Distal risk factors, interpersonal functioning & family skills training in attempted suicide

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There's a crack in everything
That's how the light gets in

Leonard Cohen

to all who have gone before
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PAPERS I-IV
ABSTRACT

Background

Suicidal behavior is an important global health problem affecting also significant others. Both genetic and environmental influences play an important role in the development of suicidal behavior. There is a need of interventions for family and friends after a suicide attempt. The aim of this thesis was to assess the impact of family history of suicide (FHS) and early life adversity (ELA) on severity of suicidal behavior and on level of interpersonal problems in suicide attempters. Furthermore it aimed to evaluate a DBT-based skills training program, Family Connections (FC), for relatives and friends of suicide attempters.

Methods

Studies I and II included 181 suicide attempters. FHS was assessed with the Karolinska Self-Harm History Interview or in patient records. ELA was assessed with the Karolinska Interpersonal Violence Scale (KIVS) measuring exposure to interpersonal violence in childhood. Suicide intent was measured with the Freeman scale. Interpersonal problems were assessed with the Inventory of Interpersonal Problems (IIP).

Study III, a pilot study evaluating the effect of FC for family members of suicide attempters, included 13 participants who completed the program with pre- and post-questionnaires. The experience of burden was assessed with the Burden Assessment Scale (BAS), general wellbeing with the Brief Symptom Inventory (BSI) and level of depression was assessed with the Beck Depression Inventory (BDI). The Swedish scale Questions About Family Members (QAFM) was used to explore the quality of the participants’ relationship with the patient and the Quality of Life Inventory (QOLI) was used to measure satisfaction with life situation.

Study IV included 132 family members, and investigated the feasibility and preliminary efficacy of FC in psychiatric care. Participants were assessed pre- and post-intervention with the following self-report questionnaires: BAS, QAFM and Five Facet Mindfulness Questionnaire.

Results

Male suicide attempters with FHS made more serious and well planned suicide attempts and had higher suicide risk. FHS and exposure to interpersonal violence as a child were independent predictors of suicide in
male suicide attempters. Regarding interpersonal problems, suicide attempters with FHS had significantly more often an intrusive personal style, indicating that they might have an impaired ability to create stable, long-lasting relationships. In the pilot study evaluating FC, the participants reported a significant reduction in burden, an improved psychic health and an improvement in the relationship with the patient after completion of the program. In the fourth study, FC showed to be feasible and effectively implemented in a psychiatric outpatient services clinic. Regarding perceived burden, results were in line with the pilot study, with a significant reduction in all subscales in BAS.

Conclusions

High-risk patients call for a consideration of both ELA and FHS in clinical suicide risk assessment. In suicide attempters at biological risk, suicide might be prevented with the early recognition of environmental risks. Further, the interpersonal problems associated with FHS may cause difficulties for suicide attempters to accept or benefit from treatment, and caregivers should take into account the characteristics of the suicide attempter’s interpersonal functioning. The results from the pilot study provide support for the need and importance of an educational program addressed specifically to family members of suicide attempters. Preliminary results support the feasibility and potential value of an implementation of FC in psychiatric open care clinics.

Key words

Suicide, Suicide attempt, Family history of suicide, Early life adversity, DBT skills training, Interpersonal problems, Family intervention
SAMMANFATTNING

Bakgrund


Syften
Det övergripande målet med denna avhandling är att undersöka familje- och interpersonella faktorer relaterade till suicidalt beteende.

Den första studien avser att studera om familjehistoria av suicid och interpersonellt våld i barndomen har någon påverkan på suicidalt beteende och på suicidrisk hos personer som har gjort ett suicidförsök.

Vidare avser den andra studien att undersöka relationen mellan interpersonella problem och familjehistoria av suicid samt att beskriva specifika mönster av interpersonella problem i denna patientgrupp.

Ytterligare ett syfte är att undersöka om en närståendeutbildning som riktar sig till närstående till suicidnära patienter kan implementeras inom psykiatrisk verksamhet. Vidare om denna intervention har en påverkan på de närståendes generella mående, deras känsla av skuld och belastning i vardagslivet samt om den har någon påverkan på deras upplevelse av kvaliteten i relationen till den suicidala patienten.
Metoder

Studie I & II
Delstudie I och II bygger på insamlade data från 181 patienter i vård på Karolinska universitetssjukhuset efter ett suicidförsök. Uppgifter om familjehistoria av suicid inhämtades från journaler eller i en semi-strukturerad klinisk intervju, Karolinska Self-Harm History Interview. Erfarenhet av våld i barndomen undersöcktes med Karolinska Interpersonal Violence Scale. Suicidavsikt mättes med Freeman Scale och interpersonella problem med Inventory of Interpersonal Problems.

Studie III
Delstudie III är en pilotstudie, genomförd på en specialistklinik för patienter som gjort ett suicidförsök. Studien utvärderar en utbildning som riktar sig till närstående till suicidnära patienter, Familjeband (FC). Tretton deltagare i två grupper fullföljde det nio veckor långa färdighetsträningsprogrammet med för- och eftermätningar. De instrument som användes var BDI, BAS, QAFM, BSI samt QOLI.

Studie IV
Delstudie IV är en öppen klinisk studie som undersöker genomförbarheten av FC i psykiatrisk öppenvårdsverksamhet. Studien inkluderade 132 närstående, 86 deltagare fullföljde utbildningen samt för- och eftermätning med BAS, QAFM samt FFMQ.

Resultat
Manliga patienter som har en familjehistoria av suicid gör mer allvarliga och mer välplanerade suicidförsök. Familjehistoria av suicid och exponering för interpersonellt våld i barndomen är oberoende prediktorer av suicid hos manliga suicidförsökare. Deras suicidrisk är fyra gånger högre än för patienter med suicidförsök i anamnesen men utan dessa riskfaktorer.

Avseende interpersonella relationer så har patienter som gjort ett suicidförsök och som har en familjehistoria av suicid oftare en mer påträngande interpersonell stil.

Efter genomgången närståendeutbildning rapporterade deltagarna en reduktion av upplevda symptom och således en förbättrad generell psykisk hälsa. De rapporterade även en upplevelse av minskad belastning av att vara närstående till psykiskt sjuk patient och en upplevelse av att relationen till patienten var förbättrad.
Slutsatser

Vid bedömning av suicidala patienter bör familjehistoria av suicid och erfarenhet av interpersonellt våld i barndomen efterfrågas. Vid biologisk belastning är kunskap om samtida miljömässiga riskfaktorer viktig för att förebygga suicid.

En belastning av suicid i familjen kan påverka möjligheter att utveckla långvariga, stabila relationer. För dessa individer kan detta leda till försämrad förmåga att tillgodogöra sig psykiatrisk behandling och försämrad förmåga att upprätthålla god kontakt med vårdpersonal och närstående. Bland andra riskfaktorer bör vårdpersonal iakta hur den suicidala patienten fungerar i interpersonella relationer.

Resultatet från pilotstudien ger underlag för att en utbildning till närstående till suicidnära patienter skulle kunna möta deras behov av stöd i deras svåra situation. Genomförbarhetsstudien visade att det är möjligt att genomföra en sådan intervention i psykiatrisk verksamhet och att den kan ha en effekt på deras upplevelse av börda.
ORIGINAL PAPERS


IV. **Rajalin, M.**, Hirvikoski, T., Salander Renberg, E., Jokinen, J. Skills training for family members of suicide attempters, a feasibility study in a psychiatric open care unit. *Manuscript*.

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ABBREVIATIONS

ADHD  Attention Deficit Hyperactivity Disorder
APA  American Psychiatric Association
BAS  Burden Assessment Scale
BDI  Beck Depression Inventory
BPD  Borderline Personality Disorder
BSI  Brief Symptom Inventory
CBT  Cognitive Behavior Therapy
DBT  Dialectical Behavior Therapy
DSM-III-R  The Diagnostic and Statistical Manual of Mental Disorders. Third Revised Edition
DSM-IV  The Diagnostic and Statistical Manual of Mental Disorders. Fourth Edition
ELA  Early life adversity
FC  Family Connections
FFMQ  Five Facet Mindfulness Questionnaire
FHS  Family history of suicide
FPE  Family psychoeducation
IIP  Inventory of Interpersonal Problems
KIIVS  Karolinska Interpersonal Violence Scale
MADRS-S  Montgomery-Åsberg Depression Rating Scale
QAFM  Questions About Family Members
QOLI  Quality of Life Inventory
SCID-I  Structured Clinical Interview for DSM-III-R or DSM-IV, Axis I
SCID-II  Structured Clinical Interview for DSM-III-R or DSM-IV, Axis II
SD  Standard deviation
WHO  World Health Organization
INTRODUCTION

Background

To reflect over life and death is part of human nature. The capacity to cognitively contemplate the worthiness of life is unique for mankind and thus at times in collision with the inherent will to live. Many are the philosophers and writers that have given these life questions much of their time, and who have put down their thoughts in running metre. Camus for one argues around the purpose and meaning of our life in the “Myth of Sisyphus” (1942/2005). In his argument, he exemplifies with the story of the mortal Sisyphus, who in Greek mythology is punished by the gods for his arrogance and doomed to push a stone up a mountain endlessly. The tragic myth reminds us of all the pain we have to endure in the path of life. Still, in comparison with death, almost anything seems tolerable and our lust for life will at most times restrain us from self-destructive action. Consequently, in spite of his punishment, Sisyphus will choose life over death over and over again. The suicidal process is similarly a struggle to cope with the hardships in life, with an underlying aim to survive. For those who in a suicidal crisis chose to end their lives, the most powerful instinct of nature is somehow overcome.

The suicidal act, even if not completed, has an immense impact not only on the individual performing it, but also on the environment. Being a very painful experience for everybody involved, the questions in the wake of a suicide or a suicide attempt often are “why?” or “what could I have done?”. The wellbeing of close relatives is strongly affected and they are themselves in an elevated risk of suicide (Pitman et al. 2016; Van Dongen, 1991).

Studies indicate a high percentage of psychiatric disorders in suicidal people, and the issue of assessing suicide risk in clinical practice is a formidable task for all professionals. It demands not only knowledge of recognized risk factors from epidemiological and clinical studies, but also a consideration of the individual characteristics within the patient. To be able to make an adequate suicide risk assessment, the current knowledge has to be well implemented. Hence, it lays upon the research community to continue to contribute in the battle to minimize the suicide numbers.

In society, the view of suicide as well as the suicide rates has shifted during different time periods and the reigning cultural orientation (Durkheim, 1897/2004). In our time, suicide is a major social and health care problem with almost 1 million people dying each year worldwide (Turecki & Brent, 2016; World Health Organization, WHO, 2014). Despite differences in prevalence, methods used, and the fact that suicide, in some parts of the world is still illegal, suicide prevention is a compelling task for scientists in every corner of the
world. Questions for the research community to focus upon are why people become suicidal, what can be done to prevent suicidal behavior and how risk can be detected in an early stage.

Regarding my own engagement in this research field, I will sometimes get a question about my choice of study: “isn’t it depressing to engage in suicide research?” My answer will always be no. There are many reasons to work for prevention of the suffering suicide and suicidal behavior bring to so many every year. In my mind, the wish to better understand suicide is hopeful in itself and gives promise for the future.

**Suicide and suicide attempt**

Suicide is the act of deliberately killing oneself (WHO, 2014), a fatal self-injurious act with some evidence of intent to die (Turecki & Brent, 2016). Though being a rare outcome, the total number of suicide deaths in Sweden 2015 was 1 554 people (Nationellt centrum för suicidforskning och prevention av psykisk ohälsa, NASP, 2016). It is the leading cause of death in the age group of 15-24 years, the last fifteen years it has been the leading cause of death for men between 15-44 years; however the highest suicide rates are to be found in the group of elderly, individuals over 70 years or older (Bertolote & De Leo, 2012; Hawton & van Heeringen, 2009; NASP, 2016). Numerous factors are involved in suicide, both predisposing and precipitating. Genetics and early life adversity are examples of the first, life events and the presence of mental disorders are examples of the latter.

The number of suicide attempts is at least ten times the number of suicide, as many as 10 to 20 million people attempt suicide every year globally (Blasco-Fontecilla et al., 2016). Suicide attempt is defined as a non-fatal, self-directed, potentially injurious behavior with any intent to die as a result of the same. A prior suicide attempt is the most important risk factor for completed suicide (Bostwick et al., 2016; Hawton & van Heeringen, 2009), and besides having an impact on the individual and the next of kin, it affects society, too. The socioeconomic costs are considerable and yet another reason to work preventative.

**Suicidal behavior**

The definition of suicidal behavior is not unanimously established, but relevant behaviors related to suicide to consider are; suicide ideation; deliberate self-harm (DSH) including non-suicidal self-injury (NSSI), preparatory acts, as well as suicide attempts and deaths (Gvion & Apter, 2011; Turecki & Brent, 2016).
Suicide prevention

During the past decades, a wide range of factors involved in suicidal behavior has been recognized. Suicide has been associated with certain clinical symptoms, social isolation, neurocognitive deficits, certain biomarkers and early life adversity. Every day in clinical practice, specialists, as well as general practitioners, have a delicate task in determining who is at risk for suicide. Chronic and acute factors that may elevate suicide risk, might be observed in the patient, however, the individual assessment will just be an anticipation of risk. Outside the health care system, in the community, this task is even more demanding. Suicide is unpredictable for anyone, although not unpreventable. In the multicentre SEYLE-trial (Wasserman et al., 2015), a mental health program, YAM, was given to adolescents in 168 schools from ten European countries. The results showed that YAM was effective in reducing suicide attempts and suicidal ideation.

To improve the care given by general practitioners, who often are the first to meet and identify depressed patients, a suicide prevention program was conducted in a region with a very high suicide rate in Hungary. The results indicated a decline in suicide rates in the target region after completion of the educational program (Szanto et al., 2007). However, suicide prevention programs need to include more than education of general practitioners. Interventions directed to raise the probability of adequate suicide risk assessment, finding effective treatments together with overall improvement in healthcare quality, are some future objectives regarding patients at risk for suicide (National Action Alliance for Suicide Prevention, 2014).

The achievements in knowledge have led to the establishment of national programs or suicide prevention activities in many countries (WHO, 2014). In Sweden the program contains several objectives: e.g. to decrease the accessibility to means, to decrease the use of alcohol and other substances, to increase awareness in society of suicidal behavior and suicidal communication, and to support better knowledge of the suicidal process and mental disorders. The latter ambition is relevant not to the least in family members and friends close to the patient.

Studies have shown that help-seeking is difficult for young people experiencing suicide ideation and self-harm (Michelmore & Hindley, 2012). Another group, whose suicidal behavior might be missed even in contact with health care services, are the elderly (Waern et al., 1999; Szanto et al., 2001). To facilitate help-seeking and to increase involvement of next of kin is therefore desirable aspects of suicide prevention work. Despite these efforts, the variation between countries regarding preventative work and existence of national plans, and the quite stable suicide numbers, there are still plenty of improvements to be made.
Suicidal communication

A suicide attempt or a suicide is often preceded by a suicidal process (Beskow, 1979). One commonly believed myth around suicide is that persons who explicitly talk about suicide will not proceed to action. However, a cross-cultural study of suicidal communication showed that decedents by suicide had in a majority of cases given statements before their death that suggested serious suicidal intent (Rudestam, 1971). In most cases, the recipients of these messages stated that they had reacted with denial. Thus, though at some level communicated to the environment (Barraclough et al., 1974; Owen et al., 2012; Pompili et al., 2016), this kind of communication may be hard to uncover for significant others. The suicidal individual may disclose intentions verbally or quite openly engage in preparations like arranging economic affairs, in cleaning the house, or more secretively plan the actual suicidal act.

The communication between the suicidal individual and the one’s closest to him or her may be crucial to how the suicidal process proceeds. People in the adjacent environment, like next-of-kin and personnel in the care-giving occupations, have to be able to receive and to recognize both verbal and non-verbal suicidal communication in order to intervene in the proceeding of suicidal behavior (Wasserman, 2000). The process seen through the stress-diathesis model theory is shown below in figure 1 (Beskow, 1979; Beskow et al., 1993; Wasserman, 2001). The model illustrates how the predisposition for suicidal behavior may interact with the individual stress response in case of an adverse life event. Regarding time, the process might be longer, even life-long, or shorter with the outcome of suicide seen upon as unexpected. The model also shows that everything that is going on within the individual is not discernible for the environment, we can only be observant of the communication that surfaces the invisible line that parts non-observable behavior form observable behavior.
Psychiatric illness and suicide

The presence of a mental disorder has a strong association with both natural and unnatural premature death, and the association between mental disorder, suicide and other violent deaths is stronger than in any other medical condition (Harris & Barraclough, 1998). Through psychological autopsies, a method used to thoroughly investigate factors surrounding a suicide, which involves examination of patient records and in-depth interviews with key informants, it has been established that about 90% of all suicide victims have a diagnosable psychiatric disorder (Hawton et al., 2013; Isometsä, 2001). Mood disorders are frequently associated with suicide and suicidal behavior, as is personality disorders, especially borderline personality disorder (Amore et al., 2014; Doyle...
et al., 2016; Isometsä, 2014; Soloff et al., 2000). A comorbid substance use disorder as well as the presence of any other psychiatric disorder will also heighten the suicide risk (Blasco-Fontecilla et al., 2016; McGirr et al., 2007).

**Family history of suicide**

Regardless the connection between psychiatric illness and suicide mentioned above, suicide and suicide attempt is heritable independent of mental disorder (Brent et al., 1996; Brent, 2010; Petersen et al., 2014; Qin et al., 2002). Studies on the Danish national adoption registry have shown that the biological relatives of adoptees that committed suicide had a higher rate of suicide than the adoptive relatives (Kety et al., 1976; Wender et al., 1986). Twin studies also support the claim that the risk for suicide raises when a family history of suicide is present. Monozygotic twins have a higher concordance with suicidal behavior than dizygotic twins (Roy et al., 1997). Studies show that the relative risk for suicidal behavior increases 4-6 times in progeny relatives with a family history of suicide (Baldessarini & Hennen, 2004; Brent & Mann, 2005; Brent et al., 2015).

A siblings’ suicide attempt was the strongest familial risk factor in a large epidemiological study closely followed by maternal and thenceforth paternal suicide attempts (Mittendorfer-Rutz et al., 2008). In family studies, both genetic and environmental influences have been shown to increase the risk of suicidal behavior in first-degree relatives (Brent et al., 1996; Kuramoto et al., 2013; Tidemalm et al., 2011). In a study by Brent and collaborators (2003), the offspring of suicide attempters did not only have a higher risk for suicide attempt but also exhibited an earlier onset age of suicidal behavior than the probands. Furthermore the study showed that impulsive-aggressive traits are more common in suicide attempters with familial loading of suicidal behavior. Impulsivity and aggressiveness have been connected to the serotonergic system and these behaviors seem partially heritable and relatively stable over time and generations (Lieb et al., 2005). In a longitudinal study, Caspi and colleagues (1996) found that both undercontrolled, impulsive children and inhibited, shy children (as observed at age 3) were more likely to attempt suicide at 21 years of age.

It is a complex issue to entangle environmental impact from genetic loading when it comes to suicidal behavior. Genetic vulnerability for suicide is one of many factors involved in suicide and there are many aspects for future research to take into account (Andriessen & Videtic-Paska, 2015). The genetic susceptibility to suicide seems to affect descendants when associated with additional stress from adverse life events (Roy et al., 1999; Wasserman, 2001).
Early life adversity

Experience of abuse in childhood has been shown to lead to different difficulties in adult life, including an increased risk for suicide. These adverse experiences could for example include parental neglect, physical, sexual or emotional abuse, mental illness or substance abuse in the household. A recent meta-analysis (Holt et al., 2014) confirmed that bullying of any kind, i.e. both being the victim and/or being involved in bullying others, is associated with higher levels of suicidal behavior. Multiple experiences of early life adversity (ELA) have been shown to add on to increased health problems (Felitti et al., 1998).

Any form of abuse will probably be damaging in adult life in some way, however physical punishment and sexual abuse in childhood are especially associated with an increased risk for suicide (Hawton & van Heeringen, 2009; Hoertel et al., 2015). There is also a familial transmission of suicidal behavior connected to sexual abuse. The offspring of individuals who experienced sexual abuse in childhood are more likely to engage in suicidal behavior (Brent et al., 2002; Hoertel et al., 2015). In a study by Perez and colleagues (2016), adverse behaviors like substance abuse and prominent school difficulties during adolescence were not significant predictors of suicide. However they found that a higher level of ELA was associated with higher levels of aggression and impulsivity and also associated with a higher likelihood of suicidal behavior.

Family and interpersonal functioning

In a study of Japanese suicide attempters with a family history of suicide (FHS) (Nakagawa et al., 2009), the most common stated reason for attempting suicide was strained family relations. Among patients without FHS, strained relations were the second most common motive for a suicide attempt. Family function seems to be one of the key elements in suicidal behavior, especially in young people (ibid.) Effective communication between family members is essential for a healthy family climate. When communication is poor, negative events that follow may lead to an elevated suicide risk (McDermut et al., 2001).

The ambition to include family members in psychiatric care is not only an objective in purpose to improve the family member’s knowledge regarding the patient’s situation. Family and friends usually possess valuable, unique information concerning the patient. With their involvement, the sharing of this information is enabled. During the last decades, a range of programs for family members of patients with psychiatric diagnosis has been developed. The interest to involve family members started in the care of patients with schizophrenia (McFarlane, 2003; Miklowitz & Hooley, 1998), and today there is
no doubt that family psychoeducation (FPE) has a positive effect for both the patient and the family member.

Biological and psychological variables do interact, and studies have shown that a well-functioning environment can protect individuals with genetic loading of heritable disorders (Caspi et al., 2003; Tienari et al., 2004). One factor determining the course of the recovery process from psychiatric illness is the climate in close relations. There might be a critical attitude between family members accentuated by the addition of stress and anxiety in daily life due to the illness. This tension in relationships may contribute to lower the chances for the patient to recover. An English sociologist, George Brown, became interested in the dynamic in family relationships and developed the construct Expressed Emotion with colleagues in the seventies (Brown et al., 1972). Expressed emotion (EE) measures criticism, hostility, emotional involvement and emotional over-involvement and is assessed through an interview with a family member. It is thought to reflect the climate in the relation with somebody close who suffers a severe mental disorder. Studies have repeatedly shown that high levels of EE are associated with relapse and the status of the illness (Hansson & Jarbin, 1997). However, the construct of EE has been criticized for blaming family members. Today the approach towards EE seems to be more balanced and the notion is that the interaction between family members is reciprocal, rather than one-way. Even if high levels of EE in the family predict relapse in schizophrenia it leads to better clinical outcome in patients with BPD (Hooley, 2007; Hooley & Hoffman, 1999). Family interventions should aim at facilitating communication and problem solving and thereby reduce the levels of EE in the family environment.

Another study of family members of patients with borderline personality disorder showed that uncertainty regarding the diagnosis and incorrect knowledge of the disorder might increase the perceived burden and level of depression (Hoffman et al., 2003). Thus, it’s important to use psychoeducation in the purpose of giving family members an opportunity to learn more about the aetiology of the diagnosis, symptoms connected with the disorder and the different treatments available. Furthermore, they need to learn how to discover early symptoms of relapse, how to improve communication skills in relation to the patient and how to handle and solve problems connected with the symptoms (Miklowitz & Hooley, 1998). Family members may also need support in accepting the fact that the disorder could be chronic. When family members are involved in treatment there is a reduction in patient relapse, the recovery is facilitated and the wellbeing of the family members is heightened (Dixon et al., 2001).
Dialectical Behavior Therapy and family skills training

Dialectical Behavior Therapy (DBT) is based on cognitive-behavioral therapy (CBT) and combines behavioral principles with components from Eastern philosophy as mindfulness and acceptance (Linehan, 1993). The treatment was developed by Professor Marsha Linehan in an attempt to find a treatment for highly suicidal individuals (Linehan & Wilks, 2015). However, the first clinical trials came to focus on patients with borderline personality disorder (BPD), a patient group that is characterized by affect lability and self-destructive behaviors (American Psychiatric Association, 2013).

Standard DBT combines weekly individual sessions and skills group training. The skills training program aims to facilitate adoption and internalization of new behavioral and emotional patterns. It includes four modules that teach mindfulness skills, strategies for change and radical acceptance, how to create and maintain relationships, emotion regulation skills, and distress tolerance; i.e. how to cope in difficult situations (Linehan, 1993).

DBT has been shown to benefit patients with BPD, and the skills training component has been incorporated as a stand-alone intervention in psychological treatment for patients with ADHD (Hesslinger et al., 2002; Hirvikoski et al., 2011; Philipsen et al., 2007) and in a manualized family skills training program, Family Connections (FC), for family members of patients with BPD (Hoffman et al., 2005). The model Hoffman and Fruzzetti present assumes reciprocity in interpersonal relations, meaning that patterns in families forms by both positive and negative emotions, and in both directions. The program has been shown to increase the wellbeing of family members as well as the relationship to the patient (Fruzzetti & Iverson, 2004; Hoffman et al., 1999; Hoffman et al., 2005; Hoffman et al., 2007). In a Swedish evaluation of FC, the results pointed in the same direction (Lund & Wångby, 2007; Fruzzetti & Hoffman, 2004/2006).

DBT is endorsed by the American Psychiatric Association (APA) as the treatment of choice for patients with BPD. However, as for other populations, there is a need for further evidence of the effectiveness of taught skills and for whom and which problems they work (O’Connell & Dowling, 2014). Methodological demands challenge the treatment outcome research field, but set these limitations aside, there are preliminary results that support the feasibility and acceptability of skills training across populations (Valentine et al., 2015).
Family Connections

Family Connections (FC) is originally a 12-week education program for family members to persons with BPD and provides psychoeducation, brief skills training and a supportive network (Hoffman et al., 2005).

<table>
<thead>
<tr>
<th>Family Connections aims</th>
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<tbody>
<tr>
<td>to increase the knowledge and understanding of symptoms and behaviors connected to the patient’s problems along with information about available treatment.</td>
</tr>
<tr>
<td>to help the family member to better understand and handle own emotions in the problematic situations that may occur with the patients.</td>
</tr>
<tr>
<td>to induce the family members sense of control and to lower their stress level by implementing more effective communication skills and problem solving strategies.</td>
</tr>
<tr>
<td>to enhance the family members psychic health and welling.</td>
</tr>
<tr>
<td>to support the creation of a network for family members in similar situations and to offer a forum for family members to exchange experiences with each other.</td>
</tr>
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The FC manual has been adapted to the target group of relatives and friends to suicidal patients (Rajalin et al., 2009).
AIMS

The overall aim of this thesis was to examine familial and interpersonal factors related to suicidal behavior.

Specific aims

Part I, including study I and II:

- To examine the influence of family history of suicide and experienced interpersonal violence on severity of suicidal behavior and on suicide risk in suicide attempters.

- To examine the relationship between interpersonal problems, family history of suicide, and to describe specific patterns of interpersonal problems in this patient group.

Part II, including study III and IV:

- To examine the feasibility of Family Connections addressed to family members of suicide attempters in a subspecialized clinic and in a psychiatric outpatient care setting, and to examine if the intervention has an effect on the family members’ general wellbeing, their experience of burden and their experience of the quality of the relation to the patient.
METHODS

Study Settings

Studies I and II

The first two studies are based on two clinical cohorts recruited between the years 1993-2005 at the Karolinska University Hospital in Solna, Sweden. The 181 patients included (113 women, 68 men), all of whom had recently attempted suicide, were referred from different units in the hospital to the subspecialized Suicide Prevention Clinic for follow-up care. Inclusion criteria for treatment at the Suicide Prevention Clinic at the Karolinska University Hospital were a recent suicide attempt and the age of 18 years or older. Exclusion criteria were schizophrenia spectrum psychosis, dementia, mental retardation and intravenous drug abuse.

The Regional Ethical Review Board in Stockholm approved of the study protocols (Dnr 93-211 & Dnr 00-194) and the participants gave their written informed consent to participate in the research study.

Study III

Study III was conducted at the Suicide Prevention Clinic at Karolinska University Hospital in the year of 2006. The eighteen participants in the study were relatives of patients in treatment after a serious suicide attempt. Family members gave informed consent to participate in the research study. Confidentiality was ensured by removing identifying data and by encoding the results.

An application for approval of the study was sent to the Regional Ethical Review Board in Stockholm. Since the work did not include any changes in the treatment of the patients, no objections were found (Dnr 2006/40-31).

Study IV

Study IV was conducted between the years 2008-2015 and includes 14 skills training groups of family members and friends to suicidal patients in the Psychiatric Outpatient Services Clinic within Psykiatri Södra, Stockholm. This clinic is located in the southern central part of Stockholm and also includes several of the southern suburbs.

The Regional Ethical Review Board in Stockholm approved of the study protocols (Dnr 2013/840-31/3). Part of the study was approved retrospectively and the first 17 participants were not contacted again for written informed
Methods

consent due to ethical aspects. Participants who joined the study after 2010 did give their written informed consent to participate in the research study.

Participants

Study I and II
The participants in the two cohort studies consisted of 181 suicide attempters, 81 and 100 respectively, receiving follow-up treatment at Karolinska University Hospital after a recent suicide attempt. 113 were women and 68 were men. Inclusion criteria were a recent suicide attempt, the ability of verbal and written communication in Swedish, and an age of 18 years or older. Suicide attempt was defined as any non-fatal, self-injurious behavior with some intent to die within the last four weeks. Exclusion criteria were schizophrenia spectrum psychosis, dementia, mental retardation and intravenous drug abuse in line with the exclusion criteria for clinical follow-up at the Suicide Prevention Clinic.

Participants were diagnosed according to DSM-III or DSM-IV with the research version of SCID-I, performed by trained psychiatrists. Trained clinical psychologists performed the SCID-II interview to establish any occurrence of Axis-II diagnosis. At least one current Axis-I diagnosis could be diagnosed in 91% of the patients. The criteria for mood disorder were met by 75%; criteria for anxiety disorder and adjustment disorder were each met by 5%. Substance-related disorder was found in 3%, one patient had anorexia nervosa and one was diagnosed with an unspecified psychiatric disorder. Regarding Axis-II disorders, 33% of the patients met criteria for personality disorder; of these patients 35% were diagnosed with borderline personality disorder, 11% were diagnosed with dependent personality disorder, and 9% with avoidant personality disorder. Antisocial personality disorder was found in 6% and 39% had a personality disorder not otherwise specified.

Assessments

Study I and II

Assessment of family history of suicide
In the first cohort (n = 81) information about family history of completed suicide was extracted from reviewing patient files. In the second cohort (n = 100) family history of completed suicide was assessed with a structured clinical interview (Karolinska Self-Harm History Interview, Appendix 1) containing specific questions regarding family history of suicide and suicidal behavior. In 48 cases (26.5%) of the total clinical cohort this information was missing and
therefore they have been excluded from the analysis. Flowchart (figure 2) shows number of patients in the two cohorts, assessment of family history of suicide and missing data.

![Flowchart of the participants in study I and II](image)

**Study I**

*The Freeman scale*

The Freeman scale (Freeman et al., 1974) is divided into two scales designed to measure suicide attempter’s intent to die. The first part takes into account the method used and ranges from complete reversibility in regards to the kind and amount of drug used to insignificant chance for reversibility, for example, a gunshot in head or trunk of body or hanging. A high score indicates low
reversibility of suicidal method (i.e. serious attempt), whereas a low score indicate the opposite (i.e. non-serious attempt).

The second part measures the probability of interruption during the suicide attempt. The rating ranges from certain intervention, act committed in presence of somebody, to remote chance of intervention, act committed in isolated setting. A high score reflects low probability of intervention. Reversibility of method and probability of interruption are each rated on a 1-5 scale, which gives a total score maximum of 10.

**The Karolinska Interpersonal Violence Scale (KIVS)**

The Karolinska Interpersonal Violence Scale (Appendix 2) consists of four subscales that measure different aspects of experienced violence (Jokinen et al., 2010). The scales assess the patient’s exposure to violence and own violent behavior both in childhood (age 6-14 years) and in adulthood (age 15 years and above). Statements about violent behavior as a child or as an adult are defined in five steps from no violence (0), few episodes of violent behavior with no cause for alarm (1), occasional violent behavior (2), repeated violent behavior (3), more severe violent behavior (4), to very severe physical or bodily harm, including killing somebody (5). Statements about being a victim of violence are rated in the same way, between no violence (0), exposed to violence on a low level (1), occasional experiences of being punished, bullied or in adult age beaten by partner (2), frequent exposure to violence (3), repeatedly beaten in school and in home environment (4), to repeated exposure to violent behavior that results in severe bodily harm (5). Ratings between 0-5 (total score maximum 20) are based on an interview performed by a trained clinician. The scale has recently been validated and described in a study of suicide attempters. The KIVS has previously been shown to have high inter-rater reliability (Jokinen et al., 2010) and has been used in suicide research (Khemiri et al., 2016; Haglund et al., 2016).

**Study II**

**Inventory of Interpersonal Problems (IIP)**

The Inventory of Interpersonal Problems (Horowitz et al., 1988) was used to assess interpersonal problems. IIP is a 64-item self-report inventory with a well-established reliability (0.78) and validity (Horowitz et al., 2000), which identifies the most apparent interpersonal problems of an individual. The scale is available in a Swedish version and has been validated in Sweden (Weinryb et al., 1996). Interpersonal problems are organized in eight scales which each describes different interpersonal problems (new denomination in parenthesis): Domineering (Domineering/Controlling); Vindictive (Vindictive/Self-
centered); Cold (Cold/Distant); Social avoidant (Social inhibited); Nonassertive (Nonassertive); Exploitable (Overly Accommodating); Overly nurturant (Self-sacrificing), and Intrusive (Intrusive/Needy). The 64 items are divided in two forms: Some begin “it is hard for me to…” and others “these are things I do too much or too often”. The subjects respond to the statements of how they handle distressing interpersonal behaviors on a Likert scale ranging from 0 (not at all) to 4 (extremely).

A high value in the scale Domineering indicates difficulties to let go of control and aggressing towards others. An example of a statement in this scale is “it’s hard for me to take instructions from people who have authority over me”. Another is “I try to change people too much”. High values in the scale Vindictive imply problems with anger, frustration, and vindictive thoughts: “it’s hard for me to put someone else’s needs before my own” and “I fight with people too much”. In the scale Cold a high value means having difficulty to connect to others: “it’s hard for me to get along with other people” and “I keep other people at a distance too much” are examples of items in this scale.

The Social avoidant scale contains statements like “it’s hard for me to socialize with other people” and “it’s hard for me to show my feelings” and describes an introvert, even dismissive personal style. High values in the scale Nonassertive suggest both low self-esteem and low self-confidence in the respondent. An example of a statement is: “it’s hard for me to be firm when I need to be”. High scorers in the scale Exploitable try to please other people and report problems with both feeling and expressing anger. Examples of statements are “it is hard for me to let other people know when I’m angry” and “I let other people take advantage of me too much”. In the scale Overly nurturant illustrative items of the responder’s inclination to try too hard are “it’s hard for me to be angry with someone I like” and “I put other people’s needs before my own too much”. In the scale Intrusive items like “it’s hard for me to stay out of other people’s business” and “I tell personal things to other people too much” depict the person’s problems with boundaries.

The individual’s total score is translated to a normative T-score that indicates the general level of interpersonal problems a person has in relation to the normal population. The individual score on each of the included eight scales describes the specific troublesome areas and character of interpersonal problems. There is also a possibility to use an ipsatized T-score that relates to the individuals’ own problem level. The score can therefore be used in various ways: to compare different groups, a patient’s level of interpersonal problems, or to compare the level of interpersonal problems before and after clinical treatment. The subscales are known to intercorrelate and to reduce the risk of multicollinearity, the scales were grouped into two factors as follows: Factor 1 (Domineering; Vindictive; Cold; Social avoidant) and Factor 2 (Nonassertive;
Exploitable; Overly nurturant, and Intrusive) using normative T-scores (Alden et al., 1990; Horowitz et al., 1988).

Follow-up mortality

All patients were linked to a national Cause of Death register by their own unique identification number. Eleven patients completed suicide before January, 2011. Their deaths were ascertained from death certificates registered. The follow-up time ranged between 6 and 17 years.

Statistical analysis

Study I

Characteristics of the study group were described by using the mean, the median and the range for quantitative variables. The Shapiro-Wilk test was used to test if data was normally distributed. Parametric statistics, analysis of variance (ANOVA), was applied for between-group comparisons where data was normally distributed, while the nonparametric Wilcoxon test was applied for skewed data. Fisher's exact test was used for cross tabulations of categorical variables. The alpha value was set at $p<.05$, whereas $p<.10$ was considered to be a statistical trend. Based on the results of univariate analysis, a standard multiple regression was conducted with family history of suicide and exposure to interpersonal violence as a child as predictors for completed suicide.

Study II

T-test and the Kruskal-Wallis’ test were used to assess group differences (suicide attempters with and without family history of suicide, suicide attempters with and without comorbid personality disorder or substance use) in continuous variables. The significance of association between the categorical variables comorbid personality disorder or substance use diagnosis and family history of suicide, was tested with a chi-square test. Tests of non-parametric or parametric correlations were performed using Spearman rho or Pearson's r.

From the results of the bivariate analyses of the two IIP factors, a standard multiple regression analysis was conducted to determine whether family history of suicide was associated with specific domain of interpersonal problems adjusted for comorbid personality disorder diagnoses. Subscales included in the IIP factor significantly associated to a family history of suicide were analyzed separately. The residual scatterplots were examined to check the assumptions of normality, linearity and homoscedasticity between the predicted dependent variable scores and errors of prediction, and the assumptions were deemed to
be satisfied. Furthermore, the Durbin-Watson test statistic expressed no correlation in adjacent residuals. All statistical tests were two-tailed.

The alpha was set at .05. The Statistical Package JMP 12.0.1 software, SAS Institute Inc., Cary, NC, USA was used for all statistical analyses.

Study III

Participants

The participants were family members of suicide attempters having their treatment at the Suicide Prevention Clinic at Karolinska University Hospital in 2006, a specialist clinic for patients with serious suicide attempts. Inclusion criteria for treatment at the Suicide Prevention Clinic at the Karolinska University Hospital were a recent suicide attempt, and the age of 18 years or older. Patients having schizophrenia spectrum psychosis, dementia, mental retardation and intravenous drug abuse had a clinical follow-up in other specialized psychiatric units.

Eighteen family members participated in the study. Ten women and eight men were randomized into two groups. Mean age of participants was 44.8 (SD = 12.7). The relation to the patient in treatment was as follows; nine were mothers (50%), three were fathers (17%), five men were husbands or live-in partners (28%), and one was a sister (5%). The mean time since the suicide attempt ranged between two months and thirty-six months.

Study IV

Participants

The study includes 132 relatives, partners or friends, 76 women (58%) and 56 men (42%), of suicidal patients in psychiatric care within Stockholm County Council. Being suicidal was defined as having attempted suicide or being engaged in serious suicidal ideation or planning of suicide. See figure 3 for distribution of types of relationship. During the eight years, 14 skills training groups were conducted. Group size varied between seven and fourteen people. Inclusion criteria were 18 years of age, knowledge in Swedish and having a close relationship to a suicidal patient within the clinic.
Assessments

Study III

**Burden Assessment Scale (BAS)**

Burden Assessment Scale (Reinhard et al., 1994) was used to assess the participants’ subjective experience of burden for being a relative to a suicidal person. The scale, consisting of 19 items, aims to measure both objective and subjective burdens of daily life in families with a member who is seriously mentally ill in the last six months period. A high mean reflects higher burden in all subscales. BAS was validated in Sweden by Ivarsson and colleagues (2004) and a factor analysis resulted in three factors: “disrupted activities”, “feelings of guilt/worry”, and “social strain”. The scale has been shown to have excellent reliability and ability to differentiate between family samples with different levels of burden and it is sensitive to changes over time (Ivarsson et al., 2004; Reinhard et al., 1994).

**The Brief Symptom Inventory (BSI)**

The Brief Symptom Inventory (Derogatis & Melisaratos, 1983) was used to assess the subjective experience of emotional discomfort. BSI is the shortened version of Symptom Checklist-90-R (Derogatis, 1994), and is a 53-item self-report inventory in which participants rate the extent to which they have been...
bothered (0 = "not at all" to 4 = "extremely") in the past week by various symptoms. The BSI has nine subscales designed to assess individual symptom groups: 1) somatization, 2) obsessive-compulsive, 3) interpersonal sensitivity, 4) depression, 5) anxiety, 6) hostility, 7) phobic anxiety, 8) paranoid ideation and 9) psychoticism. The scale also includes three scales that capture global psychological distress: Global Severity Index (GSI) which is the mean of all of the subscale scores, Positive Symptoms Total (PST) which is a count of the number of items endorsed at a level higher than zero, and Positive Symptoms Distress Index (PSDI), which is the sum of all item values divided by the PST. The Swedish version of BSI used in this study has been validated in Sweden and the Swedish norms were used for comparisons (Fridell et al., 2002).

Questions About Family Members (QAFM)

Questions About Family Members (QAFM) (Hansson & Jarbin, 1997) is a self-rating instrument and aims to assess expressed emotion (EE) in dyads. We used QAFM to explore the relationship between the participant and the patient from the participant’s perspective. The scale consists of 30 items which are rated on a 5-point Likert scale with answers ranging from “almost always” to “almost never”. QAFM has been homogenized by factor analysis, resulting in four subscales; two factors about “given” EE: critical comments and emotional over-involvement and two factors about “perceived EE”: perceived criticism and perceived emotional involvement. The score is summed for each subscale, and is divided by the sum of items in the subscale. A higher score reflects a more strained relationship in the three subscales Critical comments, Perceived criticism and Emotional over-involvement and are thus expected to decrease, whereas in the subscale Perceived emotional involvement, an increase is regarded positive for the relationship. The reliability in clinical and non-clinical groups is good (Cronbach’s alpha is 0.87 for critical comments, 0.69 for perceived emotional involvement, 0.73 for perceived criticism and 0.81 for emotional over-involvement) and there is acceptable predictive validity (Hansson & Jarbin, 1997).

Beck Depression Inventory (BDI)

Participants’ level of depression was assessed with the Beck Depression Inventory (BDI), one of the most commonly used self-measurement instruments for depression and therefore also extensively tested for validity and reliability (Beck et al., 1988). The scale contains 21 statements with different response options, graded from 0 to 3. The total score varies between 0 and 63 where a higher score reflects a more severe degree of depression. Examples of symptoms measured are feelings of guilt and failure, pessimism, irritability, tiredness, social withdrawal and suicide ideation.
Quality of Life Inventory (QOLI)

The Quality of Life Inventory (Frisch et al., 1992) measures life satisfaction in 16 explicitly defined domains based on subjective well-being and life satisfaction theory. The responder rates the importance of the different domains on a 3-point rating scale as well as their current satisfaction with each domain on a 6-point rating scale. The domains are: 1) Health, 2) Self-regard, 3) Philosophy of life, 4) Standard of living, 5) Work, 6) Recreation, 7) Learning, 8) Creativity, 9) Civic action, 10) Love relationship, 11) Friendships, 12) Relationship with children, 13) Relationship with relatives, 14) Home, 15) Neighborhood, and 16) Community.

Each domain is shortly described in the answer sheet followed by two questions, the first about the importance of the domain in the respondents’ life (0 = not at all important, 1 = important, 2 = extremely important) the second in terms of their satisfaction with the same area (-3 = very dissatisfied to 3 = very satisfied). The product of the satisfaction and importance ratings for each area of life is computed. A total score for all domains is calculated; in the next step this score is divided with the number of domains. The total QOLI score is obtained by averaging all weighted satisfaction ratings that have nonzero importance rating. Higher scores indicate a higher overall quality of life (Lundh & Simonsson-Sarnecki, 2001). The QOLI has been regarded as having good reliability and validity.

Study IV

Feasibility

The criteria for being regarded as having completed the program was attending at least six sessions out of the nine given (67%). The participants described their satisfaction with the program verbally in the group and in an open questionnaire in the last session.

Outcome measures

In Study IV the earlier described scale BAS was used as the primary outcome measure. The secondary outcome measures used were QAFM (described above) and Five Facet Mindfulness Questionnaire.

The Five Facet Mindfulness Questionnaire (FFMQ)

To assess mindfulness, the The Five Facet Mindfulness Questionnaire was used (Baer et al., 2006). The scale measures five facets of mindfulness: Observing, Describing, Acting with Awareness, Non-judging of Inner Experience, and Non-reactivity to Inner Experience. The scale consists of 39 statements and
Mia Rajalin uses a 1-5 Likert scale ranging from “Never or very rarely true” to “Very often or always true”. The subscales Acting with Awareness and Non-judging of inner experience are reversed, i.e. a high score reflects a low awareness regarding one’s behavior and a high degree of self-judgement respectively. The FFMQ has been shown to have good psychometric properties with alpha coefficients adequate-to good (range .72 to .92). FFMQ was included in the fifth group and forward.

Study III and IV

**Intervention**

The manualized educational program FC is divided into six modules. Every module treats a certain area described below:

*Psychoeducation*

In CBT the first session often begins with an introduction to the problem in question. This introduction, called psychoeducation, aims to increase the knowledge and understanding concerning the diagnosis. It typically consists of current facts about the disturbance e.g. symptomatology, cause, and treatment options.

*Mindfulness*

Mindfulness is based on elements from Eastern philosophy and has been introduced in Western medicine by Jon Kabat-Zinn (1994). According to the tradition, mindfulness is a meditative state reached by regular meditation. However, everybody has an innate ability to be mindful, though the level of this ability varies. With practice the ability improves which can affect health outcomes.

Mindfulness practice seeks to heighten the awareness of thoughts and emotions in the present. Therapeutic applications based on mindfulness are now used for a variety of conditions in the Western clinical and psychiatric care. Mindfulness practice has been documented to lead to reduced stress, anxiety, depression and chronic pain (Sharma & Rush, 2014; Strauss & Cavanagh, 2014; Zeidan & Vago, 2016).
Kåver (2006) describes the most important parts of mindfulness as:

- To observe, to pay attention to events, thoughts, feelings and bodily sensations in the present moment.
- To describe, to put words on the experience.
- To be non-judgmental, avoid reasoning in categories like good or bad, should or shouldn’t.
- To engage in the moment and the experience, to receive what happens with objectivity.

**Acceptance**

What we choose to accept or not in life is certainly a private event. The inclusion of the concept of acceptance in skills training is intended to increase the ability to let feelings, thoughts and experiences be what they are, whether pleasant, neutral or unpleasant, without taking a fight against them or to judge them as positive or negative (Harris, 2009/2011; Linehan, 1993). This is particularly important when avoidance of certain experiences is in the way of constructive action. Furthermore the skills training is intended to encourage the family member to consider what is important in different life domains and to define values and goals in order to improve the ability to act accordingly.

**Emotion**

The ability to use the innate communication- and information system that emotions constitute varies between individuals. However, humans rely on being able to identify emotions correctly to get access to accurate information about how to respond in a certain situation. Emotions guide us in what’s important to attend to from one moment to another to make the consequences that follows the most favorable.

To better understand our emotional responses we need to be able to distinguish between primary and secondary emotions. Primary emotions are normative, automatic responses, and usually functional in the situation they appear (Fruzzetti & Hoffman, 2004; Fruzzetti et al., 2003). Secondary emotions are fast, almost automatic responses that follow the primary emotion, however they’re nevertheless taught. If the secondary emotion doesn’t reflect the primary emotion correctly it often will lead to misinterpretation. One example of a primary emotion that could be troublesome is fear/worry. While worry is a perfectly understandable emotion in, say a situation where for example a teenager doesn’t come home in time, it is easily transformed into a secondary emotion of anger, as soon as the teenager steps inside, which in most cases tend to escalate a conflict.
Validation

Validation means to confirm that somebody is true, comprehensible and logic seen from their point of view (Kåver, 2006; Linehan, 1993). It also means to be able to communicate this apprehension, to oneself and to others with clarity. Validation can be expressed verbally or non-verbally, with committed action (Fruzzetti & Hoffman, 2004; Nilsonne, 2004). Invalidation is the opposite, i.e. to dismiss the counterpart independent of the validity of the behavior. Continuous invalidation will form negative patterns that in the long run will be destructive to the relationship (Fruzzetti & Hoffman, 2004; Kåver, 2006).

Problem management

FC suggests three different ways to manage interpersonal problems; radical acceptance, which means to fully accept and tolerate a problem as well as the own reaction to it, to change how you feel about the problem or to try to solve it. Strategies for problem management are mutual problem solving and identification of goals and limits for what you are able or want to change.

Chain analysis

In DBT chain analysis is used to carefully analyze a maladaptive behavior that leads to negative or unwanted consequences. The chain analysis model focuses on individuals in their own environment. Together with a therapist, a step-by-step review is made around the sequence of events that surrounds a target behavior. Chain analysis includes information about the individual vulnerability, triggers, feelings, thoughts, problem behavior and short-term as well as long-term consequences. The process includes generating hypotheses about alternative behaviors that may influence or control the target behavior in the future.

Homework

Homework consists of practice of taught material in between sessions. These exercises give opportunities to find concrete examples in daily life where the new knowledge is applicable.

The skills training program was given during nine weeks with one weekly two-hour session. Two therapists, trained in FC or DBT led the groups. Except for the introductory session, every session began with a mindfulness exercise followed by a review of the homework from the previous week. After a coffee break a new skill was introduced. The ambition was to follow the original FC-manual as close as possible, however some changes to the material was done. One change was that the program was shortened by three sessions. The main adaptation was conducted in the psychoeducational part. Updated research
based information about suicidal behavior, risk- and underlying factors and a description of the suicidal process as well as information of psychiatric disorders with high suicide risk (mood disorders, personality disorders and substance use disorders) was given. General information about pharmacological and psychotherapeutical treatment recommendations was also included in this section. The participants in all groups took part of the different educational steps in the same order and rate. After the modifications the skills training program was conducted as follows:

Session I: Introduction and psychoeducation
After a general introduction of the program and its content, aims and goals, participants were given psychoeducation according to the description above.

Session II: Presentation of the group
The session includes presentation of the participant and his or her individual situation with the patient.

Session III: Mindfulness
The participants are familiarized with the concepts of mindfulness and validation.

Session IV: Emotion and introduction of chain analysis
Information of modern theories of emotion followed including learning about primary and secondary emotions, communicatory aspects of emotions and relationship and function between cognitions, emotions and behaviors.

Session V: Acceptance
The concept of acceptance is defined and discussed. Identification of goals and values regarding the relationship with the patient.

Session VI: Validation
Continuous work with the concept of validation in relationships.

Session VII: Self-validation and self-invalidation
Focus on self-validation and self-invalidation.

Session VIII: Problem management
Training in how to define problems and how to effectively handle them.

Session IX: Retrospect and outlook
The participants were invited to discuss the contents of the program.
Procedure

The design of the two studies was an open trial within-subject with pretest and posttest. The participants completed several assessments before beginning the program. The same instruments were repeated after completion of the program to be compared with the baseline assessments.

Statistical analysis

Initial analyses were carried out to evaluate skewness and kurtosis of the distributions with Shapiro Wilk test.

Study III

Wilcoxon Signed Ranks test for matched pairs was used to compare the data from pre- and posttest. Where data was normally distributed, paired samples t-test, was used to assess change from pre- to posttest. All tests were two-tailed (SPSS 14.0, 2005). The alpha value was set at $p<.05$.

Study IV

A missing values analysis was performed in SPSS to detect systematic patterns of missing data. After that cases with more than 50% missing (i.e. no pre- or post-intervention assessment) were excluded as well as cases who did not fulfill the criteria of participation; attendance of at least six out of nine sessions. In the next step a new analysis was performed to detect single cases of missing data. Since missing values was less than 5%, an imputation was made. The method involves replacement of missing values based on the proportional answers of the whole sample for each item (Little & Rubin, 2002).

Initial analyses were carried out to evaluate skewness and kurtosis of the distributions with the Shapiro Wilk test. Data was crosschecked with both parametric and non-parametric (Wilcoxon Signed Ranks test for matched pairs) tests. Results did not diverge notably between parametric and non-parametric methods. Paired samples $t$-test was used to assess change from pre-test to posttest and these results are the ones reported. All tests were two-tailed (SPSS 23.0, 2015). The alpha value was set at $p<.05$.

To calculate effect sizes, Cohen’s $d$, we corrected for dependence among means in order to make direct comparisons to effect sizes from within-subjects studies (Morris & DeShon, 2002). Thus, we entered the correlations between the pre- and post-intervention means in a regular online effect size calculator for within-subjects studies. To control for an overestimation of effect we also performed Rosenthal’s $r$. Since the effect size $r$ did not alter the effect sizes, we report Cohen’s $d$, small (0.2), medium (0.5) and large (0.8) (Cohen, 1988).
Ethical considerations

To perform studies that include vulnerable patients like those in care after a suicide attempt is surely a delicate task. Even though the patients got information that participation in the studies did not affect their clinical care, some patients could feel forced to participate, in order to get the care they needed. By the right of their psychiatric diagnosis they might be more or less dependent of a fruitful relationship with caregivers. Some could feel exploited, while others might want to express their gratitude for all the help they have gotten. However, clinical experience contradicts that patients would react negatively. Instead, in most cases, they feel that they contribute to clarify the problem and that they can help others in the same situation.

The measurements included are similar to interviews and scales regularly used in psychiatric care. The questions asked could be considered sensitive in regards of integrity. The participants are well informed of their voluntariness, and of their right to leave the study whenever they want to, without having to give a reason, and that their identities will be decoded and known only by research personnel. Another aspect is to be observant of the need of extra support during the time of the studies. Patients would normally be in observant care, however, the family members and friends participating in the family skills training groups might not be, and extra attention to their wellbeing is a priority during the time of the intervention. Sometimes the focus and the new perspective on a difficult life situation could make you feel worse, however, in the long run, this focus could ease the pain and make it possible to change and handle the situation in a new, perhaps better way.

The Declaration of Helsinki states that groups that are underrepresented in research should be prioritized. Based upon the ethical considerations above, we consider the risk for harm negligible in all four studies.
RESULTS

Study I

Family history of suicide and suicide attempt

Among the suicide attempters, 20% (27/133) reported a family history of suicide. Nine suicide attempters reported a first degree relative who had committed suicide (6.7%). As for family history of suicide attempt, 20% (26/133) of suicide attempters reported a positive history (table 1). Forty-six patients (35%) reported either family history of suicide or suicide attempt, seven patients (5%) reported a family history of both suicide and suicide attempt.

Table 1. Reported family history of suicide and suicide attempt

<table>
<thead>
<tr>
<th></th>
<th>Men n = 55</th>
<th>Women n = 78</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family history of suicide</td>
<td>11/55 (20%)</td>
<td>17/78 (22%)</td>
<td>0.04</td>
<td>0.84</td>
</tr>
<tr>
<td>Family history of suicide attempt</td>
<td>8/55 (15%)</td>
<td>18/78 (23%)</td>
<td>1.5</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Family history of suicide, suicide intent and interpersonal violence

The Freeman rating (total score) in the whole group of patients showed a trend to be higher in suicide attempters with a family history of suicide ($p = 0.07$). Freeman interruption probability showed a trend to be higher in suicide attempters with family history of suicide ($p = 0.07$), but not regarding the reversibility of the method ($p = 0.32$). Among males, the Freeman interruption probability score was significantly higher in suicide attempters with a family history of suicide compared to suicide attempters without family history of suicide ($p = 0.04$).

Suicide attempters with a family history of suicide showed a trend to report more exposure to interpersonal violence as a child and expressed violence as an adult, but not in expressed violence as a child or exposure to interpersonal violence as an adult (table 2). The patients in the first cohort reported more exposure to violence as a child and higher Freeman rating ($p = 0.03; p = 0.01$).
Table 2. Freeman and the Karolinska Interpersonal Violence Scale (KIVS). Mean, median, standard deviation (sd), range, p-value (p) for Freeman total, Freeman interruption probability scale, Freeman reversibility scale and the four subscales of KIVS in suicide attempters with and without family history of suicide. Freeman rating n = 27 for positive family history and n = 106 for negative family history and KIVS rating n = 26 for positive family history and n = 100 for negative family history.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Family history +</th>
<th></th>
<th>Family history -</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>sd</td>
<td>Range</td>
</tr>
<tr>
<td>Freeman total</td>
<td>6</td>
<td>6</td>
<td>1.7</td>
<td>3-10</td>
</tr>
<tr>
<td>Interruption probability</td>
<td>3.1</td>
<td>3</td>
<td>1.1</td>
<td>1-5</td>
</tr>
<tr>
<td>Reversibility of method</td>
<td>3</td>
<td>3</td>
<td>1.0</td>
<td>1-5</td>
</tr>
<tr>
<td>Exposure to violence in childhood</td>
<td>2.5</td>
<td>3</td>
<td>1.3</td>
<td>0-5</td>
</tr>
<tr>
<td>Expressed violence as a child</td>
<td>0.7</td>
<td>1</td>
<td>0.7</td>
<td>0-2</td>
</tr>
<tr>
<td>Exposure to violence in adulthood</td>
<td>2.3</td>
<td>2.5</td>
<td>1.6</td>
<td>0-5</td>
</tr>
<tr>
<td>Expressed violent behavior as adult</td>
<td>1.7</td>
<td>2</td>
<td>1.3</td>
<td>0-5</td>
</tr>
</tbody>
</table>

Suicide risk

Eleven suicides occurred during the follow-up time, four women and seven men. Family history of suicide was approaching a statistical trend to predict suicide in the suicide attempters (p = 0.12, Fisher exact one tailed). Broken down by gender, family history of suicide was a significant predictor for completed suicide in male suicide attempters (p = 0.01, Fisher exact two tailed), (figure 4), but not in female suicide attempters (p = 0.58, Fisher exact two tailed).

Figure 4. Family history of suicide in male suicide victims and in survivors of suicide attempt

The mean KIVS exposure to interpersonal violence score as a child distinguished between suicides (Mean ± SE) (3.3±1.5) and survivors (2.0±1.3) (n = 126, p = 0.004 Wilcoxon test).
Predictors of suicide

A standard logistic regression analysis was conducted with family history of suicide and KIVS exposure to violence as a child as predictors of suicide. The regression model in the whole group was significant, $\chi^2 = 10.2$, DF 2, $p = 0.006$. Due to differences in the exposure to interpersonal violence as a child between the cohorts, cohort number was also entered as a predictor. Cohort number was not a significant predictor and did not affect the results and was therefore dropped in the regression model.

Exposure to violence as a child was the only statistically significant predictor of suicide in the final regression model, $p = 0.01$. Broken down by gender, the regression model was significant only in males, $\chi^2 = 11.9$, DF 2, $p = 0.003$. Both family history of suicide and exposure to interpersonal violence were significant predictors for completed suicide in male suicide attempters, (table 3). The regression model for female suicide attempters showed a statistical trend, $\chi^2 = 5.4$, DF = 2, $p = 0.07$. Exposure to interpersonal violence as a child was a significant predictor of suicide, $p = 0.04$.

<table>
<thead>
<tr>
<th>Predictors for suicide in male suicide attempters ($\chi^2 = 11.9$, DF = 2, $p = 0.003$)</th>
<th>$\chi^2$</th>
<th>$p$ value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to violence in childhood</td>
<td>4.3</td>
<td>0.04*</td>
<td>2.5</td>
</tr>
<tr>
<td>Family history of suicide</td>
<td>5.4</td>
<td>0.02*</td>
<td>3.5</td>
</tr>
</tbody>
</table>

In the next step, we analyzed the impact of environmental factors in the form of exposure to interpersonal violence as a child for suicide risk in male suicide attempters with family history of suicide. Four suicide victims had reported significantly higher exposure to interpersonal violence as a child compared to seven survivors, all with family history of suicide ($p<0.0001$), (figure 5).

Figure 5. Effect of exposure to violence as a child in 11 male suicide attempters with FHS
Study II

Interpersonal problems in suicide attempters

The mean T-score for each scale for the participants in the total sample that completed IIP, is shown in Table 4 (n = 162). The mean T-scores for subscales ranged between 49 to 61. Suicide attempters with comorbidity of a personality disorder scored significantly higher in both factors (Factor 1: t(113) = -5.6; p<0.0001), (Factor 2: t(113) = -3.3; p = 0.0012) compared to suicide attempters without a comorbid personality disorder. The factors did not differ in suicide attempters with and without comorbidity of substance abuse (Factor 1: t(119) = -0.96; p = 0.34), (Factor 2: t(119) = -1.0; p = 0.30).

Family history of suicide and interpersonal problems

Among the suicide attempters, 20% (27/133) reported a family history of suicide. These individuals more often fulfilled criteria for a comorbid personality disorder (χ² = 7.7, p = 0.006) but not a comorbid substance abuse disorder (χ² = 0.13, p = 0.72). Suicide attempters with a family history of suicide (25/121) scored significantly higher in Factor 2 (t(119) = -2.8; p = 0.0053), but not in Factor 1 (t(119) = -3.5; p = 0.18) compared to suicide attempters without a family history of suicide.

Consequently, a multiple regression of the Factor 2 subscales as a dependent variable and family history of suicide, as well as comorbid personality disorder as independent variables was conducted. The overall model was significant (F = 7.6, p = 0.0008) with R² = 0.12 and adjusted R² = 0.10, which implies that the model accounted for 10% of the variance in intrusive interpersonal problems.

Both independent variables were significantly associated with interpersonal problems within the Factor 2: family history of suicide (p = 0.048) and comorbid personality disorder (p = 0.0079). The standardized value of t-ratio for family history of suicide (= 2.00) indicated that positive family history of suicide was associated with higher scores in the Factor 2.
Table 4. IIP-ratings in suicide attempters, T-score mean, standard deviation (sd), range, p-value (p), and effect size for Cohen’s d (d) for IIP with and without FHS

<table>
<thead>
<tr>
<th>Factor 1</th>
<th>IIP total (n = 162)</th>
<th>FHS + (n = 25)</th>
<th>FHS – (n = 96)</th>
<th>Cohen’s d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T score Mean (sd)</td>
<td>Range</td>
<td>T score Mean (sd)</td>
<td>T score Mean (sd)</td>
<td></td>
</tr>
<tr>
<td>Domineering</td>
<td>49 (12)</td>
<td>38-96</td>
<td>53 (16)</td>
<td>48 (11)</td>
<td>0.36</td>
</tr>
<tr>
<td>Vindictive</td>
<td>56 (16)</td>
<td>38-114</td>
<td>58 (18)</td>
<td>56 (16)</td>
<td>0.12</td>
</tr>
<tr>
<td>Cold</td>
<td>55 (13)</td>
<td>39-96</td>
<td>58 (15)</td>
<td>56 (13)</td>
<td>0.14</td>
</tr>
<tr>
<td>Social avoidant</td>
<td>56 (15)</td>
<td>35-104</td>
<td>60 (19)</td>
<td>56 (15)</td>
<td>0.23</td>
</tr>
<tr>
<td>Nonassertive</td>
<td>55 (16)</td>
<td>31-98</td>
<td>61 (18)</td>
<td>55 (15)</td>
<td>0.36</td>
</tr>
<tr>
<td>Exploitable</td>
<td>59 (15)</td>
<td>30-100</td>
<td>65 (17)</td>
<td>58 (14)</td>
<td>0.45</td>
</tr>
<tr>
<td>Overly nurturant</td>
<td>61 (15)</td>
<td>32-103</td>
<td>67 (17)</td>
<td>59 (14)</td>
<td>0.51</td>
</tr>
<tr>
<td>Intrusive</td>
<td>52 (12)</td>
<td>34-85</td>
<td>58 (14)</td>
<td>50 (10)</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Note: IIP = Inventory of Interpersonal Problems; FHS+ = family history of suicide; FHS- = no family history of suicide confirmed; *Kruskal-Wallis test

Table 4 shows IIP ratings in suicide attempters with and without family history of suicide. Within the factor 2, the patients with a family history of suicide reported significantly more interpersonal problems in the domains of Intrusive (t(119) = -3.5; p = 0.0007), Exploitable (t(119) = -2.2; p = 0.03) and Overly nurturant (t(119) = -2.4; p = 0.02).

Study III

Attendance and drop-outs

Twenty-nine family members were offered to participate in the family skills training program. Nineteen persons accepted of which eighteen came to the first session. As the program started one participant moved, two participants quit the program after two sessions – one because of lack of time and the other one on demand of the patient in treatment at the clinic. One participant did not complete the pre-intervention assessment and was therefore excluded from the study. Of the fourteen participants who completed the program, one did not complete the post-intervention assessments. The thirteen family members who completed the nine-week program were included in the study. The attendance rate was 79%.
Brief Symptom Inventory (BSI)

The three global indexes in BSI investigate the general psychiatric health of the participants, the number of symptoms noticed and the intensity of these symptoms. The analysis showed a significant difference between pre- and posttest in the global index PSDI (table 5). Both GSI and PST showed a trend to a significant reduction between the two measures (table 5). An adherent intention was to investigate whether the level of anxiety changed between the two measures. The subscale in BSI that measures anxiety showed a significant difference between pre-test ($Md = 0.67$) and post-test ($Md = 0.33$), $T = 4$, $p<.05$, $r = .40$. The anxiety level was reduced between measures.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Pretest</th>
<th>Posttest</th>
<th>$T$</th>
<th>$p$</th>
<th>$r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSI (general psych. health)</td>
<td>0.30 0.12-0.64</td>
<td>0.11 0.05-0.70</td>
<td>2</td>
<td>.064</td>
<td>0.36</td>
</tr>
<tr>
<td>PSDI (intensity)</td>
<td>1.33 1.05-1.60</td>
<td>1.00 1.00-1.41</td>
<td>2</td>
<td>.008</td>
<td>0.52</td>
</tr>
<tr>
<td>PST (nr of symptoms)</td>
<td>13.00 6.00-20.50</td>
<td>5.00 2.50-23.50</td>
<td>2</td>
<td>.086</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Beck Depression Inventory (BDI)

There was a trend in reduction of depressive symptoms after completing Family Connections, $p<.059$ (table 6).

Burden Assessment Scale (BAS)

The difference between the pre- and post-test on BAS was statistically significant, $p<.01$ (table 6), and showed that the perceived burden was reduced between the two measures.

Quality of Life Inventory (QOLI)

The experienced quality of life was not changed on a significant level between measures (table 6). However, the quality of life was stated higher at posttest and indicates a change in a positive direction.
Questions About Family Members (QAFM)

Figure 6 shows the results from the analysis of the data from QAFM. Three out of four subscales, perceived criticism (PC), critical comments (CC), and emotional over involvement (EOI) showed significant differences between the measures. A decrease in perceived criticism from the family member was found, as well as a decrease in criticism expressed by the participant towards the family member. There was also less and more balanced emotional over-involvement after completion of the intervention. The result from the fourth subscale, perceived emotional involvement (PEI) was not significant.

![Figure 6. Pre- and post-intervention assessments in QAFM subscales, Perceived Criticism, Emotional over-involvement and Critical Comments with p-values](image)

Study IV

Demographic data and background characteristics

The total number of participants in this study was 132, whereas the final sample, included in the analyses, consists of 86 participants. Table 7 shows the characteristics of participants. The distributions of these characteristics did not diverge in the sample of the 54 participants that completed the scale FFMQ.
Table 7. Participant characteristics in the total sample, \( (N = 132) \) and in the analyzed sample \( (n = 86) \)

<table>
<thead>
<tr>
<th>Type of relationship</th>
<th>( N = 132 )</th>
<th>Percent %</th>
<th>( n = 86 )</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>55</td>
<td>41.7</td>
<td>38</td>
<td>44.2</td>
</tr>
<tr>
<td>Father</td>
<td>25</td>
<td>18.9</td>
<td>19</td>
<td>22.1</td>
</tr>
<tr>
<td>Partner (male)</td>
<td>22</td>
<td>16.7</td>
<td>14</td>
<td>14.2</td>
</tr>
<tr>
<td>Partner (female)</td>
<td>9</td>
<td>6.8</td>
<td>4</td>
<td>6.6</td>
</tr>
<tr>
<td>Child (son)</td>
<td>3</td>
<td>2.3</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>Child (daughter)</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Brother</td>
<td>4</td>
<td>3.0</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Sister</td>
<td>6</td>
<td>4.5</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Friend</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Grandmother</td>
<td>1</td>
<td>0.8</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Stepmother</td>
<td>1</td>
<td>0.8</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Ex husband</td>
<td>2</td>
<td>1.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gender distribution</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>76</td>
<td>57.6</td>
<td>49</td>
<td>57</td>
</tr>
<tr>
<td>Men</td>
<td>56</td>
<td>42.4</td>
<td>37</td>
<td>43</td>
</tr>
<tr>
<td>Living in the same household</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>64</td>
<td>48.5</td>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
<td>40.9</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>No information</td>
<td>14</td>
<td>10.6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Multiple family members</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>51</td>
<td>38.6</td>
<td>37</td>
<td>43</td>
</tr>
<tr>
<td>No</td>
<td>81</td>
<td>61.4</td>
<td>49</td>
<td>57</td>
</tr>
<tr>
<td>Gender distribution patient</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>105</td>
<td>79.5</td>
<td>70</td>
<td>81.4</td>
</tr>
<tr>
<td>Men</td>
<td>27</td>
<td>20.5</td>
<td>16</td>
<td>18.6</td>
</tr>
</tbody>
</table>

Feasibility

Out of the total of 132 participants, 104 (79%) completed the program, i.e. attended six or more sessions. The average number of attended sessions was eight. However, the criteria for being included in the analyses also commanded a completion of both pre- and post-intervention assessments, which 86 participants (65%) fulfilled. Of the 86 participants included in the analysis, 41% completed all nine sessions.

Attrition

The relative distribution among men and women that dropped out was equal, 27 (36%) women and 19 (34%) men, respectively. If the participant was living together with the patient there was a little less likelihood to drop out than if they did not live together, 66% versus 59%. Regarding the relation to the patient, parents (71%), partners (61%) and children (84%) completed the program to a higher extent comparing with the groups of siblings and other relations. Figure 7 shows a flowchart of the sample.
Stated reasons for dropping out in an earlier stage were illness or other major life events (10 persons), lack of time because of work or studies (8 persons), wanting another type of intervention (3 persons), there were cancellations to the last session, and also drop-outs during the program where the reason for dropping out is not known (7 persons). Another reason for not being included in the final analyses was that either the pre- or post-assessment was not completed in or that the assessment was incorrectly filled out.

![Figure 7. Flowchart of participants in study IV](image)

**Efficacy-related outcome measures**

**BAS**

The change between the pre- and posttest on BAS was statistically significant in all subscales as well as in the total scale (table 8). The perceived Guilt/worry ($p<0.0001$), the social strain ($p<0.029$) and the disruption in activities ($p<0.016$) as well as the perceived total burden ($p<0.001$) were all reduced between the two measures. The effect size regarding this reduction was medium in the total and in the guilt/worry subscales. The effect size in the other two subscales was small. On an item-level, the change between pre- and post-intervention assessment was significant in three out of five items in the subscale Guilt/worry. Both guilt and worry were reduced after completion of the program.
**FFMQ**

The analysis showed a statistically significant change between pre- and post-intervention assessments in one of the five facets: Acting with Awareness, \(p<0.006\) (table 8) which indicates an enhanced ability to be in the present moment. There was a statistical trend of gaining more skills in the facet Observing after completing Family Connections educational program, \(p<0.056\). The effect size regarding this reduction was small. The facet Describing showed no significant change between pre- and post-intervention assessments as well as the facets Non-judging of Inner Experience and Non-reactivity to Inner Experience.

**QAFM**

None of the four subscales; perceived criticism (PC), perceived emotional involvement (PEI), critical comments (CC), and emotional over involvement (EOI) in QAFM showed significant changes between the pre- and post-intervention assessments (table 8). The participants’ scores remained high in all four subscales. These values indicate a relationship under pressure.

**Table 8.** Mean (m), standard deviation (sd), mean difference (Mean diff.), paired samples t-test (t), \(p\) value (\(p\)) and effect size according to Cohen’s \(d\) (\(d\)) for BAS, FFMQ and QAFM at pre- and post-intervention assessments

<table>
<thead>
<tr>
<th>Scale</th>
<th>Pre-intervention m (sd)</th>
<th>Post-intervention m (sd)</th>
<th>Mean diff.</th>
<th>t</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BAS</strong> (n = 86)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAS total</td>
<td>26.31 (11.3)</td>
<td>23.34 (12.1)</td>
<td>2.98</td>
<td>3.48</td>
<td>.001</td>
<td>0.38</td>
</tr>
<tr>
<td>BAS guilt/anxiety</td>
<td>1.82 (0.70)</td>
<td>1.56 (0.74)</td>
<td>0.26</td>
<td>4.16</td>
<td>.000</td>
<td>0.44</td>
</tr>
<tr>
<td>BAS social stress</td>
<td>0.92 (0.67)</td>
<td>0.82 (0.63)</td>
<td>0.10</td>
<td>2.27</td>
<td>.026</td>
<td>0.25</td>
</tr>
<tr>
<td>BAS disrupted activities</td>
<td>1.40 (0.70)</td>
<td>1.27 (0.74)</td>
<td>0.13</td>
<td>2.16</td>
<td>.033</td>
<td>0.23</td>
</tr>
<tr>
<td><strong>FFMQ</strong> (n = 54)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observing</td>
<td>23.35 (6.79)</td>
<td>24.91 (6.09)</td>
<td>-0.19</td>
<td>-1.95</td>
<td>.056</td>
<td>-0.27</td>
</tr>
<tr>
<td>Describing</td>
<td>25.85 (7.33)</td>
<td>25.43 (6.63)</td>
<td>-0.06</td>
<td>0.78</td>
<td>.437</td>
<td>0.10</td>
</tr>
<tr>
<td>Acting with Awareness</td>
<td>25.30 (6.01)</td>
<td>23.43 (6.26)</td>
<td>0.22</td>
<td>2.86</td>
<td>.006</td>
<td>0.39</td>
</tr>
<tr>
<td>Non-judging of Inner Experience</td>
<td>27.93 (6.33)</td>
<td>27.63 (6.74)</td>
<td>0.01</td>
<td>0.37</td>
<td>.710</td>
<td>0.05</td>
</tr>
<tr>
<td>Non-reactivity to Inner Experience</td>
<td>20.07 (3.90)</td>
<td>21.06 (5.66)</td>
<td>-0.06</td>
<td>-1.34</td>
<td>.187</td>
<td>-0.19</td>
</tr>
<tr>
<td><strong>QAFM</strong> (n = 81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC (perceived criticism)</td>
<td>2.08 (0.76)</td>
<td>2.03 (0.74)</td>
<td>0.05</td>
<td>0.95</td>
<td>.345</td>
<td>0.11</td>
</tr>
<tr>
<td>PEI (perceived emotional involvement)</td>
<td>2.63 (0.53)</td>
<td>2.64 (0.60)</td>
<td>-0.01</td>
<td>-0.28</td>
<td>.776</td>
<td>0.03</td>
</tr>
<tr>
<td>CC (critical comments)</td>
<td>2.30 (0.78)</td>
<td>2.29 (0.74)</td>
<td>0.01</td>
<td>0.34</td>
<td>.738</td>
<td>0.04</td>
</tr>
<tr>
<td>EOI (emotional overinvolvement)</td>
<td>3.28 (0.77)</td>
<td>3.24 (0.75)</td>
<td>0.04</td>
<td>0.73</td>
<td>.470</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Note: BAS Burden Assessment Scale; FFMQ Five Facet Mindfulness Questionnaire; QAFM Question about family members
The overall aim of this thesis was to examine distal risk factors for suicide, FHS and ELA, interpersonal functioning and further its impact on family relations.

Suicide is a multifactorial act, which makes it hard to predict. Furthermore, it is also a rare outcome. Thus, preventive action becomes even more crucial. As pointed out earlier in this thesis, mood disorder and personality disorder play a role in familial transmission of suicidal behavior, however psychopathology is clearly not the only explanation (Brent et al., 1996, 2003; Mann et al., 2005). The impact of risk factors also varies according to environmental factors and socioeconomic status (Mok et al., 2016; Wilcox et al., 2012). Though studies have shown that the environment does have an effect on suicidality, it is not yet clarified how and to what extent. It has also been suggested that there are certain critical time periods in the developmental stages in youth for development of suicidal behavior (Mirkovic et al., 2016).

When risk for suicide is assessed in clinical care, protective and risk factors are considered together. However, factors that might be considered protective in one stage, vanish if you don’t sleep, don’t eat or abuse drugs. It is pivotal that every risk factor is understood in the context of all the others. The ones examined in this thesis; familial aspects, such as FHS, ELA and current interpersonal functioning and the available network, contribute to more information on the complex chain of events that precedes a suicide or a suicide attempt. Treatment means taking every factor in consideration, even the one that successful treatment can lead to poor adherence, especially in adolescents, and therefore increase suicide risk since new capacity is gained for action. Figure 8 shows the studies I, II, III and IV and their interrelation.

**Figure 8.** Predisposing, mediating, precipitating factors and preventative measures
We have studied what the presence of FHS and ELA mean for suicidal behavior. Our findings in study I were that male suicide attempters with FHS make more severe and well-planned suicide attempts. In terms of suicidal behavior, this means that they chose seclusion to a higher degree, with less chance of being found by anyone. Out of the eleven suicides in the two cohorts that occurred during the follow-up time, 40% had FHS. This might not be surprising news, however, much is to be done regarding preventive action, since it has not yet found its way to acknowledge this loading and take the needed measures in an earlier stage.

Of the few women who committed suicides in study I, none had FHS, instead ELA was a predictor for suicide in women. Their mean score on KIVS childhood scale indicates experience of adversities like severe physical punishment, frequent bullying (victimization) and sexual abuse. For men with both FHS and ELA the suicide risk was more than three times higher than for those with only FHS. This means that even if FHS was present the experience of ELA was determinant in the whole group. This study replicates previous research findings of positive FHS and ELA as risk factors for suicidal behavior. However, there are few clinical studies of high-risk populations focusing on both FHS and ELA as risk factors.

There are many types of maltreatment, and KIVS does not separate different types of adversities, which makes it difficult to decide what the actual events experienced were. Most prior studies have focused on a specific type of victimization, however, research has also shown that multi-victimization is common in children and adolescents (Charak et al., 2016). This could to some extent justify the steps in KIVS, creating different classes of victimization for each score. In the Hoertel study (2015), sexual abuse was the form of childhood maltreatment that had the strongest effect on suicidal behavior. It is also discussed that sexual abuse has a greater capacity to disrupt neurobiological development and makes the individual more susceptible to influence from a dysfunctional environment. Sexual abuse in KIVS rating renders a score of 4 or 5 depending on duration and severity of sexual abuse as a child, indicating that sexual abuse is classified as very severe form of interpersonal violence.

Another example of ELA is bullying. Similar to victims of sexual and physical abuse, victims of bullying also have a higher risk for suicide and suicidal behavior. A study in Finland found that bullying behavior at a young age was associated with later suicidal behavior (Klomek et al., 2009). The effect on suicidal behavior was different dependent of the type of bullying performed; physical, verbal or relational. Relational bullying has been connected to depression and isolation to a higher degree than the other two types of bullying (ibid.). Keeping the relational component in bullying in mind, it is concluded that the interpersonal aspects are of importance to prevent further isolation. The necessity of the development of more forceful preventive methods to help
children that are exposed to violence in their home and school environment is evident.

In study II, bearing in mind the complexity of suicidal behavior and the role of distal risk factors, we wanted to investigate if the distal risk factor of family history of suicide was associated with certain types of interpersonal problems in suicide attempters. When it comes to personal traits, impulsiveness, hostility, aggressiveness, and cluster B personality psychopathology (e.g. BPD), all have been associated with suicidal behavior (Diaconu & Turecki, 2009; Lopez-Castroman et al., 2014; McGirr et al., 2007). Impulsive aggression has been linked to suicidal behavior especially when concurrent with childhood abuse and FHS (Lopez-Castroman et al., 2014). Other personality traits that have been found to have an association with suicidal behavior are novelty seeking, self-directedness and harm avoidance (Brezo et al., 2006; Calati et al., 2008; Dzamonja-Ignjatovic et al., 2010). The results are somewhat inconsistent, and studies use different measures and are grounded in different theories. However, the overall impaired ability in interpersonal relationships is mutually recognized, as well as the decreased ability to regulate and adapt behavior to the demands of a specific situation.

In our cross-sectional study of interpersonal problems in patients in treatment after a suicide attempt, an intrusive personal style appeared in suicide attempters with FHS. This would suggest an impaired ability to keep boundaries, low self-esteem and low self-confidence. This could negatively affect independence, responsibility and social tolerance, which could cause interpersonal strain and irritability. In a longer perspective, the individual might lose important relationships due to these relational disabilities.

It seems plausible that locus of control, the development of emotional response in difficult life situations and total social function has its roots in family relationships. When Hagan and Joiner (2016), performed a study on students, they found that perceived criticism from parents and friends had an indirect effect on suicidal behavior. To evolve communication skills in families with suicidal members therefore seems to be a prerogative. In our pilot study of FC, the criticism decreased in the relationship with the patient after completion of the program. In the feasibility study of FC we did not find such a clear, significant change. However, the participants declared that they became better listeners, which was confirmed by their post-intervention score in the FFMQ subscale Act with Awareness. This means that the family members who participate in FC become more validating, which in turn decreases relational strain. To be able to lessen the gap between family members seems crucial in order to enhance the sense of belongingness in the individual and to limit isolation tendencies. Sense of belonging is related to depression (Fisher et al., 2015), and because of that indirectly connected to suicidality. The individual’s
experience of isolation before a suicide or suicide attempt is a well-
substantiated fact (Joiner, 2005).

A suggested explanation for non-genetic transmission of suicidal behavior is
the intergenerational transmission of abuse and of dysfunctional home
environment (Brent & Melhem, 2008). An abused parent with genes that
predispose more impulsivity and aggressiveness will be more prone to continue
abuse in the next generation. The lack of support between parent and child,
leaving the young subject with a feeling of being rejected by family might be
one factor in impaired interpersonal function. Furthermore, the patterns in the
closest relationships are often transferred to other relationships as well.
Without adaptation, these dysfunctional patterns might lead to marital conflict,
conflicts at the workplace and so forth. The belief that you are a greater burden
to others when depressed or suicidal might partly be a product of the social
stigmatization connected to suicide. This makes the combat of myths and to
decrease this stigma of certain importance. One way of lessen the stigma in the
patient might be to include familial aspects, and involve next-of-kin in
treatment.

The assumption that the emotional behavioral repertoire is a confined pattern
in the family makes sense of the inclusion of exercise in identification of
primary emotions through mindfulness in FC. It will give an opportunity to
increase psychological flexibility, and in the long run, this may facilitate
interpersonal relationships and strengthen social bonds (Fruzzetti, 2003).

We saw a reduction of burden in family members that took part in FC. The
burden in family members was for instance expressed in worry over if own
behavior had worsened the situation, or in guilt over not having done enough
to prevent the suicide attempt. They also felt restricted in their own activities,
and frequently stayed home from work. The scoring in FFMQ showed that the
participants in FC had a much higher degree of judgment to begin with
compared to other studied groups (Liu et al., 2015). This suggests a self-critical
attitude, according to the scale’s item content. This score did not change
between assessments. That is in concurrence with the non-significant results in
QAFM. The interpersonal critique has not lessened in the two subscales
measuring critical remarks between family members. The fact that the ability to
be more present had increased in post-intervention measurement, would imply
that the family member is more aware of dysfunctional behavior, both own and
not to the least the patient’s, which could contribute to maintain a high level of
critique. The family member might still want to change the patient according to
own values and needs instead of accepting the situation that is. It is not hard to
imagine, that destructive behavior in a loved one might be one of the hardest
things to accept as a family member.
The concept of validation involves an assumption that it is the key to more effective problem solving and better communication in relationships (Fruzzetti & Hoffman, 2004). Participants in FC especially mentioned validation as an effective tool to reduce negative response and reactivity. A validating home environment contains an appreciation of the relation, and an expression of this through acceptance, interest and respect for the other one, oneself and the own limits. An enhanced ability in the environment to accept slow and episodic rate of progress and the constant risk of suicide might lessen the guilt of being a burden in the patient.

To our knowledge, other studies on family members of suicidal patients are scarce. Pineda and Dadds performed a RCT on a 4-week family intervention for parents of adolescents with suicidal behavior (2013). The results showed improved family functioning and a reduction in suicidal behavior in the adolescents. It was a single-family design and offered to be held at home to promote adherence to the program. In the light of this the 9-week FC program held during working hours at the clinic seems to have been much appreciated.

Every single step in suicide prevention is of importance. Biological and psychological factors, past history and the current life situation lead up to the outcome of suicide. All paradigms are needed to gain more knowledge of the specific events that occur before and in a suicidal crisis. The acute, intense suicidal urge is normally short, from minutes to hours, with a dynamic element of ambivalence, which leaves room for interventions of different dimensions.

We have described the impact of FHS and ELA on suicidal behavior, the effect of FHS on behavioral repertoire and emotional response, and its consequences for interpersonal relations. Furthermore we tried to find an intervention for family members of patients with suicidality, which would enhance their relational skills. The risk factors presented in this thesis, FHS and ELA should be included in suicide risk assessment, as well as the interpersonal function in the individual.

Furthermore, the network around the patient needs to be involved and given own support. Given that many depressions are treated within primary care, and that family members turn to primary care for help for stress related health issues, the general practitioners need to be aware of the importance of the context around the patient. The suggestion is that a combination of knowledge of risk factors leading to suicidal behavior, a focus on interpersonal functioning and involvement of significant others is to be used for preventive action. The goal is to use all of our knowledge to decide when and how to intervene. In a broader perspective this involves also the society to make new policies in achieving the desired outcome.
Methodological considerations

To study rare outcomes like suicide is of a certain challenge. Not only the ethical aspects but also methodological issues offer difficulties. However, the consequences in the case of suicide are so severe to the individual, the family members and society, that every serious effort is justified. Limitations of the studies included are mentioned in relation to the methodology deployed.

The participants in study I and II are suicide attempters with a mood disorder and a high degree of psychiatric comorbidity that are part of a unique high-risk population for suicide with a quite long follow-up time. However, they are not to be considered representative to the general population, which decreases external validity. One option to study a rare outcome like suicide is to focus on high-risk populations like suicide attempters. The suicide attempters were selected according to several criteria (for example exclusion of patients with schizophrenia) and do not represent a natural sample of suicide attempters.

The open study design in studies III and IV, made it possible to realize this educational intervention at a low cost, however, the possibility to eliminate confounders and to make causal inferences is decreased. Regarding the participants in studies III and IV, the challenges in recruitment made randomization difficult. In study III the participants, family members of suicide attempters in treatment at a subspecialized unit, were randomized into the two groups, but sample size was very small. In study IV, the sample was not randomized, neither was there a control group. The recruitment was at times difficult. The involvement of family members in psychiatric care is not a customary element, which added to the difficulty to find a matching control group. There is also a societal stigma connected to mental illness, and in particular to suicide that may be an obstacle to seek help within psychiatric care. Therefore, one can assume that the participants that found the intervention were from a very motivated group to begin with, which again has consequences for the external validity, i.e. generalizability to a broad group of significant others is not allowed.

Small sample size may elevate the risk for Type-II errors, with false negative results as a consequence, i.e. potential small but clinically important effects goes undetected. The small samples also limited the analyses we could perform. For example, in the studies of Family Connections there were sometimes multiple participants from one family, which means that the data is nonindependent, and should be treated as such, since ignoring this may lead to overestimated p-values and increased Type-II errors (Du & Wang, 2016; Schrodt, 2015). However, the number of such cases was too low to analyze accordingly.
The self-report assessments used entail another limitation. Every respondent has a unique experience of symptoms and other circumstances and conditions that are evaluated in the scales, and in addition to that, there might be a recall bias. Even the interviews or observer rated scales impose bias in the form of the interviewer’s preunderstanding. In the first cohort information of FHS was retrieved from patient journals resulting in more missing information than when information was from an interview, as in the second cohort. When it comes to reported FHS, suicide was separated from suicide attempt in our analysis, and when reported, we assume that a suicide is certain. In any case, due to social stigma, the cases of suicidal behavior are likely to be underestimated rather than the opposite.

Further, self-report assessments will not always be filled out correctly or in full. Missing data is a problem in many studies and to use imputation has both advantages and disadvantages. Imputed data will never be true data, but it allows keeping valuable data in the analysis instead of discarding them and lose important findings. We had less than 2% missing data in our final sample and made an imputation accordingly.

In the future, more information on demographics in the intervention group is wanted, combined with qualitative method or an extended quantitative approach where participants (and maybe the patients too), are asked if they learned anything new, about their willingness, and other aspects after completion of the program.

The Swedish Causes of Death Register is internationally considered of good standard; however, the amount of missing data in the register has been increasing since the 1960’s. Some causes of death are harder to detect, especially in the elderly (Socialstyrelsen, 2016). There is an under-report of suicide in verified death causes, and it is estimated that 70-75% of the uncertain diagnosis are in fact suicides. Concerning reports of accidents, it is estimated that a part of these deaths are also undetected suicides (ibid.). In the study I, all suicide deaths were ascertained from death certificates.

To conclude, it is important to keep the above in mind when interpreting the results, however, we consider that the present thesis contributes to the knowledge of risk factors of suicide, and has clinical implications for psychiatric care in terms of what to be observant of in patients with suicidality and how to strengthen their network that is so crucial to them.
CONCLUSIONS

The factors that lead to suicide attempt and suicide are multiple. The studies included in this thesis all together support the notion that familial factors of different aspects are of importance in suicide prevention.

Early recognition of familial and environmental risks such as family history of suicide and early life adversity is essential for identification of high-risk individuals. In clinical care a consideration of family history of suicide and early life adversity should be made in the assessment of suicide risk since these liabilities increases suicide risk in both a short- and a long-term perspective.

Further, patients with a family history of suicide have more difficulties in interpersonal relationships, and caregivers, whether professional or within family, have to be observant of stand-off tendencies in the contact.

The studies on Family Connections give support that the program is feasible, attractive to family members of suicidal patients, and thereto the participants seem to experience relief and less burden after completing such a program.
FUTURE PERSPECTIVES

Further identification of the factors behind familial transmission of suicide and suicidal behavior is needed. Genetic and epigenetic studies in high-risk populations as well as in close relatives to high-risk patients can contribute to further clarification of the role of distal biological and environmental risk factors for suicidal behavior. More studies on protective factors and resilience are also needed. These studies can in turn lead to effective treatments and preventive measures.

The role of early life adversity on interpersonal function needs to be elucidated, ideally in long-term follow-up studies, but also in cross-sectional studies of high-risk populations. Studies assessing mediators of early life adversity are also needed.

Both family history of suicide and early life adversity have to be addressed when in treatment so that elevated risk in regards to these distal risk factors may be detected. In a longer perspective, society needs to take action in an early stage when these factors are present in an individual’s life. Furthermore, the offspring of these individuals have to be attended to, and this will demand more cooperation between different agencies.

Isolation, either real or a feeling of desolation, seems to be a crucial factor in suicidal behavior, and focus on the family and network around the suicidal individual needs attention from health care professionals, school employees and other concerned civil authorities. This includes development of interventions and treatments that help families to improve interpersonal communication and facilitate problem-solving.

There is a need for randomized controlled trials to evaluate the efficacy of family interventions. Today there are many different interventions, and different outcome measures are used, which makes it hard to compare the effects in full. Future studies would have to be more stringent and coherent in their design, to better generate evidence of the effects the interventions might generate.

An interesting expansion in the future is to extend the family intervention to include certain variables of the patients. The study design could include a follow-up of future suicide attempts and hospitalizations. It would also be interesting to include the patient’s assessment regarding the relationship and their experience of burden.
In terms of clinical implications, involvement of significant others of suicide attempters is essential for health care services. This includes the offspring of the patients where clinicians find these risk factors; these individuals should be a target population for interventions in an earlier stage. Professionals should get appropriate education to raise the level of competence to deliver family interventions. An evaluation of the support given should be done to understand the impact, eventual long-term sustainability and cost-effectiveness.

At the end of the day, at the same time as biological advances are made, further evolution of preventive action in the society will be imperative.
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APPENDIX 1

Karolinska Self Harm History (family history part)

C.1 Suicide/suicide attempt in the family

C.1.1 Did anyone commit suicide in your family?

- Biological mother/father
- Biological sibling
- Other biological relative Who:
- Child Who:
- Adoptive mother/father Who:
- Adoptive sibling Who:
- Other adoptive relative Who:
- No

How old where you when it happened? Did you know him/her? Do you know what they did? How did you find out? Was it spoken about openly?

C.1.2 Did anyone in your family make a suicide attempt?

- Biological mother/father
- Biological sibling
- Other biological relative Who:
- Child Who:
- Adoptive mother/father Who:
- Adoptive sibling Who:
- Other adoptive relative Who:
- No

How old where you when it happened? Did you know him/her? Do you know what they did? How did you find out? Was it spoken about openly?

(Unpublished interview)
APPENDIX 2

The Karolinska Interpersonal Violence Scale

The Karolinska Interpersonal Violence Scale

The steps of this scale are defined by short statements about violent behaviour. Based on an interview with the subject; use the highest score where one or more of the statements apply.

A. Used violence.

As a child (6 - 14 years)

0  No violence.

1  Occasional fights, but no cause for alarm among grown-ups in school or in the family.

2  Fighter. Been in fights a lot.

3  Often started fights. Hit a comrade who had been bullied. Continued hitting when the other had surrendered.

4  Initiated bullying. Often hit other children, with fist or object.

5  Caused serious physical injury. Violent toward adult(s). Violent behaviour that led to intervention by social welfare authorities.

As an adult (15 years or older)

0  No violence.

1  Slapped or spanked children on occasion. Shoved or shook partner or another adult.

2  Occasionally smacked partner or child. Fought when drunk.

3  Assaulted partner drunk or sober. Repeated corporal punishment of child. Frequent fighting when drunk. Hit someone when sober.

4  Instance of violent sexual abuse. Repeated battering/physical abuse of child or partner. Assaulted/attacked other persons frequently; drunk or sober.

5  Killed or caused severe bodily harm. Repeated instances of violent sexual abuse. Convicted of crime of violence.
B. Victim of violence.

*Childhood (6 - 14 years)*

0  No violence.
1  Occasional slaps. Fights in school, of no great significance.
2  Bullied occasionally for short period(s). Occasionally exposed to corporal punishment.
3  Often bullied. Frequently exposed to corporal punishment. Beaten by drunken parent.
4  Bullied throughout childhood. Battered/beaten up by schoolmates. Regularly beaten by parent or another adult. Beaten with objects. Sexually abused.
5  Repeated exposure to violence at home or in school that resulted at least once in serious bodily harm. Repeated sexual abuse, or sexual abuse that resulted in bodily harm.

*Adulthood (15 years or older)*

0  No violence.
1  Threatened or subjected to a low level of violence on at least one occasion.
2  Beaten by partner on occasion. Victim of purse snatching. Threatened with object.
3  Threatened with a weapon. Robbed. Beaten by someone other than partner. Frequently beaten by partner.
4  Raped. Battered.
5  Repeatedly raped. Repeatedly battered. Severely battered, resulting in serious bodily harm.