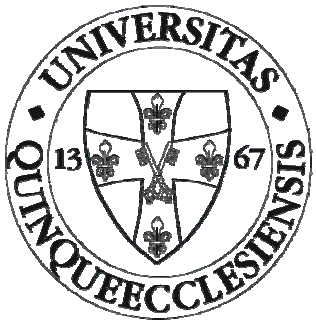
The Stress-Diathesis Model of Suicidal Behaviour

Ph.D. Thesis

Dr. Viktor Voros



Department of Psychiatry and Psychotherapy

Faculty of Medicine,

University of Pecs

Pecs, 2010

The Stress-Diathesis Model of Suicidal Behaviour

Integrative Perspectives in Our Clinical Studies

Among Patients with Suicidal Behaviour

Ph.D. Thesis

Dr. Viktor Voros

Department of Psychiatry and Psychotherapy

Faculty of Medicine

University of Pecs

Project Leader: Prof. Dr. Sandor Fekete

Ph.D. School Leader: Prof. Dr. Laszlo Lenard

Ph.D. Program Leader: Prof. Dr. Matyas Trixler

Pecs, 2010

TABLE OF CONTENTS

"There is only one really serious philosophical problem, and that is suicide."

(Camus A.: The Myth of Sysyphus)

I. INTRODUCTION

Suicide is complex, multi-causal phenomenon, which is a result of an interaction of several biological, psychological and social etiological factors. As '*final common pathway*', suicidal act is the endpoint of a dynamic progress. The causes of suicidal behaviour are complex and many different factors are involved, as is described in the *stress-diathesis model*, in which both genetic setup and exposure to overwhelming psychological stress (environmental factor), during childhood and in the adult, contribute to a person's final predisposition for suicidal behaviour. There is considerable evidence that there are complex interactions between genes, environment, that increase risk or protect against the neurobiological alterations that are observed in the diathesis for suicidal behaviour. It is important to integrate all the several aspects of suicidal phenomenon, because there is *no 'royal road'* to understand or prevent suicide. This may achieve a further increased understanding of suicidal causality, which is much needed for additional improvement of suicide prevention and intervention tools, in the form of better risk-assessment and treatment opportunities, at both the population-wide and individual levels.

Although *suicide rates* are decreasing worldwide, suicide is still a major health concern. In the *world* 1 million people commit suicide each year and 10–20 times more perform suicide attempts. In *Europe* there are 150000 completed suicides in a year (4/5 of them are males), and approximately 1 million people attempt suicide (mainly females). Despite of the major, almost 50% decrease of suicide rates in *Hungary* in the past 30 years, the country is still at the top of suicide statistics with the rate of 24/100000 suicides per year.

This work does not have a special focus on one particular topic or study, rather summarizes the *research process* which was conducted in Pecs suicide study centre in the last decade. Our aim was to introduce a comprehensive *theoretical model* of suicidal behaviour in our clinical studies, and also to develop an integrative, regional *suicide prevention strategy*.

II. CLINICAL STUDIES

1. *The WHO/EURO Multicenter Study on Suicidal Behaviour and the MONSUE Project*

Objective: A monitoring project within the framework of the *WHO/EURO Multicenter Study on Suicidal Behaviour* and the EU supported *MONSUE project* on suicidal behaviour has been performed in Pecs catchment area, which were aimed to register and statistically analyze all suicide attempts in the region, thus to explore current trends and consequences.

Method: Within the European, international, collaborative, multicenter study design (*monitoring study* and *repetition-prediction study*), detailed and complete data registration (epidemiologic, socio-demographic, socio-economic, previous attempts, methods, psychiatric diagnoses) of all suicide attempts is being carried out in the region from 1997.

Results: According to the Hungarian National Statistic Office 2500 *suicides* occurred in 2008, the population rate is 24.7/100000 inhabitants (40.1/100000 males, 10.7/100.000 females). The most common method for suicide was strangulation in both genders (male: 69.2%, female: 41%). Regarding *suicide attempts* we registered 993 cases during the last two-year period (males: 41.7%, mean age 38.43 years; females: 58.3%, mean age 42.02 years), which corresponds to former rates. We found high rate of *repeated suicide attempts*, female attempters were more likely repeaters (60 vs. 40%). Drug overdose (frequently combined with alcohol intake) was the most common *method* for suicide attempt in both genders, especially in females (72 vs 54%). Adjustment and affective disorders were the most common *diagnoses* among suicide attempters. We found higher rate of affective (26.2 vs 13.8%) and anxiety (9.2 vs 7.2%) disorders in females, but higher rate of alcohol related (20.4 vs 8.0%) and personality (13.4 vs 8.4%) disorders in males. *High-risk groups* by age and gender for suicide attempt are the young (adolescent crisis) and middle-aged (mid-life crisis) females, and for suicide are the middle-aged (mid-life crisis) and elderly (old-age crisis) males, correspondent with the developmental *psycho-social crisis concept*, described by *Erikson*.

Conclusion: These results suggest that the rates of *completed suicides* decreased significantly (approximately with 25%) compared to the rates in the late ‘90s, but in contrary the number of *suicide attempts* remained almost the same. The potential explanations include restriction of lethal methods, health care changes and the positive role of treatment and prevention strategies, but this fact also warns for that suicide is still a major health issue.

2. *The Gender Study*

Objective: As gender is one of the most replicated predictors for suicide, our aim was to determine *gender differences* in suicidal behaviour and to investigate the factors associated with suicide attempts in males and females.

Method: Within the framework of the *WHO/EURO Multicentre Study on Suicidal Behaviour* 1158 suicide attempts have been analyzed retrospectively and descriptive statistics and logistic regression analysis were performed to compare the characteristics of male and female suicide attempters.

Results: 63% (n=728) of the 1158 medically treated suicide attempters were *females*. The mean *age* of the patients was 36.4 years, the mean age of women was significantly higher (37.4 vs. 34.7 years). Females were more likely to choose self-poisoning (74 vs. 54%, $p<0.005$), while males rather used violent *methods*, like cutting (13 vs. 7%, $p<0.005$), hanging (4 vs. 1%, $p<0.005$), shooting or jumping (3 vs. 2%, $p=0.157$). According to our data a '*typical male attempter*' could be characterised as follows: he is unemployed, ha has never been married and he is living alone. He tends to use violent methods, in case of self-poisoning, he takes mostly meprobamate or carbamazepine, which may refer to the high rate of alcohol abuse or dependence among male suicide attempters. According to the logistic regression analysis, *female suicide attempters* were mainly divorced or widowed, economically inactive, and there was depressive disorder in their medical history. Female attempters were mainly repeaters using the method of self-poisoning, mostly with benzodiazepines.

Conclusion: Suicide attempts are more common among females, but in contrast the rates of suicide are higher in males (*gender paradox*). Significant differences were found between males and females in risk factors of suicide attempts. Concerning *methods*, males tend to use violent methods for both suicide and attempted suicide. Our data strengthen the theory, according to which alcohol abuse in *males* might be the symptom of a latent, masked affective disorder. Additionally, the compliance with the therapy of male patients is poorer than that of females. Since suicide is a multi-causal phenomenon, its therapy and prevention should be complex, and *gender differences* should be considered while building up our helping strategies.

3.1.*The CASE Study*

Objective: *Deliberate self-harm* (DSH) among young people is an important focus of policy and practice. Despite of the decreasing suicide rates, the number of DSHs in the adolescent population shows a growing tendency. The *Child and Adolescent Self-harm in Europe (CASE)* study has a special focus on adolescent suicidal behaviour (suicidal thoughts, ideation, self harm, suicide attempt) and other self destructive behaviour (drug, alcohol).

Method: We have used data from the CASE Study, an internationally collaborative investigation of DSH among young people in seven countries (*Belgium, England, Hungary, Ireland, The Netherlands, Norway and Australia*). School-based surveys were conducted with a total of 30477 adolescents, the majority being 15 or 16 years, who provided *anonymous self-report* data on self-harm behaviour (timing, frequency of episodes, methods used, motives, help-seeking before and after the episode, hospitalisation, serious thoughts about self-harm, etc.), negative life events, lifestyle and psychological characteristics including symptoms of anxiety, depression, self-esteem and impulsivity. In *Hungary* 4408 (boys: 2388, girls: 2020) pupils were included. Young people were subsequently categorised according to whether they had previous DSH episodes or not.

Results: Out of the 4408 pupils, 7.8% (males: 4.6%, females: 11.6%) of the adolescents reported former *DSH*, 1.6% of the boys and 3.6% of the girls reported more than one self-harm. DSH was more than twice as common among *females*. More males and females in all countries except Hungary cut themselves, than used any other *method*. The most common *reasons* given were ‘to get relief from a terrible state of mind’ followed by ‘to die’, although there were differences between those, cutting themselves and those, taking overdoses. According to the statistical analysis the DSH group greatly differs from the non-self-harmers. DSHs were more likely to use alcohol, drugs or nicotine than their non-suicidal peers. *Drug abuse* was four times more common among suicidal boys, and five times more common among suicidal girls than in the non-DSH group. The use of ecstasy and sedato-hypnotics showed the strongest difference between the DSH and non-DSH teenagers in both genders. The comparative analysis revealed that *DSHs compose a subgroup* with more severe psychopathology (anxiety, depression, impulsivity), lower self-esteem and ineffective coping.

Conclusion: *Deliberate self-harm* is a widespread, yet often hidden problem in adolescents, especially in *females*, which shows both similarities and differences internationally. The results of our study may help in recognizing the role of risk factors coexisting with DSH and thus make it possible for schools and policies to have adequate and effective *prevention programs*.

3.2.*The Elderly Study*

Objective: Both suicidal behaviour and cognitive impairment in elderly are major public health problems. Our aim was to assess the prevalence and importance of dementia and *cognitive impairment* in relation with suicidal behaviour in elderly psychiatric inpatients.

Method: We investigated all the *elderly inpatients*, who were hospitalised in a psychiatric ward after suicide attempt. Besides demographic and general medical features, mental disorders and the level of cognitive functioning of the elderly suicidal inpatients (N=62) were compared to the same parameters of the general elderly inpatients, hospitalised at the same period in the same psychiatric hospital (N=152). In the statistical analysis we used crosstabs and Fisher's exact test, and for calculating the odds ratios of suicide attempters we applied logistic regression model.

Results: Out of the 214 elderly inpatients, 62 were admitted because of *suicide attempt*, while the remaining 152 patients had other psychiatric disorders. The most frequent *diagnoses* were affective (53%) and adjustment (35%) disorders in the group of suicidal patients, while dementia (67%, mainly vascular aetiology) and delirium (59%) had the highest rate among those, who did not have current suicide attempt. There were significant differences in *cognitive functioning* (assessed with MMSE) between the two groups. In the suicidal group there was no cognitive impairment in 37% of the patients, but mild cognitive deficit or mild dementia was found in 57%. In the non-suicidal group cognitive function level was significantly lower. Out of the elderly inpatients who did not have a current suicide attempt 18% had mild cognitive impairment, but 31% suffered from moderate or severe dementia. In the suicidal group 43.5% had previous suicide attempt, while in the non-suicidal this number was only 9.9%. According to the *logistic regression analysis* the hazard of occurrence of current suicide attempt was increased by previous suicide attempts (OR=7), current mood disorder (OR=6.1), actual crisis situation (OR=8.7) and current stress or traumatic events (OR=5.2). While increasing cognitive impairments carried lower risk for suicide attempt (severe dementia: OR=0.14).

Conclusion: Our results indicate that in the background of elderly suicidal behaviour not only mood disorders, but other risk factors have key roles as well. In old age the common presence of *affective disorder and cognitive impairment* create a particularly high risk for suicide attempt. Thus in the treatment and prevention of suicidal behaviour in the elderly it is also important to apply a complex model, in which adequate pharmacotherapy, psychotherapeutic approaches, and proceedings enhancing cognitive functioning are of outstanding significance.

4.1.*The MINI-Plus Study*

Objective: *Mental disorders* are one of the strongest predictors for suicide, but the diagnostic distribution of suicide attempters has been found to be different in several studies, which fact is partly due to the different diagnostic tools used in the studies. The aim of this survey was to assess the *prevalence and diagnostic distribution of mental disorders* among medically treated suicide attempters and also to compare the clinical diagnoses (ICD-10, n=1158) with the diagnoses given by a structured diagnostic interviews (MINI-Plus, n=100).

Method: Within the framework of the *WHO/EURO Multicentre Study on Suicidal Behaviour*, in this survey we collected 1158 medically treated suicidal events and conducted 100 structured diagnostic clinical interviews (*MINI-Plus*) in Pecs Centre. The registration of attempted suicides was carried out in consecutive episodes at the university hospitals.

Results: We found a high rate of mental disorders among medically treated suicide attempters. According to the MINI-Plus interview *89% of the suicide attempters* have a current psychiatric disorder. *Life-time prevalence* is even more with 92% frequency. Affective (42%), anxiety (26%) and addictive (24%) and adjustment disorders were the most common. Among males, the rate of addictions and psychoses were more common, than in females, while among females affective and anxiety disorders were more frequent With the MINI interview the rate of affective and anxiety disorders were higher, than with the ICD-10 clinical diagnoses, where the rate of adjustment disorders was found to be relatively high, compared to the results of the MINI structured clinical interview.

Conclusion: There is a *high prevalence of mental disorders* among suicide attempters. *MINI interview* is effective in diagnosing these Axis I. mental disorders, because it has high sensitivity, especially for affective, anxiety and addictive disorders. Using the structured MINI diagnostic interview clinicians are able to obtain more accurate psychiatric diagnosis rapidly, particularly in patients with high-risk for suicidal behaviour (repeaters, psychotics, elderly, co-morbid somatic illnesses) and MINI can also be used in research studies on suicide, especially in exploring depression and anxiety.

4.2.*The MDQ Study*

Objective: Studying the connection between *affective disorders and suicidal behaviour* are in the spotlight of recent epidemiologic studies. Besides depressive disorders, bipolar disorders also play an important role in developing suicidal behaviour. However, it is difficult to assess the problem, because the bipolar progression of affective disorders often remains hidden. Our aim was to study the use of the *Hungarian version of MDQ* among patients with depressive disorders, to assess the prevalence of hidden *bipolar disorders* among patients with current depressive episodes, and its relation to suicidal behaviour and to *impulsivity*.

Method: All the patients were included in the study who were treated at our in-patient department in the year of 2007 with the DSM-IV diagnostic criteria of *major depressive disorder and with current suicide attempt* (52 males and 152 females). Besides collecting socio-demographic and psychiatric history, the Mood Disorder Questionnaire (*MDQ*), the Beck Depression Inventory (*BDI*) and the Barrat Impulsivity Scale (*BIS*) were applied.

Results: Among the 204 patients 37.7% (males: 46%; females: 35%) were found to have *bipolar disorder* with the MDQ. The mean age of these patients was less than those without bipolarity (40 vs. 45 years). Many socio-demographic factors indicate *social instability* among patients with bipolar disorder (marriage /44 vs. 52%/, stable relationship /43 vs. 52%/, living alone /23 vs. 17%/, unemployment /27 vs. 15%/, geographical mobility /17 vs. 10%/). Among patients with bipolar disorder the life-time prevalence of suicide attempts were higher (55 vs. 45%), and repeated suicide attempts were also more frequent (37 vs. 26%). In the severity of current depressive symptoms with the BDI there were no significant differences between the two groups (31 vs. 29 points). The total mean-values (81 vs. 76 points) and the scores of the subscales (non-planning, attention, motor) of the BIS were significantly higher in the bipolar group. According to the *multi-variant regression analysis* the main factors associated with bipolar disorder were repeated suicide attempts (OR=1.8), geographical mobility (OR=1.9) and impulsivity (OR=3.6).

Conclusion: Our results suggest that the Hungarian version of the *MDQ* can be applied successfully among patients with depressive disorders. Our data strengthen the literature concerning the high frequency of -mostly hidden- *bipolar disorders* among depressive patients with suicide attempts. Bipolarity is linked with suicidal behaviour, and the connection between them could be the factor of *impulsivity*. The recognition of bipolarity can help clinicians to apply the adequate mood stabilizer pharmacotherapy, which could be important in the prevention of suicidal behaviour as well.

4.3.*The Prime-MD Study*

Objective: The major risk factors for completed suicide are *previous suicide attempts and mental disorders*. Our aim was to assess the value of a screening method developed to determine the prevalence of suicidal behaviour, and to describe the characteristics of suicide attempters in *primary care*, including screening for major mental disorders.

Method: A Hungarian urban *general practitioner's district* with 1248 inhabitants was screened for suicidal behaviour and for major mental disorders. The *Prime-MD questionnaire (Primary Care Evaluation of Mental Disorders)* was used to recognize the most common psychiatric disorders. Suicidal behaviour was assessed by the six structured questions of *MINI-Plus* diagnostic interview. All the patients (n=382) who visited their general practitioner within a two-week period were asked to participate. 277 patients completed the Prime-MD questionnaire, an easy-to-use diagnostic instrument developed for general practitioners to recognize the most common psychiatric disorders, like depressive (major depressive disorder, minor depressive disorder), anxiety (panic disorder, generalized anxiety disorder), somatoform, eating and alcohol-related disorders.

Results: Prevalence of patients with *suicide attempts in primary care* was 2.9%; 9% of the patients had either suicidal thoughts or gestures the month before. Self-destructive thoughts or behaviour often coexisted with depressive disorders, 60% of suicidal patients and 11.5% of the screened population had depressive episode. According to *multivariate logistic regression analysis*, suicidal patients were more likely to take antidepressants, they also had a tendency to have more previous psychiatric treatments and suicide attempts; they visited their general practitioners less frequently and were more likely to have current depressive episodes.

Conclusion: The *Prime-MD* questionnaire, complemented with questions on suicidal behaviour, is an effective, easy-to-use method for general practitioners to assess suicide risk and to recognize the most common mental disorders in *primary care* practice. This method can be of great help and is proposed for use by *general practitioners* in every-day practice.

5. *Suicide Prevention Model*

Objective: According to several recent studies general practitioners and primary care professionals could play an important role in suicide prevention. Despite the fact that the majority of suicide attempters visit their GPs before their suicidal act, the *doctor-patient meeting* is a necessary, although not always sufficient enough way to prevent suicide. Most patients who commit or attempt suicide are not regarded as being at high immediate *risk* at their final contact with mental health services. Thus, our aim was to introduce a complex, integrative, comprehensive, easy-to-use regional *suicide prevention strategy*.

Methods: Based on reviewing the relevant literature and based on our previous studies and clinical experience, we developed a *model* for an integrated, regional suicide prevention strategy, which includes recognition, risk assessment and intervention.

Results: The major elements of the model includes: 1. Recognition of the *warning signs* (communicative or behavioural); 2. Assessment of *mental disorders* and explore emotional *crisis* situation and psychopathologic symptoms; 3. Assessment of the *protective and risk* factors; 4. Estimation of *suicide risk*; 5. Make a *plan* for intervention strategies; 6. *Management* of the suicidal patients through the different levels of interventions

Conclusions: In the *management of suicidal behaviour*, the complex stress-diathesis model has to be adjusted by considering biological markers (mental disorders, personality trait factors, psychopathological symptoms) and psycho-social factors (crisis, loss, isolation, negative life events, interpersonal conflicts). Only after the assessment of these factors can primary care professionals, as gatekeepers, manage suicidal patients effectively by using adequate psychopharmacotherapeutic and psychotherapeutic interventions in the *recognition, treatment and prevention* of suicidal behaviour. This integrative regional *suicide prevention model* could help general practitioners and primary care professionals in assessing and managing patient with suicidal behaviour in every-day practice. Thus, it can be a significant method for the intervention and prevention of self-destructive behaviour.

III. SUMMARY

With the presented epidemiological and clinical studies on suicidal behaviour and with our ongoing research concerning the genetic and neurobiological correlates, we would like to give a comprehensive view of the *complex phenomenon of suicide*. The integration of the previous *bio-psycho-social* and the recent *stress-diathesis* model of suicidal behaviour can give a strong and coherent theoretical basis for the management of patients with suicidal behaviour in the clinical practice. This model should include biological markers (genetics, neurobiology, mental disorders, personality trait factors) and psycho-social factors (psychopathological symptoms, emotional crisis, negative life events, social effects) and also should consider the circular, dynamic interaction between them ('*gene-environment interplay*').

No single effort seems to contribute to a sustainable decline in *suicide rates* by itself, but the combination of different theories and strategies in a multi-level approach might be the most effective way in *suicide management*. Our *suicide prevention model* tries to integrate these theories and helps to assess these factors, thus can help in the adequate *recognition, treatment and prevention of suicidal behaviour*.

From all the above, we can understand the meaning of the saying: „*Saving one life is like saving the entire world*"

Table 1. The integration of the bio-psycho-social and the stress-diathesis model of suicidal behaviour

MODEL	Biological	Psychological	Social
Stress	- Mental disorders (currently emerging - major depressive episode, psychotic disorder) - Post-partum disorders - Medications (steroids, interferon, SSRI early period) - Abuse (alcohol, drug, nicotine)	- Actual negative life events - Stress situations - Emotional crisis - Loss (divorce) - Grief, etc.	- Migration, emmigration - Social,economical changes, crises - Changes in social roles - Existential, financial changes - Loss of job, etc.
Diathesis	- Depression in the family - Family history of suicide - Mental disorders (life-time, chronic) - Serotonin system dysfunction, etc.	- Family background - Disturbances in the development of the personality - Child abuse, neglect, etc.	- Social, cultural environment in which we are living - Trans-generational effects - Social transmission, etc.

IV. ACKOWLEDGEMENT

First of all, I thank my mentor and project leader *Sandor Fekete*, the head of the Department of Psychiatry and Psychotherapy, to support and guide my research and clinical work, together with *Peter Osvath*. Working with them was a fundamental experience influencing my carrier and shaping my professional thinking throughout the years.

I wish to thank *Karoly Ozsvath* and *Matyas Trixler*, previous heads of the department for giving theoretical and practical background for my work. I also thank *Gyorgy Koczan*, *Jozsef Varga* and *Istvan Tiringer* for influencing my choice of career and my scientific interest.

I wish to acknowledge *Balazs Kezdi*, *Andras Stark*, *Maria Koltai* and *Maria Horti* whose academic achievements and the conversations with them essentially established my way of thinking.

I am very grateful to the members of the crisis study group - *Amaryl Arkovits*, *Jozsef Csurke*, *Peter Osvath* - and to *Ildiko Abraham* for the creative work and conversations, which were exceptionally inspiring.

I am indebted to my colleagues at the *S.O.S. Crisis Hotline* and at the *Department of Psychiatry and Psychotherapy*, especially to *Tamas Tenyi*, *Attila Kovacs*, *Robert Herold* and *Maria Simon*.

I thank all my *colleagues*, *fellows* and *students*, who I worked with during these years, and also thank the *patients* sharing their experience.

Finally, I wish to thank my *friends* and my *family*, *Anna* and *Sara* for their understanding and emotional support during this project.