

# Which are the recent clinical findings regarding the association between depression and suicide?

## Quais são os recentes achados clínicos sobre a associação entre depressão e suicídio?

Eduardo Chachamovich,<sup>1</sup> Sabrina Stefanello,<sup>2</sup> Neury Botega,<sup>2</sup> Gustavo Turecki<sup>1</sup>

### Abstract

**Objective:** Suicide is one of the leading causes of mortality worldwide, especially among young subjects. Suicide is considered the outcome of a multidimensional and complex phenomenon, which is a result of the interaction between several factors. The association between psychopathology and suicide has been extensively investigated. Major depression plays an important role among the psychiatric diagnoses associated with suicide. This finding seems to be confirmed by different study designs, and in distinct populations. The present paper aims to briefly review the recent findings regarding the suicide-related clinical features of depression. Moreover, strategies for suicide prevention were also reviewed. **Review:** Recent references were identified and grouped in order to illustrate the main contributions about depression and suicide. Briefly, the literature review stresses the high prevalence of major depression among subjects presenting suicide behaviors. Psychopathological traits, such as aggression and impulsivity play a relevant role in triggering suicidal behaviors. Strategies for suicide prevention were also reviewed in Brazil and internationally. In general, detection and treatment are effective in reducing suicide rates. **Conclusion:** Studies regarding suicide behaviors have had a pragmatic approach, and generated a large body of evidence about correlates of suicide. However, these studies have not been able to provide a consistent theoretical explanation for this phenomenon. The recent adoption of modern strategies represents a possibility of enhancing the research capability of such studies. In order to be clinically useful, findings should make it possible to deepen the understanding over the experience of a suicidal person, as well as to design specific strategies for prevention and treatment in population subgroups.

**Descriptors:** Suicide; Depression; Primary prevention; Impulsive behavior; Psychopathology

### Resumo

**Objetivo:** Suicídio é uma das maiores causas de mortalidade ao redor do mundo, especialmente entre indivíduos jovens. Suicídio é considerado o desfecho de um fenômeno complexo e multidimensional, e decorrente da interação de diversos fatores. A associação entre psicopatologia e suicídio tem sido largamente estudada. Dentre os diagnósticos psiquiátricos associados a suicídio, depressão maior se destaca sobremaneira. Tais achados parecem ser confirmados em diferentes desenhos metodológicos e em distintas populações. Este artigo visa a revisar sucintamente as contribuições recentes acerca das características clínicas da depressão que se encontram vinculadas a casos de suicídio. Destacam-se também os esforços de prevenção, no sentido de, ao se detectar e tratar casos de depressão em serviços gerais de saúde, diminuir o risco de suicídio. **Revisão:** Referências recentes foram identificadas e agrupadas com o intuito de ilustrar as principais contribuições acerca da interface entre depressão e suicídio. Brevemente, a revisão de literatura aberta aponta para a grande prevalência do diagnóstico de depressão maior entre os casos de comportamento suicida. Traços psicopatológicos de agressão e impulsividade parecem exercer um papel relevante no desencadeamento de atos suicidas. Estratégias de prevenção foram também revisadas nos contextos internacional e brasileiro. De modo geral, a detecção e tratamento de depressão são capazes de reduzir as taxas de suicídio. **Conclusão:** No campo da pesquisa sobre comportamento suicida, os estudos têm tido caráter pragmático e produziram um panorama de fatores claramente associados ao suicídio, sem, no entanto, oferecer uma amarração teórica consistente para os achados. A crescente adoção de modernas técnicas traz uma ampliação das possibilidades de investigação. Para serem clinicamente úteis, os novos conhecimentos devem possibilitar um olhar mais profundo no mundo de uma pessoa suicida, bem como a adoção de estratégias específicas de tratamento e de prevenção que fossem mais eficientes para subgrupos populacionais.

**Descritores:** Suicídio; Depressão; Prevenção primária; Comportamento impulsivo; Psicopatologia

<sup>1</sup> McGill Group for Suicide Studies, Department of Psychiatry, McGill University, Montreal, Canada

<sup>2</sup> Laboratory of Mental Health and Medicine, Department of Psychology and Psychology, School of Medical Sciences, Universidade Estadual de Campinas (Unicamp), São Paulo (SP), Brazil

### Correspondence

Gustavo Turecki  
McGill Group for Suicide Studies  
Douglas Mental Health Institute  
McGill University  
6875 LaSalle Blvd.  
Montreal, QC H4H 1R3, Canada  
E-mail: gustavo.turecki@mcgill.ca

Neury Botega  
Departamento de Psicologia Médica  
e Psiquiatria FCM Unicamp  
Caixa Postal 6111  
13081-970 Campinas, SP, Brasil  
E-mail: botega@fcm.unicamp.br

## Introduction

Suicide is one of the highest death causes worldwide, especially among the youngsters.<sup>1</sup> Consequently to its increasing prevalence, this condition has been considered a public health issue.<sup>2</sup> Recently, epidemiological prevalence studies have described great intercultural and age range variations. As a whole, the prevalence of deaths due to suicide is higher in East European countries, but lower in Central and South American countries. The rates in the US, Western Europe and Asia are in the middle range.<sup>3</sup>

In Brazil, 24 people die daily by suicide, and this information ends by not being divulged. Therefore, the impact of suicide is obscured by homicides and by traffic accidents, which exceed by six and four fold, in average and respectively, the number of suicides.<sup>4</sup>

Other parameters have been investigated as indicators of the impact of suicide. Its impact has been also assessed in terms of the DALYs (*disability-adjusted life years*). According to this indicator, suicide was responsible for 1.8% of the total impact of diseases worldwide in 1998. This rate varied from 1.7% in developing countries up to 2.3% in developed countries.<sup>5</sup> Comparatively, these rates are similar to those of wars and homicides, and approximately twice the rate of conditions such as diabetes.<sup>5</sup>

Besides the increasing number of deaths by suicide, suicide attempts are even more prevalent. It is estimated that they be twenty fold more frequent in the general population.<sup>6,7</sup> Results of the National Comorbidity Survey (NCS) indicate that nearly 5% of the general American population has attempted suicide at some point of their lives. Similarly, suicide attempts are associated with significant morbidities and constitute a major predictor of later suicide.<sup>8,9</sup>

The epidemiological survey of the Multisite Intervention Study on Suicide Behavior (SUPRE-MISS) of the World Health Organization (WHO) interviewed 5,987 individuals from population samples of eight cities in South Africa, Brazil, China, Estonia, India, Iran, Sri Lanka, and Vietnam. Suicidal ideation (2.6-25.4%), suicide planning (1.1-15.6%) and suicide attempts (0.4-4.2%) varied among the centers studied.<sup>10</sup> In the urban area of the city of Campinas-SP, in lifetime, 17.1% of individuals "had thought seriously about ending their lives", 4.8% even had elaborated a plan for that and 2.8% had effectively attempted suicide. The same prevalences in the prior 12 months were, respectively, 5.3%, 1.9% and 0.4%. Suicide ideation was more frequent in women (OR = 1.7), in young adults (20 to 29 years: OR = 2.9; 30 to 39 years: OR = 3.6; compared to the group aged 14 to 19 years), among those who lived outside the family nucleus (OR = 4.2) and in those with mental disorders (OR between 2.8 and 3.8).<sup>11</sup> Suicide ideation was strongly associated with depression symptoms, especially with lack of energy (OR = 4.8) and depressed mood (OR = 4.4).<sup>12</sup>

Suicide is considered the outcome of a complex and multidimensional phenomenon, stemming from the interaction of several factors.<sup>1</sup> There is consensus among researchers in suicidology about the notion that there is no single factor capable of responding for the cause of suicide attempts. Contrarily, the factors which concur for this phenomenon are concurrent.<sup>5</sup> Among the risk factors extensively studied in the international literature stand out prior suicide attempts, genetic factors, social and familial support, and psychopathology.<sup>13-16</sup>

Historically, psychological theories have tried to understand the factors which concur for suicide. Psychoanalysis highlighted the pathological form of the grieving process which occurs in melancholy: the sadism would be invested against the self, identified with a lost object.<sup>17</sup> Freud, when considering the importance of human aggressiveness, has introduced a new pulsional dualism:

life instinct and death instinct.<sup>18</sup> Menninger highlighted that the desire of killing, present in suicidal individuals, may be directed not only to an internal object, as the clinical experience reiteratively confirms that suicide is frequently aimed, as a revenge, to destroy the lives of the survivors.<sup>19</sup>

Cognitive psychology, in turn, understands that the higher the ideation, the higher the risk of suicide; the higher the desire of death, and, especially the feeling of hopelessness, the higher the suicide planning and the lethal power of the chosen method.<sup>20,21</sup> Shneidman states that experiencing an unbearable emotional pain, "*psychache*", is what most characterizes the state of an individual in the imminence of committing suicide: a feeling of internal turbulence and of being caught within oneself.<sup>22</sup> The idea of suicide would arise in a situation of constriction of the perceptive state (affective and intellectual narrowing).

This article aims to briefly summarize the recent contributions on the clinical characteristics of depression which are linked to suicide cases. Next, we highlight the preventive efforts to decrease the risk of suicide by detecting and treating depression cases in general health services.

## Major depression and suicide

The association between the clinical picture of major depression and suicidal behavior has been extensively described. These findings seem to be confirmed in different methodological designs and in different populations. For instance, population-based surveys in the US (National Comorbidity Survey<sup>23</sup> and Epidemiologic Catchment Area<sup>24</sup>), Canada<sup>6</sup> and urban areas of China<sup>25</sup> point that depression is the main nosological entity associated with suicide attempts, suicidal ideation, and suicide plans. Lee et al. reported that, compared to anxiety disorders, the diagnosis of major depression was associated with a nearly ten-fold odds ratio (OR = 1.9-18.5 and OR = 17.8-50.0, respectively).<sup>25</sup> Nock et al. corroborate the Chinese findings, indicating the persistence of these in distinct cultural contexts.<sup>3</sup> In addition, Kessler et al. confirmed the temporal stability of this association when comparing the results of the NCS (collected in 1990-1992) to those of the NCS-R (obtained in 2001-2003).<sup>26</sup> After one decade, the proportion of major depression among subjects with suicide ideation, plan, gesture and attempt remained comparable.

Several clinical studies have also dealt with the association between depression and suicide, and their conclusions point in the same direction. Using a retrospective longitudinal design, Chang et al. reported a higher chance of death by suicide (*hazard ratio* = 1.72) in a group of Taiwanese patients with diagnosis of major depression in relation to a control group.<sup>27</sup> Using case-control studies with a diagnosis proceeding based on psychological autopsy interviews, McGill's Study Group on Suicide has consistently indicated the extensive association between major depression and suicide. Lesage et al. investigated men victims of suicide and matched controls of the community of Montreal, exploring the comorbidity patterns by means of latent class analysis.<sup>28</sup> Major depression was the most frequently found Axis I diagnosis (38.7% in the studied group vs. 5.3% in the control group). Using an innovative data collection strategy (Life Trajectory Instrument), which provides in detail the life events and psychological signs of the subject studied, Séguin et al. corroborated the remarkable prevalence of depression in the studied sample (102 victims of suicide consecutively selected).<sup>29</sup> The diagnosis of major depression was the most widely found (66% of the cases), followed by substance use disorder (59%).

The importance of comorbidity in increasing the suicide risk is also well established. One Finish study of psychological autopsy, in a

random sample of 229 suicides, has revealed that 93% of them had an Axis I psychiatric diagnosis. Only 12% of the cases received an Axis I diagnosis alone, without other associated disease. Almost half of the cases (44%) had two or more Axis I diagnoses. Most prevalent disorders were depression (59%) and alcohol dependence or abuse (43%). A personality disorder diagnosis (Axis II) was suggested for 31%, and a diagnosis of non-psychiatric disease (Axis III) for 46% of suicide cases.<sup>30</sup> In addition, a recent study on the same cases has shown that, although half of the victims considered as depressed were on psychiatric treatment at the time of suicide, only few of them were receiving an adequate treatment for depression. The results have also evidenced some factors more related to men who suffer from depression: they seek less for help, they are less frequently diagnosed as depressed and receive fewer treatments for depression, besides complying less with them.<sup>31</sup>

Among the depressed, drug dependence, panic attacks, severe anxiety, restlessness, and insomnia increase the chance of death by suicide.<sup>32</sup> Among the elders it is common the coexistence of non-psychiatric diseases; among the youngest, personality disorders.<sup>27</sup> In the case of bipolar disorder, the mixed states, delusions in the manic phase, and the lack of compliance with treatment increase the risk.<sup>33</sup>

Interestingly, the presence of depression sometimes represents the link (mediation) between anxiety and suicidality features. Diaconu and Turecki have demonstrated in a sample of outpatient psychiatric subjects with panic disorder that anxiety disorder alone was not associated with suicidality, whereas individuals with comorbid major depression showed significantly higher association of suicide intention and behavior.<sup>34</sup>

An extensive meta-analysis about psychiatric diagnoses and suicide indicated that 87.3% of the subjects showed at least one psychiatric diagnosis prior to suicide. As a whole, 43.2% of the cases showed mood disorders, 25.7% showed substance use disorders, 16.2% had diagnosis of personality disorder, and 9.2% showed psychotic disorders. Moreover, the prevalence has shown to be significantly variable according to gender. In fact, gender seems to determine differences in the profiles of subjects with suicide attempts, among which outstand a higher prevalence and intensity of depressive symptoms.<sup>35</sup>

Aiming to explore the temporal relation between suicide and depression, McGirr et al. advanced in the investigation of such inter-relationship.<sup>36</sup> Starting from the controversy about the peak of suicide risk in depressed patients (higher risk in the early development of depressive disorder or cumulative risk along the disorder), the authors performed one case-control study and showed that 74.4% of suicides were associated with the first episode of major depression, 18.8% were related to the second episode, and 6.5% were associated with more than two episodes. Moreover, the exploratory analyses of these data evidenced that impulsive and aggressive behaviors underlay these differences.

Complementarily, depressive symptoms seem also to be decisive as an etiological factor of suicide ideation and suicide attempts. In one case-control study, Da Silva et al. have reported that depressive symptoms (especially lack of energy and depressed mood) were consistently associated with suicide ideation, whereas the demographic characteristics were not predictors in this study.<sup>12</sup>

Although the great majority of individuals who commit suicide have any psychiatric pathology (most of them from Axis I and predominantly major depression), approximately 10% of subjects who commit suicide do not have psychiatric diagnoses.<sup>37</sup> Ernst et al. have conducted a case-control study including a sample of

suicide victims with Axis I diagnosis, a sample of victims without Axis I diagnosis and a third sample of living controls.<sup>38</sup> Measures of impulsiveness, aggressiveness, hostility, and mood were obtained in the three subsamples. The results have shown that the group of victims without Axis I diagnosis presented more similarities to the sample with the diagnosis than to the control group. Thus, the notion that psychopathological traits have an outstanding role in suicide cases is reinforced, even in cases apparently free of major psychiatric diseases. In addition, the authors emphasized the need of enhancing the understanding of the relationship between psychiatric pathology and suicide, beyond the mere association diagnosis vs. suicide.

Another possible methodological approach to investigate depression and suicide is the identification of specific characteristics that may mediate or moderate this relationship.<sup>39</sup> Although several personality dimensions have been studied (such as neuroticism, anxiety, and introversion), the association between aggressive/impulsive behaviors and suicide have received a deserved remark in the literature.<sup>14</sup>

#### Impulsiveness/Aggressiveness and suicidality

Despite the fact that mood disorders have been systematically implicated in the etiology of the suicidal behavior, only a minority of patients who develop major depression will engage, in any moment of lifetime, in suicidal acts. The heterogeneity of depressive disorders does not seem to fully explain this discrepancy.<sup>8</sup> The reason why not more than 15% of depressed patients die from suicide, whereas others with similar levels of depression do not, remains an issue of immense clinical relevance.<sup>16</sup> Consistent findings have indicated that the increase in impulsiveness and aggressive behavior have a remarkable role in the mediation between mental disease and suicide.<sup>1,14,16,40,41</sup>

Several researchers have dealt with the causal relationship between aggressiveness/impulsiveness and suicide by means of different methodological strategies. Studies with living subjects who tried suicide are consensual to demonstrate significantly higher levels of these characteristics.<sup>42,43</sup> Other findings corroborate the importance of impulsiveness and aggressiveness traits in the presence of psychiatric diagnoses and suicide attempts.<sup>44,45</sup> More recently, the etiological role of impulsiveness and aggressiveness have received notable support from studies involving individuals who committed suicide, when compared to control groups.<sup>1,14-16</sup> Aggressive and impulsive behaviors are extensively present not only in subjects with major depression and suicide,<sup>43,46</sup> but also in suicide victims who showed other diagnoses, such as substance abuse disorder<sup>15,47,48</sup> and borderline personality disorder.<sup>14,49</sup> The association between aggressive and impulsive behavior seems not to be dependent on psychopathology.<sup>16</sup> Impulsiveness and aggressiveness could be, in fact, the causal link between depression and suicide.<sup>46</sup>

Moreover, the use of violent suicide methods is also associated with the levels of aggressiveness in lifetime. Dumais et al. have described the use of violent methods as an essential behavioral marker of aggressiveness and have demonstrated other correlates of aggressiveness and impulsiveness (particularly drug and alcohol abuse in lifetime) are also frequently present.<sup>16</sup> Even after a statistical control for possible confounders, the association between aggressive behavior and suicide by a violent method remains.

Due to the clinical relevance implied in the detection of more specific predictors of suicide, and to the fact that aggressiveness and impulsiveness traits are not restricted to determined diagnostic

categories, recent studies have explored those constructs in different clinical contexts. Under the familial point of view, the presence of suicide in the family is associated not only with a three-fold chance of suicidal behavior in probands when compared to subjects without family history (13.2% vs. 4.2%, respectively).<sup>8</sup> Additionally, the presence of family history has been also associated with significantly higher scores of aggressiveness/impulsiveness, independently from his/her own psychopathological history. As a consequence, it is estimated that the aggressive/impulsive behavior may be the underlying link between family history of suicide and new attempts by probands. Family aggregation studies on suicide reinforce this association, even controlling for other confounders which also show high family aggregation. Kim et al. have designed a study to test for the association between aggressiveness traits in family member of victims of suicide and death by suicide, aiming to exclude the mediation of psychological traits.<sup>50</sup> The results point that the familial component of suicide is independent from the family-grouped psychopathology. More details about the familial transmission of suicidal behavior can be found in a recent review study by Bredt e Melhem.<sup>51</sup>

In patients who have diagnosis of major depression, aggressive and impulsive behaviors are also remarkable. Dumais et al. conducted a case-control study with depressed patients (104 victims of suicide and 74 living controls), demonstrating that aggressive behaviors were associated with suicide, and that such an association is even more evident in subjects aged between 18 and 40 years.<sup>16</sup> Subsequent studies have focused the distribution of risk among different age ranges, corroborating Dumais et al.'s findings.<sup>16</sup> Recently, McGirr et al. have investigated one sample of 645 subjects aged between 11 and 87 years via psychological autopsy.<sup>49</sup> After controlling for confounders and psychopathology, the interaction between impulsive-aggressive behaviors, age and novelty seeking was capable of predicting the present state of suicidality. Additionally, the effects of impulsive-aggressive behaviors were more prominent in young subjects, and their importance has decreased with age.

#### Other developmental factors

Developmental factors not directly included in the diagnostic criteria of psychopathological pictures have been investigated in suicide cases. Among other characteristics, the identification of these factors enables primary preventive strategies, as it deals with stages previous to the onset of mental disease and its consequent functional impairment.

Brezo et al. have studied the natural course of suicidal behaviors in a cohort of 3,017 individuals.<sup>52</sup> Among the five dimensions implied in suicide, history of sexual abuse in childhood has been associated with later suicidal behavior. Moreover, the presence of physical abuse is also associated with the increase of risk of suicidal behavior, but with markedly lower intensity. For example, the increase in the chance of one single suicide attempt was OR = 2.3 (CI 95% 1.1-4.8) in individuals with physical abuse, and OR = 6.8 (CI 95% 2.0-23.3) in subjects with history of sexual abuse. Interestingly, individuals with history of combined abuse (physical and sexual) showed even higher OR.

The trajectory of determined child characteristics up to the possible outcome of suicide constitutes a well-established investigation line. Transversal studies have demonstrated that cognitive antecedents and child personality traits may be involved in suicidal behaviors in adult phases.<sup>53</sup> Neuroticism, anxiety and behavioral deregulation are characteristics frequently implied in the etiology of suicide

attempts or suicide.<sup>54-56</sup> These findings have been strengthened by a recent longitudinal study, which avoids the main limitations of the former ones. Brezo et al. have identified that disruptive behaviors in childhood have statistical association with suicidality (OR = 1.80 CI95% 1.03-3.13), as well as with mixed disrupted behaviors and anxiety (OR = 1.88 CI95% 1.05-3.37).<sup>57</sup>

Contrarily, anxiety has not shown significant association with the outcome studied. Interestingly, gender represents an important moderating factor, being the risk significantly higher in female than in male subjects (for mixed behaviors, OR = 0.8 in men and OR = 3.60 in women).

#### Detecting and treating adequately reduces the risk of suicide

As it has been described up to now, depressed people have an increased risk of suicide, which is higher in the presence of other diseases and comorbidities. The risk is lower when the disease is being treated or in remission. Thus, the detection and adequate treatment of people with mental disorders, especially depression, starting from the attention in health general services seems to be the most effective form of preventing suicide.<sup>58-60</sup> This strategy was adopted in Brazil by the Ministry of Health and is part of the National Strategy to Prevent Suicide.<sup>61</sup>

One study carried out in Gotland, a Swedish island, is an example of how an intervention which included the training of professionals, aiming at the higher detection and adequate treatment of depression, can reduce the number of suicides. Two years after starting the project, there was a 60% reduction in the coefficient of mortality by suicide. This reduction occurred among those who had diagnosis of depression and who were under medical follow-up, a group mainly composed of women and elderly people. There was no decrease in the suicide coefficients among men.<sup>62,63</sup> As a whole, studies based on the training of physicians, focused on the detection and treatment of depression, evidence an increase in the prescription of antidepressants and a decrease in the rates of suicidal ideation and suicide.<sup>60,62,64,65</sup>

Along ten years, the association of an educational program on depression and a community-based program for the detection of depression among elderly people in Yasuzuka (Japan) has obtained similar results to those of the study in Gotland. The risk of suicide in elderly women has decreased by 64%; however, among men there were no significant differences.<sup>66</sup> Nevertheless, some studies have not confirmed the good results obtained in Gotland and Yasuzuka, when the educational program aimed especially at primary care physicians.<sup>67-69</sup>

Currently, in order to make clinically effective the management of depression, there is evidence suggesting complex and multifaceted approaches.<sup>70</sup> The Nuremberg Alliance against Depression has accomplished a two-year intervention program in Nuremberg (Germany), in four levels: training of family doctors and support by means of different methods; a public information campaign about depression; partnership with community facilitators (teachers, priests, local media etc.); support for self-help activities, as well as for groups at high risk of suicide. The effects of this intervention in the number of suicidal behaviors (suicide plus suicide attempts, defined as the main outcome) were assessed comparing them to the data obtained one year later and to the control region (Wuerzburg). Even taking into account the limitations of the study, the Nuremberg Alliance against Depression has presumably improved the attention given to depressed patients and has prevented the suicidal behavior. A reduction in the frequency of suicidal acts in Nuremberg was detected, of 19% and 24% during the first and second year of the

program, respectively.<sup>71</sup> The Nuremberg project was expanded to other regions of Germany and, due to its positive results, eighteen international partners, representing 16 European countries, have formed the European Alliance against Depression in 2004.<sup>72</sup>

Actions to prevent suicide can also be started in the general hospital, in at least two groups of individuals: in those who, after being assessed as outpatients or hospitalized patients, a mental disorder is detected and among those who are seen due to a suicide attempt.<sup>35,73,74</sup>

It is estimated that the suicide risk in hospitalized patients is three times that of the general population.<sup>75</sup> The majority of those who commit suicide during hospitalization suffer from chronic or terminal diseases, or yet of painful and debilitating conditions.<sup>76</sup> In the same way that in the general population, suicide is more frequent among those who have a psychiatric comorbidity, commonly not detected by the health professionals. One psychological autopsy study has shown that 88% of patients who had committed suicide during a hospitalization suffered from one or more psychiatric disorders.<sup>77</sup>

In one study accomplished in the Clinical Hospital of the Universidade Estadual de Campinas (Unicamp), in a random sample of 253 hospitalizations, it was estimated a high suicide risk, according to the The Mini International Neuropsychiatric Interview (MINI) in 5% of the patients. The latter had a recent diagnosis of severe disease, performed during the hospitalization, sudden worsening of chronic diseases and chronic suffering by cancer or physical deformity. The risk was higher among young adults, aged less than 30 years, among those had no matrimonial link and among those who were depressed. Of the 74 patients suffering from major depression, 58% had risk of suicide, compared to 0% among those not affected by depression.<sup>78</sup> In the same line of these results, one Danish study which has assessed 5.000 multiple sclerosis patients showed higher risk among young adults. The risk in those who had been diagnosed after 40 years of age was near to that of the general population.<sup>79</sup> Other studies have evidenced higher risk of suicide in young adults among patients with spinal medulla lesion,<sup>80</sup> Parkinson disease,<sup>81</sup> and cerebral vascular accident.<sup>82</sup> Considering all this set of information, it is advisable a proactive action of psychiatric liaison and hospital psychology services, by training professionals to detect and treat depression cases, as well as cases of pathological use of alcohol and risk of suicide during hospitalization and after discharge.<sup>83</sup>

There are several clinical studies that profited from psychosocial interventions aiming to prevent new suicide attempts, which are available in review articles.<sup>84,85</sup> When recurrence of suicide attempts is used as the outcome variable, the set of publications show controversial results.<sup>86</sup> On the other hand, some studies have evidenced that regular contacts with groups at high risk of suicide resulted in a significant decrease in the number of suicides after a variable follow-up period.<sup>87,88</sup>

One clinical trial with 1,867 cases of suicide attempts in five centers which participate in the SUPRE-MISS (Campinas, Brazil; Chennai, India; Colombo, Sri Lanka; Karaj, Iran; and Yuncheng, China) has compared a low-cost psychosocial intervention (motivational interview, plus regular telephone contacts) with the usual treatment available at those places (generally, hospital discharge, with or without outpatient referral). At the end of 18 months, less deaths by suicide occurred in the group that received the intervention than in the group that received the usual treatment (0.2% vs. 2.2%, respectively,  $p < 0.001$ ) were recorded. These results show that such a program could easily be a suitable

alternative to prevent suicide in countries that have little financial resources applied in the health area.<sup>89</sup>

### Conclusion

In the research field on suicidal behavior, the studies have had a pragmatic character and detected several factors clearly associated with suicide, without, however offering a theoretical explanation consistent with the data. These, most of times, can be taken only as correlations.<sup>90</sup> It is necessary that the identification of risk and protective factors be followed by theories which may, comprehensively, integrate the new findings to the theoretical body of knowledge aiming to understand the human behavior.

The increasing adoption of modern techniques widened the possibilities of investigation. In an environment of basic research, the development of technology lab has brought about more comprehensive and specific results regarding the interrelationship of genes and environment, as well as concerning the molecular alterations linked to suicide. In the setting of clinical investigations, new statistical tools (such as, for example, Structural Equation Modeling analyses) also enable the refinement of the findings and the broadening of the knowledge generated.

In order to be clinically useful, the new knowledge should enable a deeper inspection into the world of a suicidal person, as well as the adoption of specific strategies for the treatment and prevention which would be more efficient for population subgroups, or even for one individual, particularly:

*"A natural scientist is not embarrassed because he cannot look at a tree and predict which leaves will fall first in the autumn or the exact path of the fall or where the leaf will land. Maybe individual lives are a lot like leaves; perhaps there is a very limited amount one can say about the individual case, based on a knowledge of leaves in general or people in general, without detailed, idiographic study of that particular case and even then it is hard to know how the winds will blow from one day to the next".<sup>91</sup>*

## Disclosures

Writing group member	Employment	Research grant <sup>1</sup>	Other research grant or medical continuous education <sup>2</sup>	Speaker's honoraria	Ownership interest	Consultant/ Advisory board	Other <sup>3</sup>
Eduardo Chachamovich	McGill	CIHR	-	-	-	-	-
Sabrina Stefanello	Serviço de Saúde Dr. Cândido Ferreira Prefeitura Municipal de Campinas	OPAS**	-	-	-	-	-
Neury Botega	Unicamp	FAPESP** Ministério da Saúde** OPAS**	-	-	-	RBP	-
Gustavo Turecki	McGill	CIHR***	-	-	-	RBP	-

\* Modest

\*\* Significant

\*\*\* Significant. Amounts given to the author's institution or to a colleague for research in which the author has participation, not directly to the author.

Note: Unicamp = Universidade Estadual de Campinas; CIHR = Canadian Institutes of Health Research; OPAS = Organização Pan-Americana de Saúde; RBP = Revista Brasileira de Psiquiatria.

For more information, see Instructions for authors.

## References

- McGirr A, Renaud J, Seguin M, Alda M, Benkelfat C, Lesage A, Turecki G. An examination of DSM-IV depressive symptoms and risk for suicide completion in major depressive disorder: a psychological autopsy study. *J Affect Disord.* 2007;97(1-3):203-9.
- Hawton K, Heeringen K, editors. *The international handbook of suicide and attempted suicide.* Chichester: Wiley; 2002.
- Nock MK, Borges G, Bromet EJ, Alonso J, Angermeyer M, Beautrais A, Bruffaerts R, Chiu WT, de Girolamo G, Gluzman S, de Graaf R, Gureje O, Haro JM, Huang Y, Karam E, Kessler RC, Lepine JP, Levinson D, Medina-Mora ME, Ono Y, Posada-Villa J, Williams D. Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *Br J Psychiatry.* 2008;192(2):98-105.
- Brasil. Ministério da Saúde. Sistema de Informações sobre Mortalidade/MS/SUS/DASIS. *Informações de Saúde - Estatísticas Vitais.* [citado 30 Jul 2008]. Disponível em: <http://tabnet.datasus.gov.br>.
- World Health Organization. *Preventing suicide: A resource for general physicians.* Department of Mental Health, Geneva: World Health Organization; 2000.
- Cutcliffe JR. Research endeavours into suicide: a need to shift the emphasis. *Br J Nurs.* 2003;12(2):92-9.
- Blackmore ER, Munce S, Weller I, Zagorski B, Stansfeld SA, Stewart DE, Caine ED, Conwell Y. Psychosocial and clinical correlates of suicidal acts: results from a national population survey. *Br J Psychiatry.* 2008;192(4):279-84.
- Diaconu G, Turecki G. Family history of suicidal behavior predicts impulsive-aggressive behavior levels in psychiatric outpatients. *J Affect Disord.* 2008;113(1-2):172-8.
- World Health Organization. *Suicide Prevention (SUPRE).* WHO, 2007. [cited 2008 Jun 30]. Available from: [http://who.int/mental\\_health/prevention/suicideprevent/en/](http://who.int/mental_health/prevention/suicideprevent/en/).
- Bertolote JM, Fleischmann A, De Leo D, Bolhari J, Botega N, De Silva D, Tran Thi Thanh H, Phillips M, Schlebusch L, Várnik A, Vijayakumar L, Wasserman D. Suicide attempts, plans, and ideation in culturally diverse sites: the WHO SUPRE-MISS community survey. *Psychol Med.* 2005;35(10):1457-65.
- Botega NJ, Barros MB, Oliveira HB, Dalgalarondo P, Marin-Leon L. Suicidal behavior in the community: prevalence and factors associated with suicidal ideation. *Rev Bras Psiquiatr.* 2005;27(1):45-53.
- da Silva VF, de Oliveira HB, Botega NJ, Marin-Leon L, Barros MB, Dalgalarondo P. Factors associated with suicidal ideation in the community: a case-control study. *Cad Saude Publica.* 2006;22(9):1835-43.
- Brezo J, Barker ED, Paris J, Hébert M, Vitaro F, Tremblay RE, Turecki G. Childhood trajectories of anxiousness and disruptiveness as predictors of suicide attempts. *Arch Pediatr Adolesc Med.* 2008;162(11):1015-21.
- McGirr A, Paris J, Lesage A, Renaud J, Turecki G. Risk factors for suicide completion in borderline personality disorder: a case-control study of cluster B comorbidity and impulsive aggression. *J Clin Psychiatry.* 2007;68(5):721-9.
- Dumais A, Lesage AD, Alda M, Rouleau G, Dumont M, Chawky N, Roy M, Mann JJ, Benkelfat C, Turecki G. Risk factors for suicide completion in major depression: a case-control study of impulsive and aggressive behaviors in men. *Am J Psychiatry.* 2005;162(11):2116-24.
- Dumais A, Lesage AD, Lalovic A, Séguin M, Tousignant M, Chawky N, Turecki G. Is violent method of suicide a behavioral marker of lifetime aggression? *Am J Psychiatry.* 2005;162(7):1375-8.
- Freud S. Luto e melancolia. In: Strachey J, editor. *Edição standard brasileira das obras psicológicas completas de Sigmund Freud.* (obra original publicada em 1915). Rio de Janeiro: Imago; 1976.
- Freud S. Além do princípio do prazer. In: Strachey J, editor. *Edição standard brasileira das obras psicológicas completas de Sigmund Freud.* (obra original publicada em 1920). Rio de Janeiro: Imago; 1976.
- Menninger K. *Eros e Tanatos: o homem contra si próprio.* São Paulo: Ibrasa; 1970.
- Beck AT. Hopelessness as a predictor of eventual suicide. *Ann N Y Acad Sci.* 1986;487:90-6.
- Weishaar ME, Beck AT. Clinical and cognitive predictors of suicide. In: Maris R B, Maltzberger J, Yufit R, editors. *Assessment and prediction of suicide.* New York: Guilford; 1992. p. 467-83.
- Schneidman E. *Definition of suicide.* New York: Wiley; 1985.
- Kessler RC, Borges G, Walters EE. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Arch Gen Psychiatry.* 1999;56(7):617-26.
- Moscicki EK, O'Carroll P, Rae DS, Locke BZ, Roy A, Regier DA. Suicide attempts in the Epidemiological Catchment Area Study. *Yale J Biol Med.* 1998;61(3):259-68.
- Lee S, Fung SC, Tsang A, Liu ZR, Huang YQ, He YL, Zhang MY, Shen YC, Nock MK, Kessler RC. Lifetime prevalence of suicide ideation, plan, and attempt in metropolitan China. *Acta Psychiatr Scand.* 2007;116(6):429-37.
- Kessler RC, Berglund P, Borges G, Nock M, Wang PS. Trends in suicide ideation, plans, gestures and attempts in the United States, 1990-1992 to 2001-2003. *JAMA.* 2005;293(20):2487-95.
- Chang HJ, Lin HC, Lee HC, Lin CC, Pfeiffer S. Risk of mortality among depressed younger patients: a five-year follow-up study. *J Affect Disord.* 2009;113(6):255-62.
- Lesage AD, Boyer R, Grunberg F, Vanier C, Morissette R, Ménard-Buteau C, Loyer M. Suicide and mental disorders: a case-control study of young men. *Am J Psychiatry.* 1994;151(7):1063-8.
- Séguin M, Lesage A, Turecki G, Bouchard M, Chawky N, Tremblay N, Daigle F, Guy A. Life trajectories and burden of adversity: mapping

- the developmental profiles of suicide mortality. *Psychol Med*. 2007;37(11):1575-83.
30. Henriksson MM, Aro HM, Marttunen MJ, Heikkinen ME, Isometsa ET, Kuoppasalmi KI, Lönnqvist JK. Mental disorders and comorbidity in suicide. *Am J Psychiatry*. 1993;150(6):935-40.
  31. Isometsa ET, Henriksson MM, Aro HM, Heikkinen ME, Kuoppasalmi KI, Lönnqvist JK. Suicide in major depression. *Am J Psychiatry*. 1994;151(4):530-6.
  32. Clark DC, Fawcett J. Review of empirical risk factors for evaluation of suicidal patients. In: Bongar B, editor. *Suicide: guidelines for assessment, management and treatment*. New York: Oxford University Press; 1992. p. 16-48.
  33. Jamison K. Suicide. In: Goodwin F, Jamison K, editors. *Manic depression*. Baltimore: Williams and Wilkins; 1990. p. 227-44.
  34. Diaconu G, Turecki G. Panic disorder and suicidality: is comorbidity with depression the key? *J Affect Disord*. 2007;104(1-3):203-9.
  35. Stefanello S, Cais CF, Mauro ML, de Freitas GV, Botega NJ. Gender differences in suicide attempts: preliminary results of the multisite intervention study on suicidal behavior (SUPRE-MISS) from Campinas, Brazil. *Rev Bras Psiquiatr*. 2008;30(2):139-43.
  36. McGirr A, Renaud J, Bureau A, Seguin M, Lesage A, Turecki G. Impulsive-aggressive behaviours and completed suicide across the life cycle: a predisposition for younger age of suicide. *Psychol Med*. 2008;38(3):407-17.
  37. Arseneault-Lapierre G, Kim C, Turecki G. Psychiatric diagnoses in 3275 suicides: a meta-analysis. *BMC Psychiatry*. 2004;4:37.
  38. Ernst C, Lalovic A, Lesage A, Seguin M, Tousignant M, Turecki G. Suicide and no axis I psychopathology. *BMC Psychiatry*. 2004;4:7.
  39. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. 1986;51(6):1173-82.
  40. Brent DA, Oquendo M, Birmaher B, Greenhill L, Kolko D, Stanley B, Zelazny J, Brodsky B, Melhem N, Ellis SP, Mann JJ. Familial transmission of mood disorders: convergence and divergence with transmission of suicidal behavior. *J Am Acad Child Adolesc Psychiatry*. 2004;43(10):1259-66.
  41. Turecki G. Dissecting the suicide phenotype: the role of impulsive-aggressive behaviours. *J Psychiatry Neurosci*. 2005;30(6):398-408.
  42. Corruble E, Damy C, Guelfi JD. Impulsivity: a relevant dimension in depression regarding suicide attempts? *J Affect Disord*. 1999;53(3):211-5.
  43. Malone KM, Haas GL, Sweeney JA, Mann JJ. Major depression and the risk of attempted suicide. *J Affect Disord*. 1995;34(3):173-85.
  44. Soloff PH, Lis JA, Kelly T, Cornelius J, Ulrich R. Risk factors for suicidal behavior in borderline personality disorder. *Am J Psychiatry*. 1994;151(9):1316-23.
  45. Grosz DE, Lipschitz DS, Eldar S, Finkelstein G, Blackwood N, Gerbino-Rosen G, Faedda GL, Plutchik R. Correlates of violence risk in hospitalized adolescents. *Compr Psychiatry*. 1994;35(4):296-300.
  46. Pompili M, Rihmer Z, Akiskal HS, Innamorati M, Iliceto P, Akiskal KK, Lester D, Narciso V, Ferracuti S, Tatarelli R, De Pisa E, Girardi P. Temperament and personality dimensions in suicidal and nonsuicidal psychiatric inpatients. *Psychopathology*. 2008;41(5):313-2.
  47. Brent DA. Depression and suicide in children and adolescents. *Pediatr Rev*. 1993;14(10):380-8.
  48. Brent DA, Bridge J, Johnson BA, Connolly J. Suicidal behavior runs in families. A controlled family study of adolescent suicide victims. *Arch Gen Psychiatry*. 1996;53(12):1145-52.
  49. McGirr A, Renaud J, Seguin M, Alda M, Turecki G. Course of major depressive disorder and suicide outcome: a psychological autopsy study. *J Clin Psychiatry*. 2008;69(6):966-70.
  50. Kim CD, Seguin M, Therrien N, Riopel G, Chawky N, Lesage AD, Turecki G. Familial aggregation of suicidal behavior: a family study of male suicide completers from the general population. *Am J Psychiatry*. 2005;162(5):1017-9.
  51. Brent DA, Melhem N. Familial transmission of suicidal behavior. *Psychiatr Clin North Am*. 2008;31(2):157-77.
  52. Brezo J, Paris J, Barker ED, Tremblay R, Vitaro F, Zoccolillo M, Hébert M, Turecki G. Natural history of suicidal behaviors in a population-based sample of young adults. *Psychol Med*. 2007;37(11):1563-74.
  53. Coté S, Tremblay RE, Nagin DS, Zoccolillo M, Vitaro F. Childhood behavioral profiles leading to adolescent conduct disorder: risk trajectories for boys and girls. *J Am Acad Child Adolesc Psychiatry*. 2002;41(9):1086-94.
  54. van Heeringen C, Audenaert K, Van Laere K, Dumont F, Slegers G, Mertens J, Dierckx RA. Prefrontal 5-HT<sub>2a</sub> receptor binding index, hopelessness and personality characteristics in attempted suicide. *J Affect Disord*. 2003;74(2):149-58.
  55. Beautrais AL, Joyce PR, Mulder RT. Personality traits and cognitive styles as risk factors for serious suicide attempts among young people. *Suicide Life Threat Behav*. 1999;29(1):37-47.
  56. Koller G, Preuss UW, Bottlender M, Wenzel K, Soyka M. Impulsivity and aggression as predictors of suicide attempts in alcoholics. *Eur Arch Psychiatry Clin Neurosci*. 2002;252(4):155-60.
  57. Brezo J, Klempman T, Turecki G. The genetics of suicide: a critical review of molecular studies. *Psychiatr Clin N Am*. 2008;31(2):179-203.
  58. Bertolote JM. Suicide prevention: at what level does it work? *World Psychiatry*. 2004;3(3):147-51.
  59. Beautrais AL. National strategies for the reduction and prevention of suicide. *Crisis*. 2005;26(1):1-3.
  60. Mann JJ, Apter A, Bertolote J, Beautrais A, Currier D, Haas A, Hegerl U, Lönnqvist J, Malone K, Marusic A, Mehlum L, Patton G, Phillips M, Rutz W, Rihmer Z, Schmidtke A, Shaffer D, Silverman M, Takahashi Y, Varnik A, Wasserman D, Yip P, Hendin H. Suicide prevention strategies: a systematic review. *JAMA*. 2005;294(16):2064-74.
  61. Brasil. Ministério da Saúde. *Diretrizes brasileiras para um plano nacional de prevenção do suicídio*. Portaria nº 1.876 de 14 de agosto de 2006. Brasília (DF).
  62. Rutz W. The role of primary physicians in preventing suicide: possibilities, short-comings, and the challenge in reaching male suicides. In: Lester D, editor. *Suicide prevention resources for the millennium*. Philadelphia: Brunner-Routledge; 2001.
  63. Rutz W, von Knorring L, Pihlgren H, Rihmer Z, Walinder J. Prevention of male suicides: lessons from Gotland study. *Lancet*. 1995;345(8948):524.
  64. Bruce ML, Ten Have TR, Reynolds CF, 3rd, Katz, II, Schulberg HC, Mulsant BH, Brown GK, McAvay GJ, Pearson JL, Alexopoulos GS. Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: a randomized controlled trial. *JAMA*. 2004;291(9):1081-91.
  65. Rihmer Z, Belso N, Kalmar S. Antidepressants and suicide prevention in Hungary. *Acta Psychiatr Scand*. 2001;103(3):238-9.
  66. Oyama H, Fujita M, Goto M, Shibuya H, Sakashita T. Outcomes of community-based screening for depression and suicide prevention among Japanese elders. *Gerontologist*. 2006;46(6):821-6.
  67. Bennewith O, Stocks N, Gunnell D, Peters TJ, Evans MO, Sharp DJ. General practice based intervention to prevent repeat episodes of deliberate self harm: cluster randomised controlled trial. *BMJ*. 2002;324(7348):1254-7.
  68. King M, Davidson O, Taylor F, Haines A, Sharp D, Turner R. Effectiveness of teaching general practitioners skills in brief cognitive behaviour therapy to treat patients with depression: randomised controlled trial. *BMJ*. 2002;324(7343):947-50.
  69. Thompson C, Kinmonth AL, Stevens L, Peveler RC, Stevens A, Ostler KJ, Pickering RM, Baker NG, Henson A, Preece J, Cooper D, Campbell MJ. Effects of a clinical-practice guideline and practice-based education on detection and outcome of depression in primary care: Hampshire Depression Project randomised controlled trial. *Lancet*. 2000;355(9199):185-91.
  70. Gilbody S, Whitty P, Grimshaw J, Thomas R. Educational and organizational interventions to improve the management of depression in primary care: a systematic review. *JAMA*. 2003;289(23):3145-51.
  71. Hegerl U, Althaus D, Schmidtke A, Niklewski G. The alliance against depression: 2-year evaluation of a community-based intervention to reduce suicidality. *Psychol Med*. 2006;36(9):1225-33.
  72. Hegerl U, Wittmann M, Arensman E, Van Audenhove C, Bouleau JH, Van Der Feltz-Cornelis C, Gusmao R, Kopp M, Löhr C, Maxwell M, Meise U, Mirjanic M, Oskarsson H, Sola VP, Pull C, Pycha R, Ricka

- R, Tuulari J, Värnik A, Pfeiffer-Gerschel T. The 'European Alliance Against Depression (EAAD)': a multifaceted, community-based action programme against depression and suicidality. *World J Biol Psychiatry*. 2008;9(1):51-8.
73. Freitas GV, Cais CF, Stefanello S, Botega NJ. Psychosocial conditions and suicidal behavior in pregnant teenagers: a case-control study in Brazil. *Eur Child Adolesc Psychiatry*. 2008;17(6):336-42.
  74. Rapeli CB, Botega NJ. Clinical profiles of serious suicide attempters consecutively admitted to a university-based hospital: a cluster analysis study. *Rev Bras Psiquiatr*. 2005;27(4):285-9.
  75. Dhossche DM, Ullsarac A, Syed W. A retrospective study of general hospital patients who commit suicide shortly after being discharged from the hospital. *Arch Intern Med*. 2001;161(7):991-4.
  76. Stenager EN, Stenager E. Physical illness and suicidal behavior. In: Hawton K, Heeringen K, editors. *The international handbook of suicide and attempted suicide*. Chichester: Wiley; 2002. p. 405-20.
  77. Suominen K, Isometsa E, Heila H, Lonnqvist J, Henriksson M. General hospital suicides--a psychological autopsy study in Finland. *Gen Hosp Psychiatry*. 2002;24(6):412-6.
  78. Ferreira MH, Colombo ES, Guimaraes PS, Soeiro RE, Dalgalarondo P, Botega NJ. Suicide risk among inpatients at a university general hospital. *Rev Bras Psiquiatr*. 2007;29(1):51-4.
  79. Stenager EN, Stenager E, Koch-Henriksen N, Bronnum-Hansen H, Hyllested K, Jensen K, Bille-Brahe U. Suicide and multiple sclerosis: an epidemiological investigation. *J Neurol Neurosurg Psychiatry*. 1992;55(7):542-5.
  80. DeVivo MJ, Black KJ, Richards JS, Stover SL. Suicide following spinal cord injury. *Paraplegia*. 1991;29(9):620-7.
  81. Stenager EN, Wermuth L, Stenager E, Boldsen J. Suicide in patients with Parkinson's disease. An epidemiological study. *Acta Psychiatr Scand*. 1994;90(1):70-2.
  82. Stenager EN, Madsen C, Stenager E, Boldsen J. Suicide in patients with stroke: epidemiological study. *BMJ*. 1998;316(7139):1206.
  83. Botega NJ, Silva SV, Reginato DG, Rapeli CB, Cais CF, Mauro ML, Stefanello S, Cecconi JP. Maintained attitudinal changes in nursing personnel after a brief training on suicide prevention. *Suicide Life Threat Behav*. 2007;37(2):145-53.
  84. Hawton K, Arensman E, Townsend E, Bremner S, Feldman E, Goldney R, Gunnell D, Hazell P, van Heeringen K, House A, Owens D, Sakinofsky I, Träskman-Bendz L. Deliberate self harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. *BMJ*. 1998;317(7156):441-7.
  85. Hepp U, Wittmann L, Schnyder U, Michel K. Psychological and psychosocial interventions after attempted suicide: an overview of treatment studies. *Crisis*. 2004;25(3):108-17.
  86. Sakinofsky I. Repetition of suicidal behavior. In: Hawton K, Heeringen K, editors. *The international handbook of suicide and attempted suicide*. Chichester: Wiley; 2000. p. 385-404.
  87. Motto JA, Bostrom AG. A randomized controlled trial of postcrisis suicide prevention. *Psychiatr Serv*. 2001;52(6):828-33.
  88. De Leo D, Dello Buono M, Dwyer J. Suicide among the elderly: the long-term impact of a telephone support and assessment intervention in northern Italy. *Br J Psychiatry*. 2002;181:226-9.
  89. Fleischmann A, Bertolote JM, Wasserman D, De Leo D, Bolhari J, Botega NJ, De Silva D, Phillips M, Vijayakumar L, Värnik A, Schlebush L, Thanh HT. Effectiveness of brief intervention and contact for suicide attempters: a randomized controlled trial in five countries. *Bull World Health Organ*. 2008;86(9):703-9.
  90. Rogers JR. Psychological research into suicide: past, present, and future. In: Lester D, editor. *Resources for the millennium*. Philadelphia: Brunner-Routledge; 2001. p. 31-44.
  91. Lykken DT. What's wrong with psychology anyway? In: Cicchetti D, Grove WM, editors. *Thinking clearly about psychology*. Minneapolis: University of Minnesota Press; 1991. p. 3-39. (Matters of public interest. v.1).