- Some overlap with genes associated with bipolar disorder and schizophrenia
- Polygenic risk scores were predictive of suicide

Depletions of brain serotonin predict suicide

A common genetic marker suggests bipolar disorder and major depression might have something in common.

- PSR analysis showed that genetic risk for major depression increases risk for suicide attempts. This genetic risk also increased risk for suicide in people diagnosed with bipolar disorder or schizophrenia

II. Endophenotypes

Clinical (Impulsiveness/Aggression; Pessimism; Neuroticism; Despair)

Neurochemicals (Serotonin; Noradrenaline; Dopamine)

Neuroendocrine (hypothalamic pituitary adrenal axis)

III. Major Suicide Risk-Moderating Traits Domains

Neural Circuity of Suicidal Behavior and Suicidal Ideation

- Structural brain findings
- Functional brain activity and connectivity
- Neurotransmitter systems

Stress Response Systems

Neurotrophic and Apoptotic Pathways

Neuroinflammation

IV. Clinical Description of Depression

Depression is a developmental disorder that can occur as early as the preschool years, with adolescence being a vulnerability period for it.

Risk of major depressive disorder is characterized by a combination of ill-defined genetic and environmental factors

SUICIDE PREVENTION

I. Novel approaches of Suicide Prevention

- Stressors and Prevention
- Pharmacotherapy and Psychotherapy
- Brief Interventions and Active Postdischarge Outreach
- Restriction of Lethal Means

II. The Future of Research and Suicide Prevention

- Suicide as a Distinct Mental Disorder
- Real-Time Monitoring of Acute Suicidal Crisis
- Implicit Cognitions and Neuroimaging for Suicide Risk Detection
- Medication and Neuromodulation

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