

# Is Suicide a Medical Problem or a Social Issue: A Review

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## ABSTRACT

Suicide has become a major social and medical problem around the world. Most people commit suicide because they don't know any other answer for their problems. Death by suicide, in reality, is an attempt to escape psychic pain. Suicide appears to be the only option left for people who, after trying to solve life's crisis, find themselves in a hopeless situation. Some people figure it would be better if they were just dead. Suicide is a tragic phenomenon that has preoccupied professionals from a variety of disciplines. Psychiatrists' ability to predict and prevent this tragic event is limited. Recent advances in brain chemistry and genetic studies have brought with them new hope that many of these deaths can be prevented. Deaths by suicides are increasing in our society at an alarming pace. But only social reasons (i.e. poverty, inflation, injustice, unemployment etc) are not to be blamed. This review is based on the medical causes related to suicide.

## INTRODUCTION

Suicide is defined as the intentional taking of one's own life. In some European languages, the word for suicide translates into English as "self-murder". Until the end of the twentieth century, approximately, suicide was considered a criminal act; legal terminology used the Latin phrase *felo-de-se*, which means "a crime against the self."

When people aren't happy with themselves or with whom they love, when depression comes in and feeling sorry for themselves, scared of their future, or the helpless feeling, is what may push a person to consider suicide. Causes of suicide can be studied as follows:

## SUICIDE AND MENTAL DISORDERS

Suicide is an important and potentially preventable consequence of serious mental disorders of unknown etiology. Two novel candidate genes, *PLSCR4* and *EMX2*, were confirmed as differentially expressed in schizophrenia between suicide completers vs. non-suicide groups.<sup>1</sup>

More than 90% of suicide completers have a psychiatric disorder and mood related disorders are

the most common disease associated with suicide<sup>2,3</sup>. Patients suffering with bipolar disorder and schizophrenia have greatly increased rates of suicide with approximately 10% of patients dying of suicide<sup>4,5</sup>. Bipolar disorder and schizophrenia share common risk factors for suicide completion such as depression, previous suicide attempts, hopelessness, substance abuse, agitation, and poor adherence to treatment. Suicide is a complex endpoint with many factors and pathways leading to death<sup>6</sup>.

## GENETIC LINKS TO SUICIDE

The medical literature has documented many genetic links to suicide. One such study, published in the *American Journal of Medical Genetics* in 1985 examined the rate of suicide among the Amish population in southern Pennsylvania. Genealogical and medical records revealed that four families accounted for 73 percent of all suicides, but represented only 16 percent of the total Amish population.<sup>7</sup>

Twin studies and family studies suggest that, irrespective of possible psychiatric diseases, suicides and attempted suicides have got a genetic

basis. A number of family studies have reported that suicidality runs in families.<sup>8-16</sup> A study revealed that the offspring of mothers with suicide attempts are at a markedly increased risk for suicidality themselves. Furthermore, it was found that maternal history of suicide attempts tended to predict an earlier onset of first suicide attempt in offspring<sup>17</sup>.

### **CENTRAL SEROTONINERGIC SYSTEM AND SUICIDE**

The serotonergic system is known to modulate mood, emotion, sleep and appetite and thus is implicated in the control of numerous behavioral and physiological functions. Decreased serotonergic neurotransmission has been proposed to play a key role in the etiology of depression. The concentration of synaptic serotonin is controlled directly by its reuptake into the pre-synaptic terminal and, thus, drugs blocking serotonin transport have been successfully used for the treatment of depression.<sup>18</sup>

Abnormalities in the functioning of the central serotonergic system are involved in the pathogenesis of depressive illness and suicidal behavior. Studies have shown that the number of brain and platelet serotonin transporter binding sites are reduced in patients with depression and in suicide victims, and that the density of 5-HT<sub>2A</sub> receptors is increased in brain regions of depressed in suicide victims.<sup>19-21</sup>

Several lines of evidence indicate that abnormalities in the functioning of the central serotonergic system are involved in the pathogenesis of depressive illness and suicidal behavior. Studies have shown that the number of brain and platelet serotonin transporter binding sites are reduced in patients with depression and in suicide victims, and that the density of 5-HT<sub>2A</sub> receptors is increased in brain regions of depressed in suicide victims and in platelets of depressed suicidal patients. Genes that code for proteins, such as tryptophan hydroxylase, 5-HT transporter, and 5-HT<sub>2A</sub> receptor, involved in regulating serotonergic neurotransmission, have thus been major candidate genes for association studies of suicide and suicidal behavior.<sup>22, 23</sup>

### **NATURALLY LOW OR CLINICALLY REDUCED CHOLESTEROL AND SUICIDE**

Accumulating evidence suggests that naturally low or clinically reduced cholesterol is associated with increased non-illness mortality (principally suicide and accidents). Other evidence suggests that such increases in suicide and traumatic death may be mediated by the adverse changes in behavior and mood that sometimes accompany low or reduced cholesterol. The investigations in monkeys reveal that reductions in plasma cholesterol increase the tendency to engage in impulsive or violent behavior through a mechanism involving central serotonergic activity. The epidemiological and experimental data could be interpreted as having two implications for public health: (1) low-cholesterol may be a marker for risk of suicide or traumatic death and (2) cholesterol lowering may have adverse effects for some individuals under some circumstances.<sup>24-27</sup>

An excess mortality for violence (suicides and injuries) has been observed following the use of cholesterol lowering drugs. It has been suggested that low cholesterol is associated with depression by modifying the serotonin metabolism. In a study, a new hypothesis concerning the association among serum lipids, depression, and atherosclerosis is proposed. The hypothesis is based on epidemiologic evidence concerning serum lipids, depression, violent deaths, and atherosclerosis. It is also based on previous results concerning a cytokine, interleukin-2. Recent observations indicate that interleukin-2 has an important role in lipid metabolism, depression, and atherosclerosis.<sup>28</sup>

### **PREFRONTAL CORTEX AND SUICIDE**

At a conference of the American College of Neuropsychopharmacology in 2001, Arango reported that the brains of people who were depressed and died by suicide contained fewer neurons in the orbital prefrontal cortex, a patch of brain just above each eye. What is more, in suicide brains, that area had one third the number of presynaptic serotonin transporters that control brains had but roughly 30 percent more postsynaptic serotonin receptors.<sup>29</sup>

Post-mortem studies of the brains of suicide victims indicate that the part of the brain associated with controlling aggression and other impulsive behaviors (the frontal cortex) has a significantly lower level of serotonin, a neurotransmitter associated with mood disorders.<sup>30-33</sup>

### **HYPERACTIVITY OF THE HYPOTHALAMIC-PITUITARY-ADRENAL (HPA) AXIS**

Hyperactivity of the hypothalamic-pituitary-adrenal (HPA) axis is also described in suicide victims. The HPA axis is the classical neuroendocrine system that responds to stress and whose final product, corticosteroids, targets components of the limbic system, particularly the hippocampus.<sup>34</sup>

### **ALCOHOL AND SUICIDE**

Next to depression, alcoholism and drug abuse are the psychiatric conditions most strongly associated with suicide attempts and completed suicides. Alcohol and drugs are involved in about 50 percent of all suicide attempts. About 25 percent of completed suicides occur among individuals with alcoholism or drug abuse. Acute substance use makes suicide more likely. Nearly all alcoholic suicides occur among active drinkers, and alcohol consumption often immediately precedes the suicide. Individuals who drink a significant amount of alcohol before a suicide attempt make more serious suicide attempts. Clinicians should be educated about a risk of suicidal behavior among individuals with substance abuse.<sup>35, 36</sup>

Between 30 and 50 percent of persons who die by suicide have a dependence on alcohol or drugs or have shown a pattern of abuse of those substances. In a Finnish study, covering all ages over the entire country, diagnoses of dependence and abuse were present in 43 percent of the cases, twice as often in men (39%) as in women (18%). In another study conducted in the United States, alcohol abuse was found in 55 percent of cases. Even in South India, where alcohol is difficult to find, author found in the city of Chennai, that 35 percent of suicides showed signs of alcoholism.<sup>37-43</sup>

### **DISCUSSION**

The taking of one's own life is the result of a complex interaction of psychological, sociological, environmental, genetic, and biological risk factors. Suicide is neither a disease nor the result of a disease or illness, but rather a desperate act by people who feel that ending their life is the only way to stop their interminable and intolerable suffering.

Deaths by suicide have broad psychological and social impacts on families and societies throughout the world. On average, each suicide intimately affects at least six other people, and if the suicide occurs in the school or workplace it can significantly impact hundreds. Suicidal behavior is the result of the interaction between an individual's threshold for suicidal acts and the stressors that can lead to suicidal behavior. Attempted suicide and causative factors like mental disorders, alcoholism clustered in a subset of families. These relationships may have a genetic origin and may be mediated by intoxication, mixed states, and/or temperamental instability<sup>44</sup>.

### **CONCLUSION**

Once high-risk patients are identified, their suicide risk can be managed through treatments such as prophylactic lithium treatment and other pharmacologic approaches.<sup>45</sup>

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