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Effectiveness of a telephone management programme for patients discharged from an emergency department after a suicide attempt: controlled study in a Spanish population

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Al Ramon

Als meus pares

A l'Anna i la Maria

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LIST OF ACRONYMS

BHS	Beck Hopelessness Scale
BPD	Borderline Personality Disorder
CDC	Centers for Disease Control
CGI-SS	Clinical Global Impression for Severity of Suicidality Scale
CoP	Cry of Pain
C-SSRS	Columbia Suicide Severity Rating Scale
CST	Consorci Sanitari de Terrassa
DSM	Statistical Manual of Mental Disorders
EAAD	European Alliance Against Depression
EC	European Commission
ER	Emergency Room
EU	European Union
FVT	Fluid Vulnerability Theory
GP	General Practitioner
IAT	Implicit Association Test
ICD	International Classification of Diseases and Causes of Death
ICT	Information and Communication Technologies
IML	Institut de Medicina Legal
ITT	Intention to Treat
NAAD	Nuremberg Alliance Against Depression
NHDS	National Hospital Discharge Survey
NIMH	National Institute of Mental Health
OCDS	Operational Criteria for the Determination of Suicide
OSPI	Optimizing Suicide Prevention Programs

Parc Taulí	Parc Taulí Sabadell Hospital Universitari
PREDI-NU	Preventing Depression and Improving Awareness through Networking in the European Union
PTSD	Posttraumatic Stress Disorder
RCT	Randomized Clinical Trial
SIS	Beck's Suicide Intent Scale
SSI	Beck's Suicide Ideation Scale
SUAS	Suicide Assessment Scale
WHO	World Health Organization

PREFACE

Suicidal behaviors are among the leading global causes of injury and death. It is estimated that every year 1 million people die by suicide worldwide.

Attempted suicide can be up to 40 times more frequent than completed suicide.

People who have made a suicide attempt run a 15% risk of repeating suicidal behavior and the risk is at its highest during the first year after the attempt. The repeated suicide attempt often occurs soon after an attempt, i.e., within 12 weeks.

The present thesis is based in two papers led by the Ph.D. candidate published in peer-reviewed journals relevant to the field. It examines the effectiveness over one year and beyond of a 12-month specific telephone management programme on patients discharged from an emergency department after a suicide attempt.

In *Chapter 1* of this thesis, an introduction to the main aspects and topics covered in the dissertation and in relation to Suicidal Behavior is provided. *Chapter 2* describes the hypothesis and objectives. *Chapter 3* describes the methods: study population, assessments, interventions, and data analysis. *Chapter 4* describes the two papers. The first paper analyzes the effectiveness of the telephone management program over the year of active intervention. The second one reports on a 5-year follow-up of the main outcomes, i.e. rate and time to suicide re-attempt. Finally, a discussion chapter puts the data in the context of the current literature and other experiences in the field, with a view to optimize the current and future management of this high risk population of suicidal behavior, prior to state the final conclusions of this thesis.

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Chapter 1 Introduction

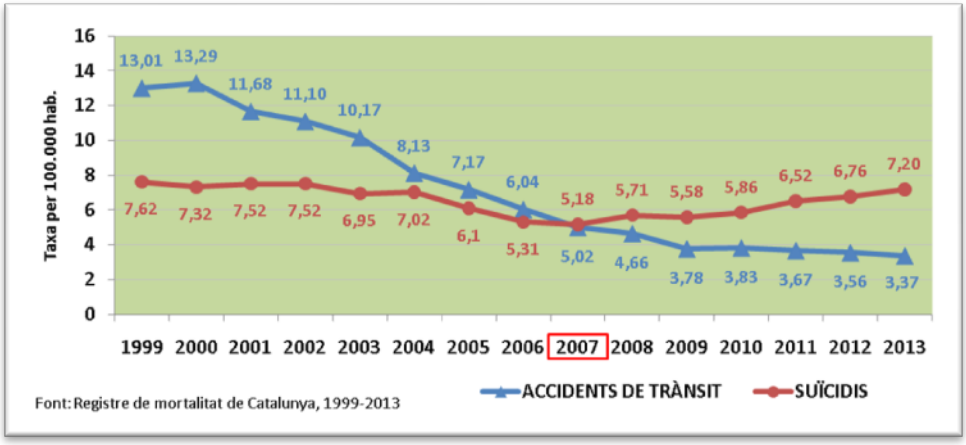
1.1 Suicidal Behavior

Suicidal behavior is a very troubling, serious and complex problem for our society, with a huge impact on public health. The fact that some people act in a way contrary to the instinct for survival and threaten their own lives is a very alarming reality. Even more so the fact that for years suicide remains one of the leading causes of death in the world. Therefore it is imperative to take measures and to adopt specific actions in order to reduce suicidal behavior.

1.1.1 Suicide nomenclature and classification

Suicide has become one of the leading causes of death in many countries (1;2), even above traffic accidents. Suicide prevention efforts for research and practice are critical and depend on an appropriate terminology and classification of suicidal behavior (3;4).

Figure 1: Traffic accidents vs suicides: Catalonia 1999-2013 (rates x 100,000 inhabitants)



Suicidal behavior and ideation has been subject of research and clinical work for many years, but agreement on the terminology in this field remains elusive. The history of the conceptualization of suicidal behavior illustrates the need for a continued effort to develop a well-defined standardized terminology and a comprehensive classification system that would be adopted by the World Health Organization and the international diagnostic systems.

Historically, the term suicide was first introduced in the 17th century, by Sir Thomas Browne's memoir, *Religio Medici* (1642), the term derived from the Latin words *sui* (of oneself) and *caedere* (to kill). But it was not until 1897 when the first influential study of suicide was published: *Le Suicide* by the French sociologist Emile Durkheim (5).

In 1903, when the International Classification of Diseases and Causes of Death (ICD) was published in its first edition, suicide was included in the section dealing with morbidity and mortality due to external causes. This category remained unchanged until 1948. From 1948 (ICD-6) until 1965 (ICD-8), the section was named “Actions, poisoning and violence” and the category was renamed “Suicide and self-inflicted injury”. In 1975 (ICD-9), the section was named “Injury and poisoning” and the category “Suicide”. In 1992 the ICD-10 created a category

of “intentional self-harm” explaining that it included “purposefully self-inflicted poisoning or injury, and suicide (attempted)” (6).

In the 1970’s, the National Institute of Mental Health (NIMH) Committee on Classification and Nomenclature, advocated for a universal nomenclature (7). They determined the division of the suicidal behavior in three classes: suicide, suicide attempt and suicide ideas. Subsequently, several articles have analysed the adequacy of the terminology used for suicide, concluding that the complexity of the phenomenon was not fully collected. More efforts followed. The World Health Organization Regional Office for Europe (WHO/EURO) defined suicide as “an act with fatal outcome which the deceased, knowing or expecting a fatal outcome had initiated and carried out with the purpose of provoking the changes he desired“ (8;9). The US Centers for Disease Control (CDC) presented a new nomenclature where suicide was defined as “death arising from an act inflicted upon oneself with the intent to kill oneself” and developed the Operational Criteria for the Determination of Suicide (OCDS) (10). The Diekstra criteria for classification of suicidal behavior (11) differentiate between suicide, attempted suicide and parasuicide, depending on whether the result of the conduct is mortal or not, and on severity of such conduct. In 2007, Silverman *et al.* proposed a review of this nomenclature, which included key aspects of different definitions previously proposed, as the conduct result, the act entity, the degree of intentionality and the awareness of the results of such conduct. In this new proposal a category called “suicide communication” was added, which included the threat and the suicide plan; moreover, the term “instrumental behavior” was changed to “suicide threat”. Later, the World Health Organization Regional Office for Europe (WHO/EURO), as part of their Multicentre Study of Parasuicide Attempts identified and proposed an unifying terminology (8). Nevertheless, no final consensus has been reached yet (12-14).

Identification of suicide attempts is essential for research in prevention and is the basis of this thesis. Simillarly, it has also been subject of multiple nomenclatures and definitions. There is an extensive body of literature evidencing suicide attempts as predictors for death by suicide (15-18). In the 1960s, the term “suicide attempt” was introduced. It distinguished between those with fatal outcomes, those with non fatal outcomes and acts with the intention to die or not (19). Kreitman in 1969 proposed the term “parasuicide” to account for self-injurious behavior without intention to die (20). The CDC later defined suicide attempt as “a potentially self-injurious act committed with at least some intent to die, as result of the act” (3;13).

The WHO/EURO Multi-Centre study on Suicidal Behavior, initiated in the 1990´s, was the largest study ever performed on the subject and reached a new definition of suicidal attempt: “a non-habitual act with non-fatal outcome that the individual, expecting to or taking the risk to die or to inflict bodily harm, initiated and carried out with the purpose of bringing about wanted changes” (8). We have decided to use this definition in this thesis, which has been done within the frame of an European Project and consortium “European Alliance against depression”.

Psychiatric Classification Systems (ICD-10 and DSM)

The two widely used medical classification systems, the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV- TR)* and the *International Classification Disease (ICD-10)* lodged suicide within the diagnoses of major depressive episode and borderline personality disorder (21). Suicidologists recomended the inclusion of suicidal behavior as a separate diagnostic category on a sixth axis of the *DSM* (22) but it wasn’t accepted in the last version of DSM-5. However, David J Kupfer, chair of DSM-5 Task Force, argued that the manual had a greater

focus on suicidal ideation and behaviors as a cross-cutting issue of mental disorders. Chapters througouth DSM-5 now identify particular characteristics that make people more vulnerable to suicide. In additon, a new component of the manual called Section III includes several assessment tools to assist clinicians in evaluating patients consistently. They assess an individual in 13 different psychological domains, one of which is suicide. Section III reflects some of the latest research and thinking on the challenging questions of how to address different types of suicidal and self harming thoughts and behavior. This section includes two new conditions for further study. Suicidal behavior disorder describes someone who has attempted suicide within the last 24 months and may help identify the risk factors associated with suicide attempts, including depression, substance abuse, or a lack of impulse control. The second condition has to do with factors related to young age and like those involving cases living in college campus and a major public health issue. This increased emphasis on suicide throughout DSM-5 will hopefully lead to more effective recognition of individuals with symptoms and behaviors that put them at risk.

1.1.2 Epidemiology, Prevalence and Incidence

Suicide is a major public health problem, but its epidemiology is difficult to study since many cases are not properly identified. However, the available data indicate a high prevalence.

Every year almost one million people die from suicide around the world; this roughly corresponds to one suicide attempt every 3 seconds and one death every 40 seconds. Suicide is among the three leading causes of death among those aged 15-44 years in some countries, and the second leading cause of death in the 10-24 years age group (23); at the other end of the age spectrum, the elderly are also at high risk in many countries (24).

Bertolote and Fleischmann, in a study published in 2002, estimated that, during the year 2020, close to 1.5 million people would die from suicide and 10-20 times more people would commit suicide attempts worldwide (25). Reports on the occurrence of suicide attempts are based on data that come from population-based epidemiologic surveys in local geographic areas (26;27) and hospital records. The National Hospital Discharge Survey (NHDS) conducted by the US National Center for Health Statistics, collects discharge data and analyses the external causes of injury and poisoning codes [(E-codes: E codes capture how the injury or poisoning happened (cause), the intent (unintentional or accidental; or intentional, such as suicide or assault) and the place where the event occurred)], from 500 hospitals (28). In 2007, 395.000 people were treated in emergency departments for self-inflicted injuries; 165.997 people were hospitalized due to self-inflicted injury (29). By 2011, the number of people treated in emergency departments for self-inflicted injuries had grown to 487.700 (30). Approximately 70% or more of all cases of self-injuries involve self-poisoning/ingestion, as per hospital based data (31). Overall lifetime prevalence of suicide attempts in the population ranges from 1.1% in New Haven (32) to 5.0% in the NCS-R (33). It is not clear whether the higher estimates from more recent studies reflect a true increase in lifetime prevalence, or improved ascertainment methods. Twelve-month prevalence estimates for suicide attempts range from 0.2% to 1.7% (34-38).

The *European Study on the Epidemiology of Mental Disorders* (ESEMED), a cross-sectional study made in six European countries with a sample of more than 20,000 people, found a lifetime prevalence of 1.5% for suicide attempts in Spain while the European average was 1.8% (39).

In Europe each year 60,000 people die by suicide (17). According to data from the Spanish Statistics National Institute 3,870 people died by suicide in Spain in 2013 (15). In Catalonia about 500 deaths/year are caused by suicide, 3 out of 4 of which affect men (40). The number of suicide attempts is approximately 10-20 times higher than suicide deaths, although the lack of appropriate national and international statistics prevents an accurate estimate. The incidence of suicide mortality in Catalonia in 2013 was 7.20 deaths per 100,000 inhabitants: these data are similar to the rate of Spain (6.98/100,000 inhabitants) and below the rate of Europe (11.4/100,000). Despite this, between 6,000-6,300 suicide attempts are reported each year in this region, and 40-140 occur in young people (under 19 years old).

Figure 2: Number of suicides in Catalonia 2013 by age group and gender

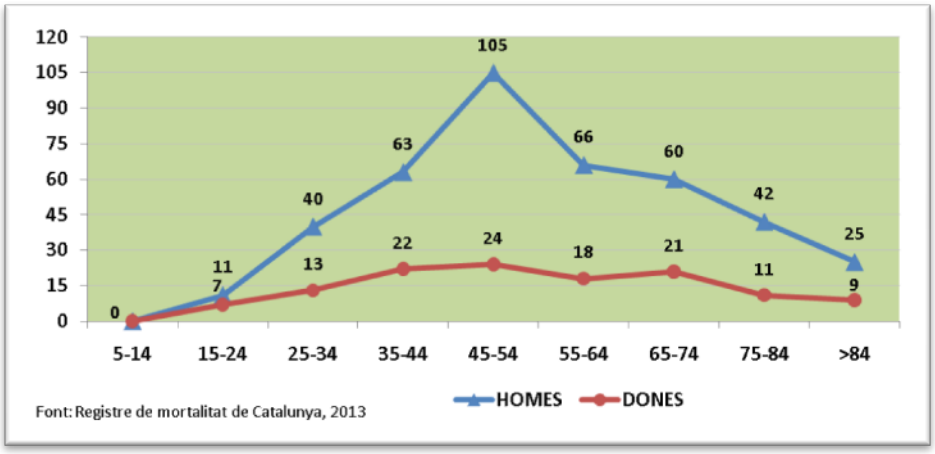
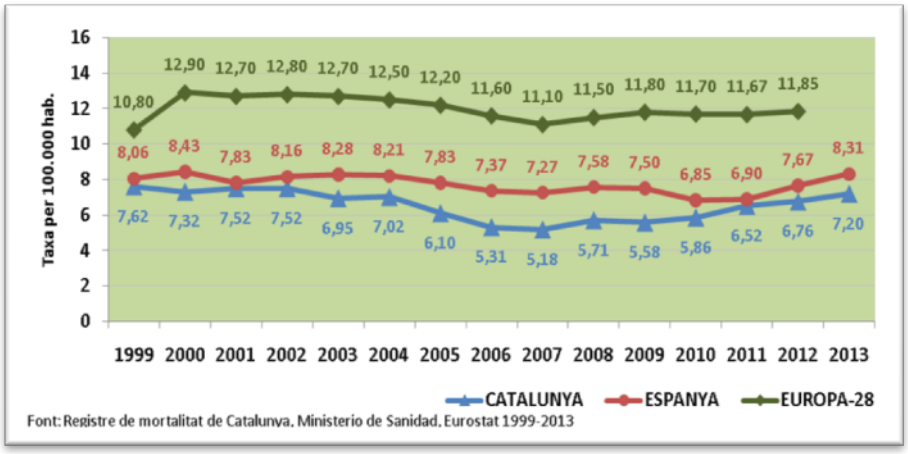


Figure 3: Suicide mortality in Catalonia, Spain, Europe-28 (1999-2013): rate by 100,000 inhabitants



In general, and in contrast to suicide deaths, prevalence rates of suicide attempts are higher among women than men, regardless of age or race/ethnicity (33;35;36;38). A common

explanation is the fact that men are more likely to use more lethal means for self-injury. In addition, higher rates of suicidal behaviors among adolescents than among adults have been consistently observed (41-43).

The social and economical impact of suicide are huge. The direct costs of premature mortality and years of potential life lost for suicide mortality and morbidity have been estimated to total $68 million for suicide fatalities, and 581 million for attempted suicides, or a total of $0.7 billion. These include expenses associated with emergency intervention and medical treatment, hospital and inpatient physician costs and costs of autopsies and investigations (44). Total indirect costs have been estimated to range between $11.8 billion (5) and $34.6 billion (30). These include premature mortality and years of potential life lost for suicide fatalities, lost earnings and productivity due to suicide attempt-related disability, and lost productivity of loves ones grieving a suicide death.

In general, and in contrast to suicide deaths, prevalence rates of both lifetime and 12 month suicidal attemps are highest among women than among men, regardless of age or race/ethnicity (33;35;36;38;45). Similarly, both lifetime and recent rates for nonfatal suicidal behaviors are higher in younger age groups (41-43;45).

1.2 Risk and Protective Factors

“The presence of any factor empirically demonstrated to correlate with suicidality, regardless of timeframe”, broadly defines a suicide risk factor (46).

Risk factors are not static entities, they should be thought as complex, dynamic processes. They change over time, can be internal and external to the individual, and interact with each other for nonfatal and fatal suicidal behaviors.

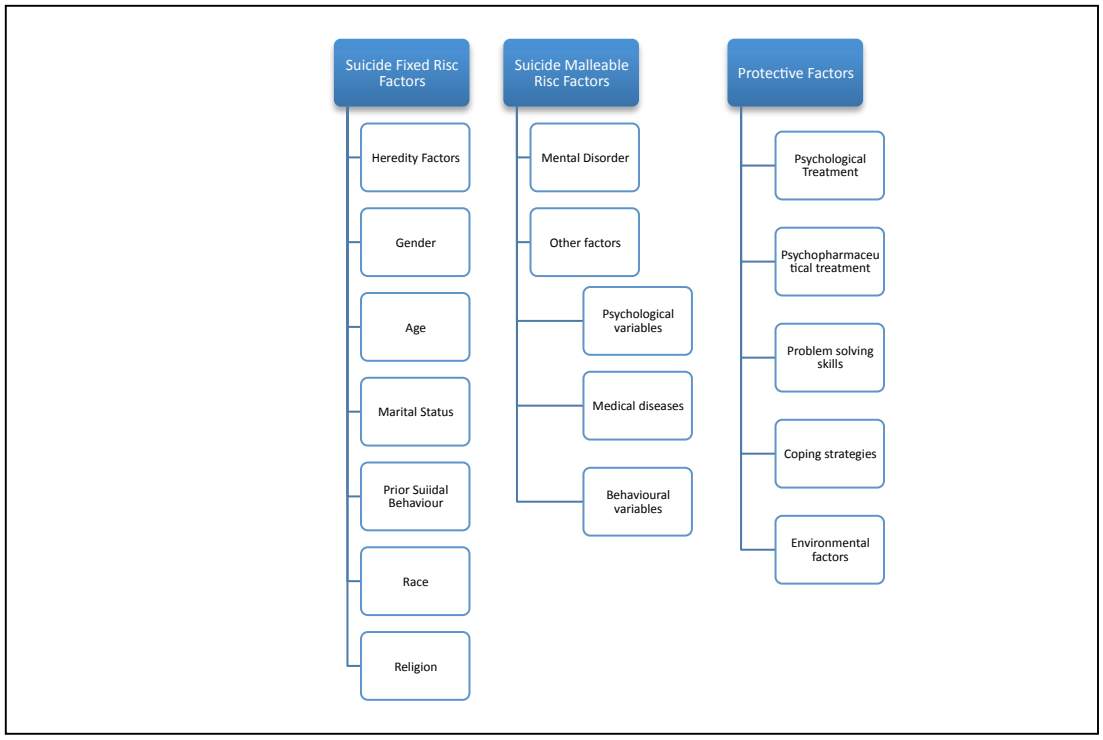
It is their interaction with other processes that can lead to necessary and sufficient conditions that result in a fatal or nonfatal event. No single risk process is unique to suicidal behavior (47).

1.2.1 Risk Factors

Risk factors can be mainly divided in two main groups, fixed or malleable (48)

Figure 4). Fixed risk factors are unrelated to the life situation or the clinical condition of the subject but are associated with the subject himself or the social group to which it belongs. Furthermore, malleable risk factors are those related to social, psychological or psychopathological factors that can be modified by clinical or population interventions (47).

Figure 4: Classification of suicide risk factors



This thesis will be centered in distinguishing between fixed immutable risk factors and other risk processes that are malleable and thus may become possible targets for prevention interventions.

1.2.1.1 Fixed Risk Factors

Heredity factors

Various authors estimate that 43% of suicidal behavior is explained by the genetic load, and the remaining 57% would be influenced by environmental factors (49;50).

Family, twin, and adoption studies provide evidence for a heritable risk of suicide and suicidal behavior (50-56). Much of the family history of suicidal behavior may be explained by the risk associated with mental disorders (57). People with a family history of suicidal behavior are at increased risk for suicidal behavior, mainly when the attempt or the consumed suicide has involved a first-degree relative. A predisposition for some suicidal risk traits is transmitted cross-generationally that is not fully explained by the presence of a particular mental disorder (58). Certain personality traits, coping strategies or cognitive styles have also been associated with suicides.

Disruptions in the functioning of the inhibitory neurotransmitter serotonin are the biologic factors most consistently correlated with suicidal behavior. Persons who die by suicide have been found to have lower levels of serotonin metabolites in their cerebroespinal fluid (59-62), higher levels of serotonin receptor binding in platelets (63;64), fewer presinaptic serotonin transporter sites and greater postsynaptic serotonin receptors in the prefrontal cortex and other specific areas of the brain (65;66), which may impair the ability to inhibit impulsive behavior. These, albeit medically very relevant, are out of the scope of the current thesis, which focuses on

psychological preventive interventions.

Gender

Differences in suicidal behavior are observed between male and female. In general, men have higher rates of suicides than women (67;68) and females attempt suicide at significantly higher rates than males (38;68). In contrast, in Asia (China and other Asiatic countries), females are more likely both to attempt and die by suicide than males (69). One potential explanation is the easier acces to non-aggressive methods like organophosphates substances.

Duberstein study concluded that suicide rate in men increases with age while in women is stable or even decreases from midlife. In people aged 65 or more the suicide rate for men/women is 7/1 in USA and 3/1 in other countries (70).

Age

The age frames with increased risk of attempted and completed suicides throughout life are adolescence and old age (33;71-74). It is also a well known fact that, before puberty, attempt and suicide are exceptional due to cognitive immaturity (74). Otherwise, patterns on age debut and course of suicidal behavior are quite consistent across countries (41-43;45).

Suicide is among the leading causes of death among young people and adolescents (24). The most frequent comorbidities for both suicide and suicide attempts are affective disorders, followed by substance abuse and conduct disorders (75). On the other hand, a history of suicidal behavior in parents has also been linked with an increase in suicide and suicide attempts and prior suicide attempts were present in a third of studied consummated suicides in adolescents as per Gould studies (76). As for psychological dimensions, an increased risk of suicide in young people has been ling with low self-esteem, hopelessness, withdrawal and impulsiveness (75). Mental disorder remains an important risk factors in this age group.

Elderly men tend to die more often in his first attempt at suicide (77). Widowhood and retirement stand out as two remarkable risk factors, both related to a situation of social isolation. Depressive episodes are the most important risk factor in the elderly within psychiatric disease. Suffering from somatic or disabling diseases, chronic pain and loss of autonomy are other risk factors that play a key role in the suicide of elderly.

Marital status

Suicidal behavior is more common among unmarried, divorced, living alone or those individuals who lack social support. This is true mainly for males, particularly during the first months after the loss (separation, divorce or widowhood) (78).

Prior suicidal behavior

A history of previous suicide attempts has consistently demonstrated to increase risk for both subsequent suicide attempts and suicide death (79). During the first three months and even during the first year after a suicidal attempt, the risk to commit a new attempt increases 20-30 times (80). Although not modifiable, knowledge of prior suicidal behavior can be valuable in determining who is at higher risk for such behavior in the future. Furthermore, multiple suicide attempts are associated with an increased risk of subsequent suicidal behavior, and those who commit multiple attempts often do so with increasing severity (81). Data from a meta-analysis (82) show that previous suicide attempts are more important predictors of suicide or re-attempts

than the other four risk factors analysed (depression, alcohol/substance abuse, employment status and marital status).

Race

There is no conclusive evidence that race or ethnicity have influence on the rate of suicides or attempts (83).

Religion

Religion may act as a protective factor, since the highest suicide rates are among atheists, being lower in practitioners of different religions such as Buddhists, Christians, Hindus and Muslims.

Religious beliefs, religious practice and spirituality have been associated to a decrease probability of suicide attempts (84-87). Potential mediators of this relation, such as moral objections to suicide (88) and social support (89), also seem to protect against suicide attempts among persons at risk.

1.2.1.2 Malleable Risk Factors

According to psychological autopsy studies, 90-95% of those who die by suicide, have a recognized mental disorder at the time of death (90). Psychiatric disorders are found associated with both suicide fatalities, and suicide attempts (41). The mental disorders most frequently found in psychological autopsy investigations of suicide deaths include mood/depressive disorders, substance abuse disorders, and personality disorders. In addition, the presence of more than one comorbid disorders increase the risk for multiple attempts (91;92). Depression, bipolar illness or schizophrenia increase the risk for both subsequent attempts and suicide death, following previous suicide attempts (79;93). A list of mental comorbid conditions mostly related with increased risk of suicidal behavior follows. Nevertheless, it is important to remember that having a mental disorder alone is not sufficient to explain or predict suicidal behavior.

Major depression is a prime target for screening and prevention since it is one of the strongest predictors of suicidal ideation (66). Major depression is a highly prevalent, episodic, recurrent and often chronic disorder which has a serious impact on quality of life (94). It may lead to suicide. The risk is especially high at the earlier or late stages of the episode, since during the bulk of the episode, psicomotor delay and inhibition protects from action (92). Importantly, 25% of the patients with a **Bipolar Disorder** are estimated to make a suicide attempt approximately, up to 15 times higher than the general population. Again, the risk is greater on the onset or when there are comorbidities (71).

The **substance abuse** disorder and, especially, alcoholism due to its high prevalence, is usually associated with suicide, both as risk or as a precipitating factor (82). It is present equally in men and women who died by suicide (35;38) and stands for 25-50% of suicides in the adult age (95). An additional common problem in these patients is the high rate of concomitant psychiatric treatments and the poor adherence to them, which could increase the suicidal risk.

The consummated suicide prevalence in these population is 5-10%, mainly in young men during the first disease episode, as well as in chronic patients suffering a relapse or during the first months after a hospital discharge (12;71;73).

Schizophrenic patients is another risk group for suicide, especially in young men during the first stage of the disease or in patients with chronic relapses and in the first months after discharge from the hospital (12;71;73).

Posttraumatic stress disorder (PTSD) and eating disorders have also been linked to attempted suicides. Wilcox *et al.* (96) found a significant association of PTSD and subsequent suicide attempts (RR=2.7), mainly if a prior physical assault occurred.

Hawton *et al.* (73) found that one in four women with **eating disorder** (especially when accompanied by comorbidities such as depression or anxiety) had a history of suicidal behavior or ideation. Within these disorders, anorexia nervosa is the one that has a higher suicide risk (97).

Anxiety disorders can also be associated with high rates of suicidal ideation and attempts (36;37;42).

Other diagnoses more commonly found in higher proportions, mainly among younger adult suicide attempters, include disorders characterized by behavioral and emotional disregulation and aggression, such as **oppositional-defiant disorder and borderline personality disorder** (35;38;91;98).

1.2.1.3 Other factors

Stressful life events that can be acute (e. g. family/romantic conflicts, bereavement or legal problems) most often preceed suicidal behaviors (69). It is not clear how and why stress influences the development of suicidal behavior.

History of physical or sexual abuse

Toxic domestic environments such as family conflicts, physical or sexual abuse increase suicide risk increases (99). Some physical or sexual abuse, specifically those produced during childhood, have a strong association with suicidal behavior (71;73).

1.2.2 Protective factors

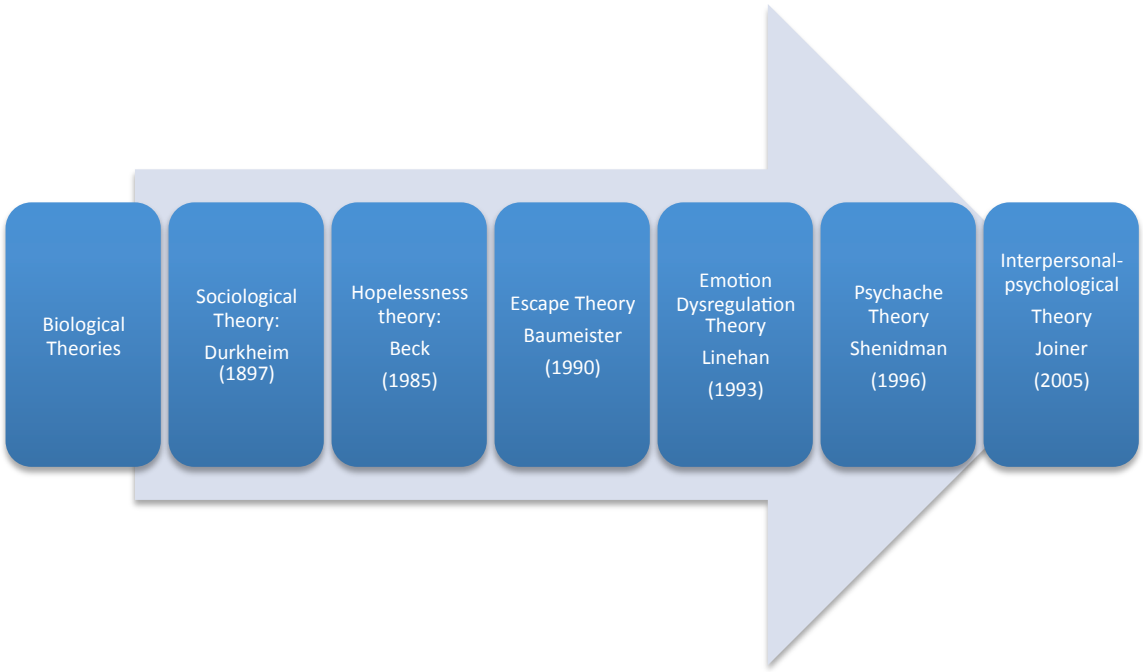
Protective factors usually are divided into two groups, the individual's own and the environment's own (100). Amongst the former, the most relevant ones are the value of the own life, a good psychological or psychopharmacological treatment compliance, establishment of a therapeutical alliance thorough the active participation in their treatment (101), problem-solving skills and coping strategies (102), social skills, emotion management and resilience. Environmental factors include a healthy social network, suitable family environment, accessibility to health resources and restriction on lethal agents such as weapons or medications. Very few studies have examined the effect of protector factors on vulnerable to suicidal behavior individuals (48). Some of the risk factors could be transformed into protective factors, e.g. to comply with appropriate treatment for a mental disorder or to return to a stable family environment (103;104). As much as a single risk factor is very unlikely to determinate a suicidal behavior, a single protective measure or factor is insufficient to protect against suicidal behavior.

1.3 Theories of Suicidal Behavior

The major theories of suicide are (Figure 5): biological theories, Durkheim's sociological theory (105), Beck's hopelessness theory (106), Baumeister's scape theory (107), Linehan's emotion

dysregulation theory (108), Shneidman's psychache theory (109), and Joiner's interpersonal-psychological theory (54;110).

Figure 5: Theories of Suicidal Behavior



1.3.1 Biological theories

Biological theories point to an inherited, physiological risk component to suicide, sometimes referred to as diathesis. The combination of a diathesis and stress may result in suicidal behavior (66;111). These biological diatheses suggested in suicidal behaviors are the dysregulation of the serotoninergic system, specifically the polymorphisms of the serotonin transporter gene (5HTT) and unherited impulsivity (112).

1.3.2. SociologicalTheory

In 1897, Emile Durheim wrote *Le Suicide,* one of the first comprehensive theories of death by suicide. He proposed that suicide is a result of disturbed regulation of the individual by society, and that there are two primary societal forces that have the most influence on suicide: social integration (degree to which the individual is integrated into society in terms of attachment with others and society as a whole) and moral integration (degree to which society regulates the beliefs and behaviors of individuals through mechanisms such as societal norms and the legal system). Durkheim proposes that there are four types of death by suicide, each of which results from either extreme on one of the two factors: egoistic, altruistic, anomic, and fatalistic. This sociological theory of suicide made an important contribution to the current understanding of death by suicide in that it was the first real theory to specifically identify types of suicide and ascribe reasons for them.

1.3.3. HopelessnessTheory

Beck's Hopelessness theory (106) suggests that suicidal ideation is a function of hopeless cognitions about the unchangeable negativity of one's situation. This hopelessness is the primary driving force of suicidal behavior.

1.3.4. Escape Theory

Baumeister's (107) escape theory of suicide is a socio-psychological theory that focuses on how individuals come to attempt suicide. Based on Baecheler's (113) scape theory of suicide that presents suicide not as an end per se; rather as a means to an end. Baumeister expanded on the theory proposing a succession of six steps that ultimately led to suicide attempts.

1.3.5. Emotion dysregulation theory

Linehan (108) proposed a theory of suicide aimed more specifically at individuals with borderline personality disorder (BPD), but still has important implications for understanding suicide in general. Linehan proposed that the emotional states generated by the emotional vulnerability are extremely intense and aversive, such that extreme behaviors are sought out as desperate attempts to manage this stress.

1.3.6. Psychache theory

Shneidman (109) reasoned that for some people, the "psychache" (psychological pain) becomes so strong that death by suicide is the only way to relieve the pain. Shneidman argues that it is the severity of psychache that constitutes the degree of the sucidal desire and risk.

1.3.7. Interpersonal-psychological theory

Joiner's theory proposes a three-way interaction of perceived burdensomeness, low belongingness, and the acquired capability to engage in lethal self-injury, such that individuals who evidence these three variables will be more likely to die by suicide.

1.3.8 Cognitive Theories of Suicidal Behavior

Recent cognitive theories of suicidal behavior incorporate a subset of the cognitive content domains and information processing variables (Table 1) described before and compile them into three models:

1.3.8.1 Cry of Pain Model

The cry of pain (CoP) model (114) was developed to extend Baumeister's (107) widely cited theory of suicide by including other key components to explain suicidal behavior. According to the CoP model, stressful or negative life events increase the likehood of suicidal behavior. These are associated with four psychological characteristics: 1) the individual experiences a sense of defeat and loss, 2) the individual cannot scape the situation, often because of poor problem solving abilities 3) the person has little hope for rescue, 4) the perception that the person will not be able to change his/her life experiences.

1.3.8.2 Fluid Vulnerability Theory

Rudd's fluid vulnerability theory (FVT) (115) favors that suicidal acts occur when the suicidal mode is activated, defined as an interaction between suicide-relevant beliefs, physiological symptoms, emotions, behaviors and motivations (116).

1.3.8.3 Cognitive Model of Suicidal Acts

This cognitive model developed by Wenzel (117) accounts for psychological risk factors identified in the empirical literature, with increased risk in the presence of psychiatric disorders, and speculates about the cognitive processes that take place in a suicidal crisis..

The majority of suicidal individuals have perceptions of hopelessness, socially prescribed perfectionism, burdensomeness, low belongingness, and unbearability. They have difficulty generating solutions to problems, low confidence in their problem-solving abilities, a tendency to engage in dichotomous thinking, difficulty generating positive thoughts for the future, an over general memory style, attentional biases toward suicide-relevant stimuli, and implicit associations between suicide-relevant concepts and their self-identify. Research is beginning to show that these cognitive constructs do not exist in isolation.

Table 1: Classification of suicide risk factors

Suicide-relevant cognitive content variables	
Hopelessness	Hopelessness or negative expectations for the future, is the cognitive variable most extensively studied by suicidologist. In 1963, Aaron Beck noted that hopelessness was associated with a broad array of variables relevant to suicidal behavior. Other studies (118) have confirmed it. A large body of research supports hopelessness as a key cognitive factor associated with increased suicide risk.
Perfectionism.	The association between perfectionism and suicidal thoughts and behaviors is another widely studied area, with the idea that perfectionism generates higher frustration, stress and exacerbates the degree to which suicidal individuals experience stress as aversive (119). Socially prescribed perfeccionism correlates positively with suicidal ideation (120). Empirical evidence suggests that people with suicidal ideation and those who have made a suicide attempt, report being excessively critical of themselves and having great concern about others expectations for them.
Burdensomeness	According to Joiner (54), the perception that one is a burden on others is a particularly relevant cognitive content variable contributing to the desire to die. Perceived burdensomeness is associated with suicidal ideation (121;122).
Low belongingness	Refers to the perception that one is is not an important member of a group, such as family and circle of friends or is alienated from others (123). Empirical research indicates that greater sense of low belongingness is associated with increased suicidal ideation (124).
Unbearability	Edwin Shneidman's theory of suicidal behavior explains suicide as an scape from experiencing intense psychological pain (109). Suicide is viewed as the only scape from an unbearable situation (125): this fact is specially relevant in adolescents (126) and elderly individuals (127).

Information Processing variables	
Problem-solving abilities	Individuals with suicidal behavior have limited **problem-solving abilities** (128;129). Several studies have shown that suicide ideators and attempters do not produce effective solutions and subsequently do not succeed in achieving their desired outcomes (130).
Overgeneral memories	Research has confirmed that people who have made recent suicide attempts tend to initially retrieve **overgeneral memories** rather than specific memories (131-133).
Dichotomous thinking	Neuringer and Lettieri (134) found that patients who were at higher rates of suicide presented **dichotomous thinking** more often than patients who were at moderate and low risk for eventual suicide. Litinsky and Haslam (135) demonstrated it again 20 years later.
In addition, suicidal individuals exhibit biases when they are processing particular types of information,	
Future thinking,	Research demonstrated that deficient positive **future thinking**, but not negative future thinking, is significantly associated with suicidal ideation (120). Suicidal individuals do not generate positive expectations for the future but do not differ from controls when generating negative expectations for the future (136;137).

1.4 Evaluation and Prevention

1.4.1 Suicide Risk Evaluation

The assessment of suicide risk is a fundamental part in the management and prevention of suicidal behavior (138). Estimating the risk of suicide is a complex process due to the complex nature of suicidal behavior (139).

The core of any assessment for suicide risk is a careful and thorough examination of suicidal thinking and behavior. Clarification early in the assessment process helps improve subsequent efforts to monitor risk over time (139). Joiner *et al.* (140) offered a general framework for suicide risk evaluation that included seven domains: 1) previous suicidal behavior, 2) the nature of current suicidal thinking behaviors, 3) precipitant stressors, 4) general psychiatric symptoms 5) the presence of hopelessness, 6) impulsivity and self-control 7) protective factors. A standard approach that explore all these domains is recommended.

Clinical Interview

The clinical interview is the essential instrument in the assessment of suicide risk. Besides having an important role in evaluation, it marks the beginning of the interaction between patient and professional: therefore, it can play an important role in the suicidal risk reduction (141).

During a clinical interview, in addition to a psychopathological assessment, sociodemographic variables and the risk/protective factors, enabling a comprehensive approach to suicide risk should be pursued.

Hetero and auto-administered tests

There is a great diversity of psychometric instruments designed to assess the risk of suicide which are often based either on direct assessment of suicidal ideation/behaviors and risk factors, or in symptoms or syndromes associated with suicide, such as hopelessness, depression, etc (142). These instruments have been developed in many cases for research use, so its application in clinical practice is very limited. Although often translated into Spanish and adapted and validated in some Spanish-speaking countries, many of them are still not available for the Spanish population (143). Nevertheless, in Spain some investigators are creating new evaluation tools (144;145) or adapting other existent ones (146).

Suicidal risk evaluation scales

- Suicidal Behavior Scales
    - Beck's Suicide Ideation Scale (SSI) (147). It is a semi-structured and hetereo-applied scale, not validated in Spain, exploring ideas and suicide risk by 19 items. Each item have three options (0-2): a higher score indicates a greater risk.
    - Columbia Suicide Severity Rating Scale (C-SSRS) (148). It is a semi-structured scale created by researchers at Columbia University, which have been validated in Spain. It explores the suicidal risk through ideation and suicidal behavior, but does not evaluate the level of suicide risk. (143).
    - SAD PERSONS Scale (149). It is a short and hetero-applied scale consisting of 10 items related to the existence of many other suicide risk factors. It has not been validated in Spain.
    - Clinical Global Impression for Severity of Suicidality Scale (CGI-SS) (150). It is a hetero-applied scale, not validated in Spain, exploring the severity of suicide risk and the improvement post-intervention.
    - Suicide Assessment Scale (SUAS) (151). It is a hetero-applied scale to assess the suicide risk of a person who has made a prior suicidal attempt.
    - Plutchik Suicide Risk Scale (152). It is auto-applied scale which has been validated in Spain by Rubio *et al.* (153), that assess the suicide risk through 15 items exploring suicidal behavior.
    - Suicidal Scale of the M.I.N.I International Neuropsychiatric Interview (M.I.N.I) (154). Is a short estructured diagnostic interview developed in 1997 by David Sheehan y Lecrubier, for DSM-IV and ICD-10 psychiatric disorders. One section of this instrument is dedicated to assessment of suicidal risk, with questions with past and current suicidality.
- Suicidal Acts Scales
    - Beck's Suicide Intent Scale (SIS) (155). It is a semi-structured scale validated in Spain (156) that explores the characteristics of suicide attempts by 20 items.
    - Suicide Medical Damage Scale (MDS) measures the medical severity of the autolytic

tentative. It was created in 1975 by Beck.

- Suicidal Variables Scales
  - Beck Hopelessness Scale (BHS) (157) is a 20-item self-report inventory that was designed to measure three major aspects of hopelessness: feelings about the future, loss of motivation, and expectations.
  - Reasons for Living Scale (RFL) is a self-report questionnaire that measures the client's expectations about the consequences of living versus killing oneself and assesses the importance of various reasons for living.
  - Barratt Impulsiveness Scale (BIS-11) (158) is a questionnaire designed to assess the personality/behavioral construct of impulsiveness. Composed of 30 items describing commo impulsive and non-impulsive behaviors and preferences.
  - Buss-Durkee Hostility Inventory (BDHI) (159) is designed to measure individual differences in trait hostility.
  - List of Threatening Experiences (LTE) (160) is a 12-item scale which assesses stressful life events.
  - Psychological Pain Assessment Scale (PPAS), proposed by Shneidhman in 1999 (161), as a simple test (with pictures) to measure psychache.
  - Mental Pain Scale, by Orbach in 2003 (162), is a 44 item instrument measuring various aspects of pain.

These instruments can be an additional aid in the exploration, the interview and clinical judgment, but should never replace them.

1.4.2 Suicide Prevention

Prevention models

Leavell and Clark (163) proposed, as part of their Community Health program, a model of prevention that became widely accepted and has largely influenced the field. They defined three levels of prevention (primary, secondary and terciary). *Primary prevention* includes activities related to both general health promotion and specific protection against specific diseases, aiming at preventing the occurrence of the disease. *Secondary prevention* is the early detection and intervention for the purposes of treating a disease condition effectively and early in its course, thus avoiding resulting incapacities or death. *Terciary prevention* refers to measures taken to recover normal functioning and avoid relapse once a disease or disability has stabilized or to avoid premature death.

In 1987 Gordon put forward another conceptual model for preventive actions, made popular by Mrazek and Haggerty (164), taking into account risk factors and population coverage rather than the natural history of the disease. Preventive interventions were classified as universal, selective and indicated. *Universal prevention* actions are addressed to the whole population. An example of these is the Suicide Prevention Day, which aimes to raise awareness of suicide and how to face it in the general population. *Selective prevention* targets specific subgroups with a known risk factor to develop, for exemple, selective prevention interventions on individuals with mental disorders with a known risk for suicidal behavior, such as depression, alcohol misuse, etc. *Indicated prevention* is addressed to individuals that have already presented symptoms or

manifestations of the problem. In the context of suicide, an indicated prevention program would target individuals with previous suicidal attemps.

Suicide prevention programs and initiatives

The nature and magnitude of suicidal behavior clearly represents a major public health issue in most countries.

In 1969, WHO published a document recognizing the importance of framing suicide prevention in the field of public health. In 1984, the countries of the Regional Office for Europe of WHO included the reduction of suicide within their health policy objectives.

In 2000, WHO launched a multisite international study (SUPRE-MISS). This was a randomized control trial that evaluated treatment strategies for suicide attempters in the emergency settings. The study was conducted in five countries and the results showed a reduction of suicide re-attempts in China, India and Sri Lanka (165). In 2004, the need for suicide prevention programs that included specific interventions for those at risk, as well as increasing collaboration between emergency services and mental health was raised at a meeting of the WHO on "Suicide Prevention Strategies in Europe". During this conference, a call for more research in the field was also considered. Along with the growing attention to national suicide prevention strategies, a major shift has also been observed in suicide-related research, which is much more oriented towards the prevention of suicide (24).

The European Union (EU) has promoted initiatives such as the *Mental Health Promotion and Mental Disorder Prevention Suicide Prevention*, which is considered one of the areas of intervention.

In Spain, the *Strategy for Mental Health* (166) includes as one of its major objectives the prevention of suicide and the evaluation of specific actions to reduce suicide rates in risk groups.

The *Pla de Salut de Catalunya 2011-2015*, prioritizes suicide prevention and the care of mental disorders considered as risk factors, such as depression.

1.5 Intervention

1.5.1 International efficient interventions on suicide prevention

The establishment of national suicide prevention policies by governments shows a commitment to address this problem. However, due to its multifactorial origin, different types of interventions and from different levels are needed to reduce suicide rates in the long term. One inspiring example was the *Defeat Depression Campaign* (167), which was started in the UK in the 1990s to increase understanding of depression and to reduce stigma. The campaign aimed at informing the public about the disorder and at updating general practitioners in the recognition, detection and management of depression. The goal was to decrease suicidality by 15% by the year 2000. The overall suicide rate fell by 11.7% in 5 years, but because of the study design (no control) there are some doubts whether the campaign itself or non-specific factors contributed to the decrease. In 2000 the Australian government initiated a multi-faceted and multi-level program addressing depressive disorders named *beyondblue* (www.beyondblue.org.au). The program aimed to raise community awareness about depression and reducing stigma. According to the first evaluation of this program, an increase in public awareness and general recognition of the program could be observed after 3 years of intervention.

1.5.2 European programs on suicide prevention

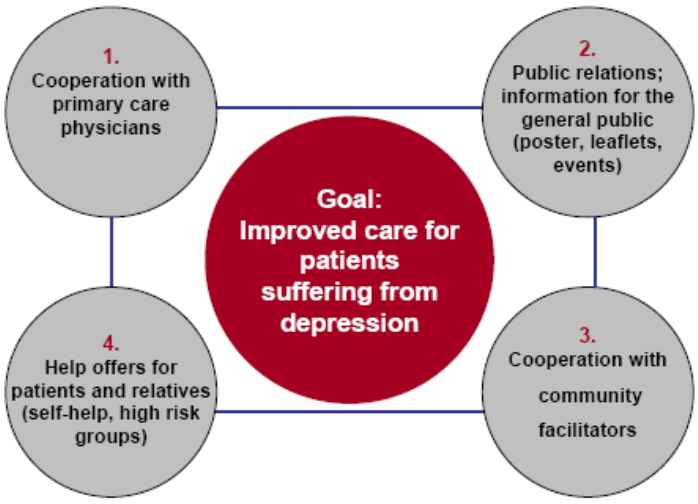
European Alliance Against Depression

The *Nuremberg Alliance Against Depression* (NAAD) was carried out as a sub-project of the *German Research Network on Depression and Suicidality* (Kompetenznetz Depression und Suizidalität), funded by the German Federal Ministry of Education and Research, in the city of Nuremberg (500,000 inhabitants) during 2001-2002. The aim was to improve the care of depressed people and to prevent suicidality. The project has been evaluated both with respect to a 1-year baseline and versus a control region (city of Wurzburg, 290,000 inhabitants).

The *European Alliance Against Depression* (EAAD), was funded by the European Commission, in 2004. The basic idea is again to implement regional community-based four-level intervention programmes with the aim of improving the care of depressed patients and to reduce suicidality.

The intervention (168) took place on four different levels complementary to each other (Figure 6).

Figure 6: European Alliance Against Depression: four-level intervention programmes



Level 1: Co-operation with general practitioners

Interactive workshops using educational packages were developed and offered to general practitioners (GP). Additionally screening tools were evaluated and handed over to GPs together with other material (e.g., leaflets and brochures).

Level 2: Public relations campaign

A professional public relations campaign was established including posters at public places, leaflets, information brochures and several public events.

Level 3: Community facilitators

To consider the important role of community facilitators, educational workshops were arranged for teachers, counsellors, priests, geriatric nurses, policemen, pharmacists and others. These

professionals might be influential in depressed and suicidal persons' decisions to access care. Special educational packages were developed for these community facilitators. Also a close co-operation with the media was established in order to avoid imitation suicides.

Level 4: High risk groups and self-help

An 'emergency card' was handed out to patients who have been treated after suicide attempt, indicating a telephone number which allowed an easy and round the clock access to professional help offered by a specialist. Additionally, several initiatives were taken to found self-help activities and support already existing self-help activities.

The European Commission (EC) adopted a *Green Paper on Mental Health* on 17 October 2005 designed to highlight the importance of mental well-being and develop a comprehensive EU strategy on mental health. The EC's proposals for actions outlined in the *Green Paper* are part of the Commission's follow-up to the *WHO Ministerial Conference on Mental Health* held in Helsinki in January 2005. The *EAAD project* is mentioned within the *Green Paper* as an example of a successful action to prevent suicide.

On 5 October 2007, the EAAD was named the winner of the European Health Forum Award at the European Health Forum Gastein, Austria (EHFG).

EAAD was also approached by the Mental Health Innovation Network (WHO), a community of mental health innovators- researchers, practitioners, policy-makers, service user advocates, and donors from around the world (EAAD now listed on MHIN site.)

Euregenas (European Regions Enforcing Actions Against Suicide)

The project brings together 11 regions (two of them Spanish Andalucía & Castilla y León) with diverse experiences in suicide prevention. Is a three years project ended in December 2014, funded by the EU (http://www.euregenas.eu). The overall objective of project is to contribute to the prevention of suicidality (sucide ideation, suicide attempts and suicide) in Europe through the development and implementation of strategies for suicide prevention at regional level that can be use to the European Community as examples of good practice.

Optimizing Suicide Prevention Programs (OSPI) and their Implementation in Europe

It is a project based on the implementation of a multifaceted intervention programme for suicide prevention in Nuremberg, the NAAD, and the later expansion of the Nuremberg-concept to other EU countries, included Spain, which formed the EAAD. The aim of OSPI-Europe is to provide EU Member States with an evidence-based prevention concept, concrete materials and instruments for running and evaluating these interventions and recommendations for the proper implementation of the intervention (169).

PREDI-NU (Preventing Depression and Improving Awareness through Networking in the EU)

The project intented to contribute to the promotion of mental health and the prevention of depression and suicidality through information and communication technologies (ICT). It started in 2011 with a duration of 36 months. The goal of the project was to develop and internet-based guided self-management tool for mild to moderate depression (http://www.ifightdepression.com). PREDI-NU was built upon the experience of the two EU-funded and internationally recognized suicide prevention projects: EAAD and OSPI. The

expected outcomes were increased uptake of support options by young people and adults with mild to moderate depression, by men who otherwise may not receive support, increased awareness of depression among health professionals, and available in nine languages (170).

MONSUE (European Multicentre Study on Suicidal Behavior and Suicide Prevention)

The project is based on the experience of the WHO/EURO Multicentre Study on Suicidal Behavior and is coworking with the WHO/EURO Network on Suicide Research and Prevention. The goals are collecting suicide and suicide attempt data, determination of trends, assessment of a sociodemographic picture, treatment, efficacy of treatment procedures and assessment of measures within primary suicide prevention activities. Project was initiated in 2007 and the final report was available on 2010 (171).

SEYLE (Saving and Empowering Young Lives in Europe)

The project is a health promoting program for adolescents (www.seyle.eu). Its main objectives are to lead adolescents to better health through decreased risk-taking and suicidal behaviors, to evaluate outcomes of different preventive programs and recommend effective culturally adjusted models for promoting health of adolescents in different European countries (172).

SUPREME (Suicide Prevention through the Internet and Media Based Mental Health Promotion)

This project aims to develop, implement and evaluate and Internet and Media Based, Multilanguage, culturally adapted, peer facilitated Mental Health promotion and Suicide Prevention Intervention Programmme for young adults in the age of 14-24 years (www.supreme-project.org). The project had a duration of three years and started in 2010.

1.5.3 National suicide prevention programs

In Spain, the *prevention of mental illness, suicide and addiction* was presented as a general purpose (general objective #2) within the *Strategy of Mental Health National Health System 2009-2013*. However, in Spain there is a very poor implementation of preventive programs. There is no national prevention plan itself, and so far only regional initiatives have been developed.

- Galicia has developed an assistential and preventive program. For instance, the *Intervención Intensiva en Conducta Suicida* program (Intensive Intervention on Suicide Behavior) developed at the Ourense Heatlh Area (173;174), aimed to: a) increase the detection of patients at risk for suicide in primary care, b) provide specific assistance to patients referred from primary care or emergency department after a suicide attempt or risked suicidal ideation, through a specific program, and c) reduce suicide mortality and the suicide attempts in patients who had made a previous attempt in Ourense. A first phase, directed at primary care medical and nursing professionals, consisted on training in the detection of patients at risk, techniques for initial management and referral criteria. The second phase was focused on assisting patients at risk for suicide. The results showed that this program was a more effective intervention than the habitual attendance to prevent suicide retries.
- Asturias, participate in the *Monitoring Suicidal Behavior in Europe* (*MONSUE*) in 2007 and launched the *Saving and Empowering Young Lives in Europe* (*SEYLE*) project in 2010. The Monsue project is based on the experiences of the WHO/EURO Multicentre

Study on Suicidal Behavior.

- In 2013, the Basque Country joined the expansion of EAAD program.
- Catalonia is member of EAAD and PREDI-NU (ifightdepression) programs. These have been developed at the *Dreta de l'Eixample* in Barcelona (first phase) and at the Sabadell city (second phase). In 2015 the pilot phase of the *Codi Risc de Suïcidi* has been implemented.
- The Institutional Collaboration Protocol is being implemented in Navarra. The aims of this protocol are duicide prevention in Navarra population, effective suicide prevention intervention, monitorization of suicidal behavior and coordination from all the agents Health area, social area, etc…).
- The Suicide Risk Attention Program (ARSUIC) has been implemented at the Madrid Community. The program was carried out on all patients admitted for suicide attempt in the emergency departments, a post-discharged visit was scheduled within one week at the Adults Mental Health Centre (CSMA) .

1.5.4 Programs following suicidal attempt

As previously mentioned in the risk factors introductory chapter, people who have made a suicide attempt run a 12-30% risk of repeating suicidal behavior and the risk is higher during the first year after the attempt (175). The repeated suicide attempt often occurs early, i.e., within 12 weeks (176). Moreover, these persons are approximately 40 times more likely to eventually die by suicide than those without such a history (177). Multiple suicide attempts are further associated with an increased risk of subsequent suicidal behavior (18) and those who make multiple attempts often do so with increasing severity (178). These observations have led to the development research interventional programs with the objective to reduce attemps and suicidal deaths following a suicidal attempt.

A study by R. Bruffaerts et al (179), which states that most suicidal people do not receive any treatment whatsoever, identified low perceived need as the most important reason for not seeking help, followed by attitudinal and structural barriers. Results showed that only 39% of people who had engaged in suicidal behavior in the previous year had received treatment for emotional difficulties during that period.

Two other studies have addressed this question using various specific methods.

Motto's study selected subjects after hospitalization for suicidal behaviors: half of the patients were randomized to the investigational arm, where they received a standardized letter at time intervals during 4 years. At 2-years follow-up time point, the suicidal rate in the investigational contact group was reduced by 50% compared with the patients in the control no-contact arm of the study (180;181).

Carter *et al.* selected subjects with deliberate self-poisoning. Subjects in the intervention group received, in addition to usual treatment, a postcard intermittently during the 12 months following their discharge. The re-attempt rates was significantly reduced in the postcards receivers (81;182).

1.5.4.1 Telephone interventions in Suicide Prevention

To date, two large controlled trials have studied the effect of telephone interventions in

preventing suicide reattempts.

Fleishman conducted a study using phone calls and found a significant difference in the number of deaths by suicide between the group who received the call and the group who did not over the 18 months of the study: significantly fewer suicide attempts were observed in the individuals randomized to receive contact phone calls (165).

Simillarly, Vaiva and colleagues observed that subjects who received telephone contact 1 month following their suicide attempts presented significantly fewer suicide attempts than those who received no contact (183). However, a subsequent interevention (telephone contact three months post attempt) did not reduce the number of subsequent suicide attempts when compared with no-contact.

Other studies on Teleassistance or Tele-chekc with people at risk of suicide have shown that assessment intervention and, specifically, telephone support programmes, provide encouraging results and should be considered as a new instrument in the care of those at risk (184-188).

Nevertheless, innovative strategies to deal with people who have attempted suicide are needed. These interventions are not costly relative to the healthcare budgets and therefore can be implemented also in regions with limited resources.

1.6 Justification and Aim

As mentioned above, in Sabadell, a city of 200,000 inhabitants in the province of Barcelona (Spain), the second phase of the EAAD European project was implemented between 2007 and 2008. The main aim was to improve the general treatment of depression in the whole area and to reduce the risk of suicide. Among the multilevel interventions carried out, specific measures for populations at high risk of suicide were developed, such as for patients treated for suicide attempt in emergency departments. For them, our team designed a specific intervention that was assessed in a controlled setting: the systematic telephone contact of patients discharged from the emergency department after a suicide attempt. We conducted a systematic telephone follow-up of all cases, provided at least one psychiatrist visit ten days after emergency room discharge, independently of diagnosis, and evaluated the outcome of intervention over one and five years.

Chapter 2 Hypothesis, General Aims and Specific Objectives

2.1 Hypothesis

We hypothesized that a specific intervention program would reduce the percentage of patients re-attempting suicide and delay the time to re-attempts in the hospital where the program was performed compared with a control hospital without any specific intervention.

2.2 Objectives

2.2.1 General Aim

The general aim of this work was to assess the effectiveness of a post-suicide attempt telephone management program on patients discharged from the emergency room of two Spanish hospitals following a suicide attempt.

2.2.2 Specific Objectives

1. To compare the time elapsed between initial suicide attempt and subsequent one (time to recurrence) in the intervention *vs* non-intervention (control) populations, in 2007 and 2008.
2. To compare the proportion of people who reattempted suicide in the intervention *vs* the non-intervention groups during the 5-year follow-up period.
3. To compare the time to recurrence in the intervention *vs* control hospital areas, during the 5-year follow-up period.
4. To compare the proportion of people who reattempted suicide in the intervention *vs* the non-intervention groups during the 5-year follow-up period.

Chapter 3 Methods

3.1 Study Population

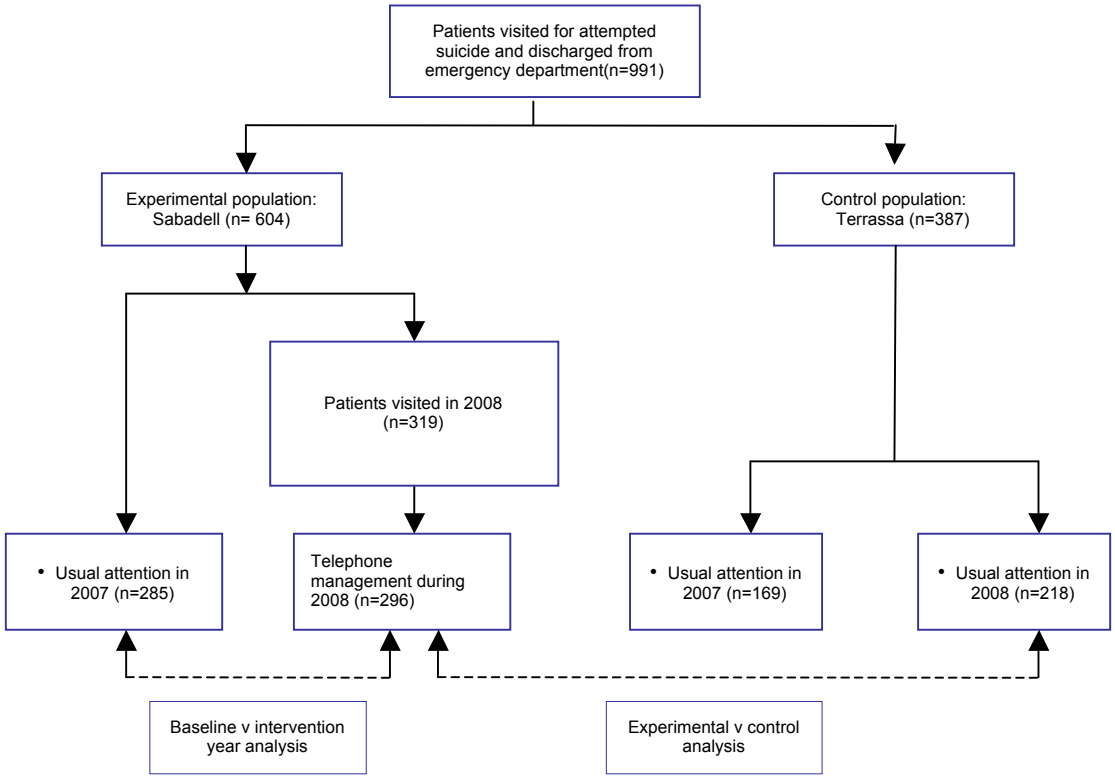
We assessed the effectiveness of a post-suicide attempt telephone management programme on patients discharged from the emergency room of the CSPT in Sabadell over one year. CSPT is a general hospital in the province of Barcelona that covers an area of 400,000 inhabitants and provides urgent medical attention for all suicidal behaviors. All the patients were examined by a psychiatrist who assessed the risk of suicide and formulated the initial treatment plan. Patients with a diagnosis of psychosis, major affective disorder or borderline personality disorder were not excluded and a proactive follow-up was provided with the help of other assertive follow-up programmes available in the area.

The impact of our intervention throughout the year 2008 was assessed by comparing all the patients recruited in the experimental area of Sabadell with those of a control area, made up of patients discharged from *Consorci Sanitari de Terrassa* (CST) for the same reason and during the same year. CST is the public reference hospital for half the population of Terrassa, a neighbouring city with similar socio-demographic characteristics to Sabadell. CST covers an area of 220000 inhabitants.

A total of 991 patients (604 in Sabadell, 387 in the control region Terrassa) without age limit that were treated during the years 2007-2008 for attempted suicide were included in the study. Patients were identified following a systematic review of electronic medical records of the emergency departments of psychiatry, medicine, traumatology, surgery and paediatrics. The procedure was the same in both regions.

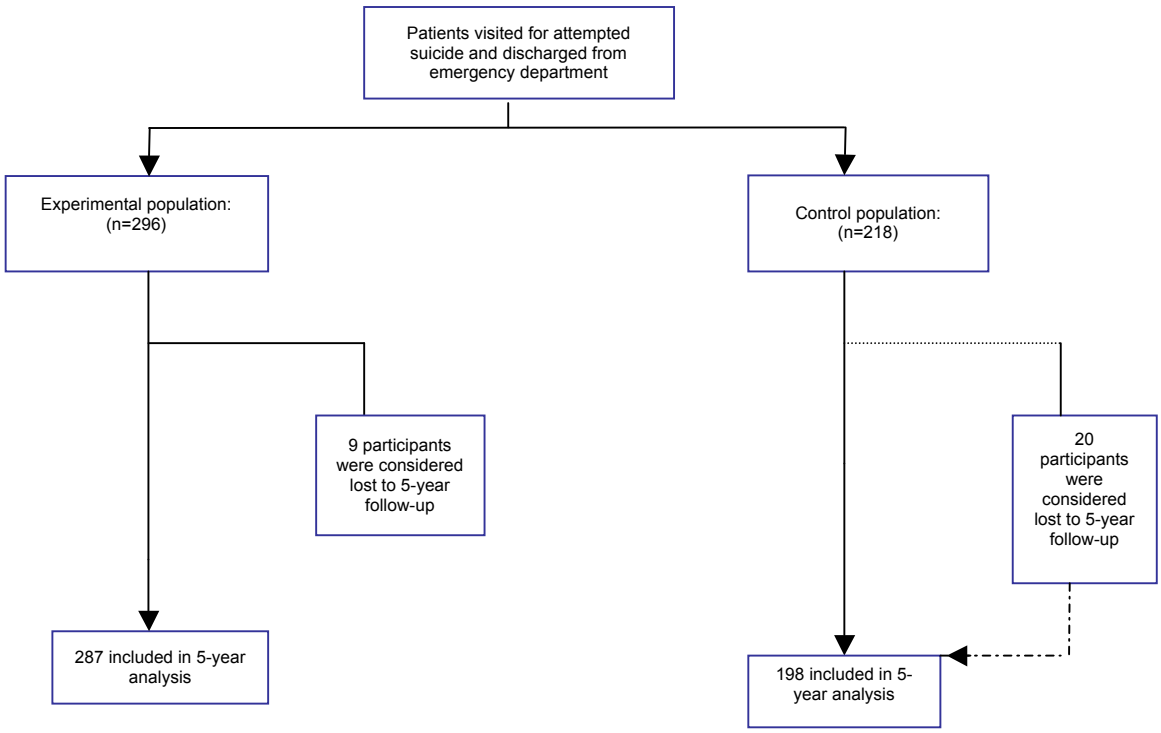
The initial experimental population included 319 patients visited in the emergency department of CSPT for attempted suicide during 2008. Among them, only 7.2% refused to participate or could not be reached. The final experimental sample included 296 patients. The control group consisted of 218 patients who were visited in the emergency department of CST during 2008. The progress of all participants through the trial is detailed in Figure 7.

Figure 7: Progress of participants through the initial trial



For the 5-year follow-up analyses, all the participants in the study initiated in 2008 (both control and intervention group) were telephoned again after 5 years. Nine out of 296 patients that received the intervention in 2008 were lost to follow-up: therefore, the final experimental sample group included in the 5-year follow-up was 287. Twenty out of 218 people who had been included in the study in 2008 could not be traced, so the final control group sample included in the 5-year follow-up study consist of 198 subjects. The progress of the patients through the intervention is detailed in Figure 8.

Figure 8: Progress of participants through the follow-up trial



3.2 Assesments

Baseline assessment was carried out by two investigators who obtained data from the electronic medical records of the emergency room (ER) of all patients with suicide attempt during the year prior to the intervention, following a systematic review of the ER's electronic medical records (psychiatry, medicine, traumatology, surgery and pediatric emergency units). The procedure was identical in both regions. All the information obtained was registered in a specific form and introduced in a database for further analysis.

The follow-up phase covered the 5 years after the first suicide attempt (including the intervention period). Two researchers made the telephone calls and confirmed the data from the electronic ER's medical records of nearly all patients with a suicide attempt in 2008 included in the main trial. All the information obtained was registered in a specific form and entered into a database for further analysis. Data recorded included whether the patient was still alive and whether they had made further suicide attempts. If the patient had died, the cause of death was recorded in accordance with Institut de Medicina Legal (IML) data.

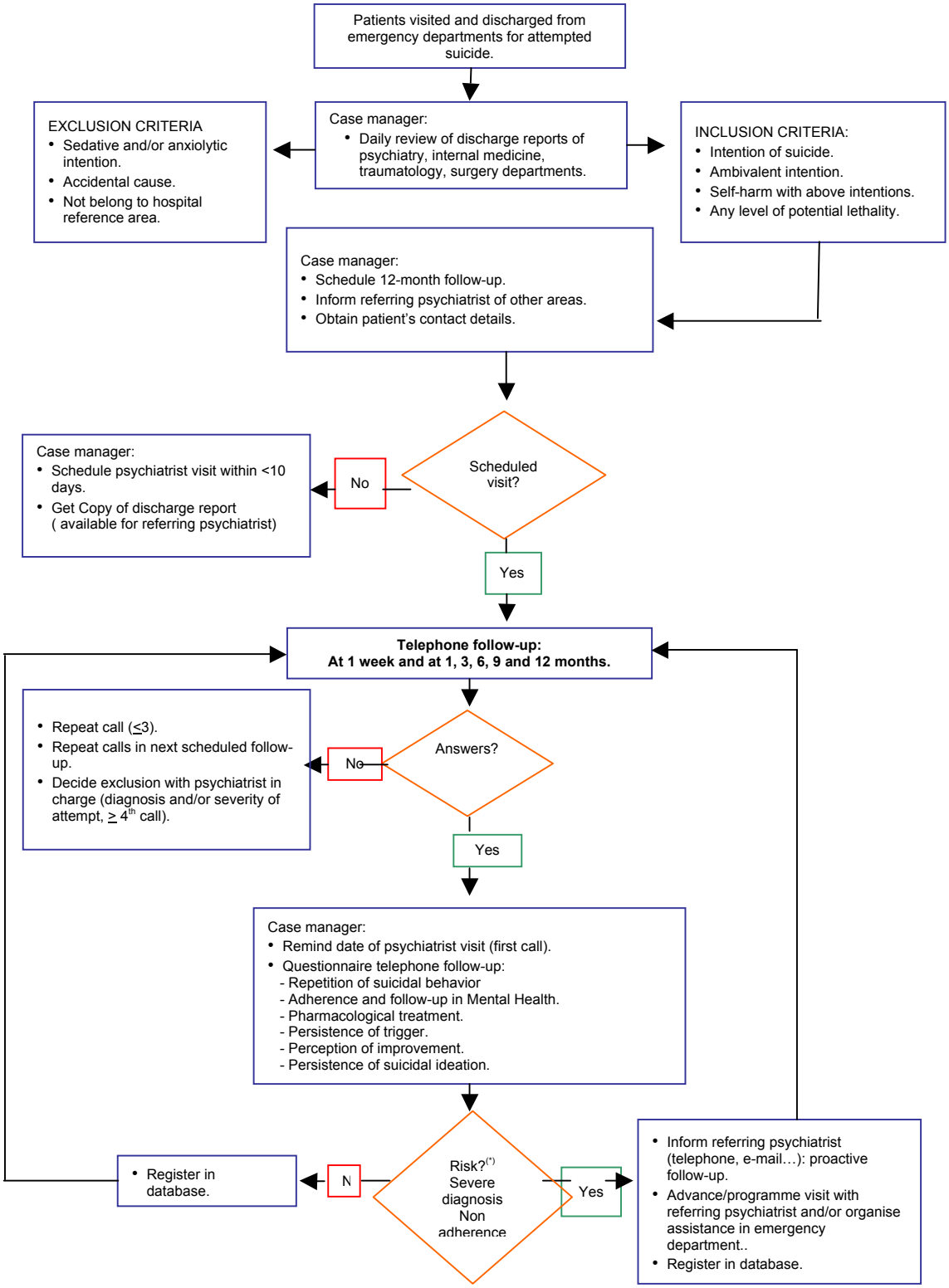
3.3 Interventions

All patients admitted for suicide attempt in both emergency departments received treatment as usual, which included medical care and evaluation of suicide risk and formulation of an initial treatment plan by a psychiatrist.

In the experimental sample of Sabadell, a protocolized intervention programme was in place since 2008. For all patients identified by the systematic review of the medical records performed

daily by the case manager, a post-discharge visit with the referring psychiatrist was scheduled within a maximum of 10 days. The intervention included verbal informed consent to allow telephone follow-up to be performed independently from diagnosis or risk level. If informed consent was not obtained in the emergency department, it was requested again during the first telephone call.

Figure 9: Algorithm of telephone management of patients with suicide attempts



The nurse responsible for the programme was specialized in mental health and had received specific training on the administration of the programme and the management of patients with high risk of suicide. Her work included: to detect all cases of attempted suicide registered daily in the medical records of the emergency departments; to provide them a post-discharge visit with the referring psychiatrist within 10 days if this was not already done in the emergency department; and, finally, to start the telephone follow-up at 1 week, 1 month and at 3, 6, 9 and 12 months.

The telephone intervention consisted of three phases: a) Initial telephone contact at one week with a duration of 15-20 minutes, including a presentation of the case manager, an explanation of the programme, the request of explicit verbal informed consent to continue the programme, and a brief interview to re-assess the present risk of suicide. The information collected included treatment, adherence to mental health services and current life stressors; b) Ordinary 5-10 minute telephone follow-up at 1, 3, 6 and 12 months, collecting the same information about the current situation of the patient and detecting whether significant changes have occurred; c) 15-45-minute intervention for situations of crisis adapted to the patient's clinical characteristics and personal circumstances. A typical call lasted 5-10 minutes. All telephone calls were made to both fixed line and mobile telephones. All telephone calls promoted the follow-up of the treatment prescribed in the emergency department and reviewed by the referring psychiatrist at post-discharge and subsequent visits. In some cases, follow-up was arranged with a primary physician according to the treatment plan established by the referring psychiatrist. When increased risk for suicide was detected, an urgent visit in the emergency department was arranged. The experimental intervention therefore included a series of measures to increase adherence to usual treatment and brief interventions in situations of crisis.

Patients under the age of 18, who constituted a very small percentage of the total cases, received a more complex and specific intervention. They had an interview at the Adolescent's Day Hospital Unit within the following 24 to 72 hours, regardless of risk factors, and received a thorough assessment by a clinical psychologist as well as a specific psychotherapeutic intervention with the family. In addition, the 12-month telephone follow-up was also performed.

In the control population, the usual procedure of most hospital emergency services was applied: a large proportion of patients considered at low risk for psychopathology were discharged and left to the care of their family and their general practitioner. Subjects at high risk were referred to the community psychiatry service, and no additional assessments were performed.

The follow-up phase covered the 5 years after the first suicide attempt (including the intervention period) during which all participants continued to receive standard care without specific intervention at the study centres. All the participants in the study initiated in 2008 (both control and intervention group) were telephoned again after 5 years by a person with clinical experience (mental health nurse or clinical psychologist). The initial telephone contact (20 minutes) consisted of a review of the programme and a brief re-evaluation of the individual's current status. The data collected included information on whether the patient had made any further suicide attempts (checked/confirmed by Hospital and Primary Care medical records); adherence to mental health services and current life stressors. In cases where patients were suffering moments of personal crisis when the call was made, a 15-45-minute intervention for situations of crisis adapted to the patient's clinical characteristics and personal circumstances

was implemented. All telephone calls promoted the follow-up of the treatment prescribed by the referring psychiatrist or General practitioner and subsequent visits. When increased risk for suicide was detected, an urgent visit in the emergency department was arranged.

Moreover, all data related to suicide attempts and suicide in the area covered by our study were checked against medical records in hospitals, primary care centres and the institute of legal and forensic medicine in the study area.

3.4 Main Outcomes Measures

The primary outcome measures were: days elapsed between the first suicide attempt and the repetition of suicidal behavior (time to recurrence) and percentage of patients who reattempted suicide in the populations studied during 2007 and 2008 (annual rate).

The term “suicide attempt” is used in this study to indicate “a non-habitual act with non-fatal outcome that the individual, expecting to or taking the risk to die or to inflict bodily harm, initiated and carried out with the purpose of bringing about wanted changes.” (8).

For the 5-year follow-up analyses, the following outcomes were evaluated:

- Number of individuals who reattempted suicide.
- Number of suicide recurrences.
- Time to recurrence.

3.5 Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 19 was used for data analysis. For the first follow-up analyses, time elapsed between the initial suicide attempt and the first reattempt was assessed for each patient during 2008. The Kaplan-Meier Method was used for the time to event analysis and patients without suicide reattempts were considered as censured data. The survival curves for both groups were compared using the Log rank test. Furthermore, the chi-square test was used to determine the effect of the intervention on the proportion of suicide reattempters with Yates' correction for continuity. The comparisons made were: a) experimental *vs* control population in 2007 and 2008; b) experimental population in 2007 *vs* 2008; c) control population in 2007 *vs* 2008. Statistical significance was set at $p < 0.05$.

For the 5-year follow-up analyses, the annual incidence rates and the incidence rate ratio of the suicide reattempts [by means of a binomial negative regression model using as offset value the Log (time of observation) and robust estimation of the variance] were estimated. Recurrence free curve analysis was performed using Kaplan-Meyer’s survival analysis and the log-rank test was used to compare curves from treated and control groups.

Chapter 4 Results

Journal Publication

Cebrià AI, Parra I, Pàmias M, et al. Effectiveness of a telephone management programme for patients discharged from an emergency department after a suicide attempt: controlled study in a Spanish population. J Affect Disord. 2013;147:269-276

Abstract

Objective: To determine the effectiveness over one year of a specific telephone management programme on patients discharged from an emergency department (ED) after a suicide attempt. We hypothesized that the programme will reduce the percentage of patients re-attempting suicide and delay the time between attempts.

Design: A multicentre, case-control, population-based study. The effect of the 1-year intervention on the main outcome measures was evaluated with respect to a 1-year baseline period and a control group.

Setting: Two hospitals with distinct catchment areas in Catalonia (Spain).

Participants: A total of 991 patients discharged from the ED of either hospital after a suicide attempt during the baseline year and the intervention year.

Intervention: The intervention was carried out on patients discharged from the ED for attempted suicide (Sabadell). It consisted of a systematic, one-year telephone follow-up programme: after 1 week, thereafter at 1, 3, 6, 9 and 12-month intervals, to assess the risk of suicide and increasing adherence to treatment. The population in the control group (Terrassa) received treatment as usual after discharge, without additional telephone management.

Main outcome measures: Time elapsed between initial suicide attempt and subsequent one, and changes in the annual rate of patients who reattempted suicide in the year of the intervention and the preceding one.

Results: The telephone management programme delayed suicide reattempts in the intervention group compared to the baseline year (mean time in days to first reattempt, year 2008=346.47, sd=4.65; mean time in days to first reattempt, year 2007=316.46, sd=7.18; P<0.0005; χ^2=16.8, df=1) and compared to the control population during the same period (mean time in days to first reattempt, treatment period= 346.47, sd=4.65; mean time in days to first reattempt, pre-treatment period =300.36, sd= 10.67; P < 0.0005; χ^2= 16.8, df=1). The intervention reduced the rate of patients who reattempted suicide in the experimental population compared to the previous year (Intervention 6% (16/296) v Baseline 14% (39/285) difference 8%, 95% confidence interval 2% to 12%) and to the control population (Intervention 6% (16/296) v Control 14% (31/218) difference 8%, -13% to -2%).

Limitations: One of the main obstacles was the difficulty to contact all patients within the established deadlines. Another limitation of our study was that patients under the age of 18 underwent an intensive intervention in the day hospital, although their number was very small (13/319 in 2008) and did not significantly influence the results. But the main limitation of our study was that it was performed within the EAAD project. This project includes a comprehensive multilevel intervention practically in the same experimental area and aimed at an early diagnosis

and treatment of depression, which is the main psychiatric disorder associated with suicide. Moreover, longer-term studies should be encouraged to determine whether such interventions really reduce suicide.

Conclusion: A telephone management programme for patients discharged from an ED after a suicide attempted would be a useful strategy in delaying further suicide attempts and in reducing the rate of reattempts, which is known as the highest risk factor for suicide completion.

In-press journal publication

*Cebrià A, Pérez-Bonaventura I, Cuijpers P, et al. Telephone management program for patients discharged from an emergency department after a suicide attempt. A 5-year follow-up study in a Spanish population. In press (authorized to be displayed in this thesis book by the publisher)**

DOI: 10.1027/02227-5910/a000331

Abstract

Objective: In a previous controlled study, the authors reported on the significant beneficial effects of a telephone intervention program for prevention of suicide attempts by patients for up to 1 year. This study reports on 5-year follow-up data. Outcomes were number of recurrences and time-to-recurrence.

Method: The intervention was carried out on patients discharged from the emergency room (ER) following attempted suicide (Sabadell). It consisted of a systematic, one-year, telephone follow-up program: after 1 week, and thereafter at 1, 3, 6, 9 and 12-month intervals to assess the risk of suicide and encourage adherence to treatment. The population in the control group (Terrassa) received treatment as usual after discharge, without additional telephone contact.

Results: The effect of reattempt prevention observed in the first year was not maintained over the long-term.

Conclusions: A telephone management program for patients discharged from an ER after attempted suicide could be considered a useful strategy in delaying further suicide attempts and reducing the rate of reattempts in the first year. However, results showed that the beneficial effects were not sustained at five-year follow-up.

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Chapter 5 Discussion

We have succeded in the implementation of a standardized intervention program in patients with a suicide attempt in our hospital. The program involved more intensive follow-up by scripted phone calls performed by a trained Mental Health nurse and subsequent psychiatrists visits, both routine or as needed. The results obtained suggest that the application of a telephone management programme to patients discharged from an emergency room for suicide attempts significantly delays further attempts.

Knowing that the risk of a subsequent suicide attempt is higher during the first 12 weeks after an initial attempt, it is to be expected that the delay in further suicide attempt is associated with a decrease of up to 6% of the total rate of patients with reattempts in one year. The rate of patients with suicide reattempts in the control population (21% in 2007, 14% in 2008) was higher to rates obtained in other studies and similar to our own hospital before the intervention. As a the number of attempts is the major risk factor for suicide completion, a long-term reduction of completed suicides is also should be expected, although it could not be attributed to a single factor (82;168).

The main difference between our programme and other telephone interventions with negative results or of lesser impact was that telephone follow-up started earlier (within a week) and was more frequent (6 calls as opposed to one or two) (165;189). It also allowed all patients attended for suicide attempts to be visited by a psychiatrist within a week (maximum 10 days) after discharge and to have a more proactive follow-up in cases with major risk (93). This, coupled with the widespread acceptance of telephone management, resulted in a participation rate of over 61.1%. Finally, this is an manageable, cost-effective and easily reproducible programme, unlike other effective programmes that are based on intensive interventions or carried out in experimental conditions (183;190). As in our study, Fleischmann *et al.* pointed out the importance of regular contact to reduce the risk of further suicide attempt and suicide completion (183). The effectiveness of such interventions may be due to the fact that telephone management allows the listener to be aware of the needs or doubts of the patient on repeated occasions and is able to regularly assess suicidal thoughts, as well as to encourage adherence to usual treatment. Furthermore, regular telephone contact allow an earlier detection of increased risk of suicide repetition and to take appropriate measures to prevent suicide completion, rather than a single telephone contact. In this line, the Vaiva *et al.* project suggests the ALGOS algorithm that includes the strategy of sending short letters to certain patients in order to improve the “connectedness” (191). However, with a single telephone call it seems unlikely that the rate of further suicide attempts can be reduced by 12% in 13 months, as obtained in their previous study (165).

An additional indirect advantage is the sensitization of all the emergency staff to assess the risk of suicide. This is of particular interest given that over 40% of patients who completed suicides received psychiatric attention for self-harm in the emergency departments during the previous year (191).

Consistent with this, the results of the five-year follow up showed that the effects of the program were not be sustained in time beyond the first year once the intervention had ended. As commented, the study was carried out on patients discharged from the ER according to

guidelines proposed by The National Strategy for Suicide Prevention. The ER was identified as an important suicide-prevention site and increasing rates of post-discharge, mental-health follow-up treatment for suicidal ER patients is listed as a national objective (192). People who have made suicide attempts are often ambivalent to treatment, do not attend treatment or terminate it prematurely. These types of telephone interventions, and better-structured collaboration between hospital and primary care professionals providing follow-up care, may improve compliance with treatment and reduce the number of suicide reattempts.

Interestingly, an innovative programme for elderly people at risk of suicide providing twice-weekly telephone support and an emergency 24-hour hotline, was shown to be an effective intervention for preventing suicide in this population. The long-term observation period of 11 years in this study is notable (185).

There are certain features that our telephone intervention shares with other studies. Firstly, the "dose" of cards/contacts received in various studies was similar over a period of 12 months. Secondly, the non-obligatory nature of the intervention increases its effectiveness. Finally, patients were offered the option of contacting the hospital treatment team. The response of participants to the invitation to "stay in touch" would suggest that most individuals are open to the offer to communicate. Follow-up arrangements on discharge provide evidence, in line with other studies, that respect for the patient and social connectedness are important parts of the intervention (185).

A strength of our study is that patients' characteristics and suicide attempts were tracked through hospital records. A further advantage is that implementation of the intervention requires little training, as opposed to the high-skilled training characteristic of more specialized psychotherapeutic treatment. Given its low cost, it can be carried out with very modest space, equipment and personnel resources. This makes it suitable for extensive application in times of economic recession such as that currently being experienced in Europe.

The study has some limitations that need to be addressed. One of the main obstacles was the difficulty in contacting all patients within the established deadlines, although only 7% of patients were excluded for lack of follow-up. Another limitation of our study was that patients under the age of 18 underwent an intensive intervention in the day hospital, although their number was very small (13/319 in 2008) and did not significantly influence the results. But the main limitation of our study was that it was performed within the EAAD project. This project includes a comprehensive multilevel intervention practically in the same experimental area and aimed at an early diagnosis and treatment of depression, which is the main psychiatric disorder associated with suicide (193;194). As pointed out by Hegerl *et al.*, general population interventions entail many factors that cannot be controlled and may affect the results obtained (168). Yet a general intervention on depression seems unlikely to have a greater impact on further attempts than a specific intervention on patients with suicide attempts such as the one presented in this study. To avoid this influence, additional studies should be carried out in other areas where the EAAD programme is not implemented. Moreover, longer-term studies should be encouraged to determine whether such interventions really reduce suicide completions or, as pointed out in other studies, follow-up should be prolonged up to two years for patients with schizophrenia, bipolar disorder or unipolar depression, or depending on the potential lethality of the method used (93;195).

Moreover, the five-years follow-up study has also some limitations. Most importantly,

generalizing results must be done with caution due to the exclusion of individuals with no available data in the electronic medical records. The scientific evidence and strength of the conclusions are not as strong as they would have been if the study had been a randomized clinical trial (RCT). Due to this design, to which we were bound, the Intention to Treat (ITT) analysis was not appropriate for a number of reasons. Firstly, because there was no randomization and secondly the possibility of crossover was very small. Finally, had we conducted an ITT, we would have had to assume, based on the information available, that those patients that were not treated at the ER or by a GP or any other mental health professional in our catchment area in this five-year period did not make a suicide attempt. This assumption may have skewed the results. As such, we opted to exclude those patients lost-to-follow up from the analysis. However, it should be borne in mind the whole reference population was included, not only a sample.

The telephone management programme demonstrated efficacy in reducing suicide reattempts in clinically unstable situations. We tried to bear risk factors in mind at all times, for instance, treating psychopathology by carrying out a re-evaluation in the mental health centre one week after being discharged from emergency department.

Risk factors were reduced during the intervention but, as the patient continued to be vulnerable, those risk factors could reappear or the patient could suffer a relapse which was only detected on readmission to emergency services following a suicide attempt. Taking this into account, an improvement which could help to maintain the effects of the intervention could be the drafting of a protocol for relapse prevention, e.g., carrying out a regular assessment of risk factors for a period following completion of the intervention. A further option would be provision of psychoeducation on early detection of relapses along with specific information on the location of centres and availability of professionals in psychological or psychiatric care to cover cases of reappearance of symptoms or emergency situations.

The fact that the programme was not effective in the long term could be due to the duration of the intervention (12 months). One possible way of maintaining benefits might be to prolong the intervention period or redesign the intervention protocol to provide a repetition of the intervention for a shorter period, for instance, delivering the intervention for six month periods with breaks of 3-6 months followed by assessment at 18 months using the same resources to determine whether effects were similar. Some authors suggest that maintaining social contacts is vital in suicide prevention (54). Contact with care providers can also contribute to reducing suicide risk as they are reminders of treatment options and help-seeking routes. In addition, this contact might help patients to feel better about treatment and improve adherence (196).

The results at five years were not under the influence of the second, modified version of the original protocol which will shortly come into effect. This involves activating resources and emergency health care followed by a preventive follow-up of greater or lesser intensity, according to the patient's status, for at least 12 months. The program's specific aims are to implement clear procedures for all health professionals involved in the detection of a case of suicide attempt, ensure a homogeneous approach to guarantee continuity of care following discharge from emergency units for those patients treated for suicidal behavior, promote and ensure proactive follow-up, and encourage links with mental health and primary care centres during the twelve months after a suicide attempt.

This protocol will be applied in distinct areas of Catalonia to allow improvements to be made in

terms of information available to those at risk and to create a wider health register covering suicide-attempt cases. This new protocol could contribute to improve outcomes by providing integrated, longitudinal follow-up of patients at risk while avoiding disconnection of patients from the care system. In addition, it will try to improve early detection of relapse risk in this patient profile by facilitating communication and coordination between the various health services providing care in this area.

Another possible early intervention would be to proceed when identifying patients with suicidal ideation that are reluctant to seek help. It has been estimated that 44% of persons with suicidal thoughts in high-income countries are not receiving treatment. The most frequently reported barriers for seeking help include attitudinal barriers and low perceived need for treatment. Other factors that may play a role in help negation include shame, fear of losing autonomy and negative attitudes towards health care providers.

The internet can play an important role by providing access to information and resources. For instance, online suicide prevention initiatives in the Netherlands have already demonstrated the effectiveness of online suicide prevention (197). However, more studies are needed to test the effectiveness of a web-based self-help program for persons with suicidal thoughts in other cultures.

Chapter 6 Conclusions

The conclusions of this thesis can be summarized as follows:

1. The intervention was effective in delaying further suicide attempts during the year of intervention.
2. The intervention was effective in reducing the rate of reattempts during the year of intervention.
3. Following the year of the intervention (up to 5 years) the time to recurrence did not differ between the intervention and control populations.
4. Following the year of the intervention (up to 5 years) the rate of reattempts did not differ between the intervention and control populations.

General Conclusion:

The intervention has shown effectiveness to delay and reduce the rate of reattemps during the interventional period (12 months). In order to increase and maintain its effects over time, improvements in the program are warranted.

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