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SUICIDE ATTEMPTS AMONG IMMIGRANTS IN EUROPE

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ABSTRACT

Introduction and Aims: Immigrants comprise about 10% of the total population of Europe, but our knowledge about their suicidal behaviour is still insufficient. This study presents an overview of suicidal behaviour of immigrants in Europe compared to host populations focusing on: (I) The frequencies of attempted suicide, compared between immigrants and their hosts, between different immigrant groups, and between immigrants and their countries of origin, (II) the variations of these frequencies across gender, (III) the recommendations of care given in medical services after the attempted suicide and (IV) the repetition patterns of attempted suicide within 12 months following the index (baseline) suicide attempt as well as the timing of the repetition.

Materials and methods: The material, with almost 30,000 persons, of which more than 4,000 immigrants, originates from the WHO/EURO Multicentre Study on Suicidal Behaviour, collected from 11 European Centres in 1989-2010. (I) Differences in person-based suicide-attempt rates (SARs) of immigrants and host groups were tested for significance. Also, completed-suicide rates of the countries of origin were compared to the SARs of the immigrant groups using rank correlations. (II) Female-to-male SAR ratios were compared between the groups. (III) The relationship between immigrant status and the type of aftercare recommended was analysed with binary logistic regression, adjusting for gender, age, the method of the attempt, and the Centre that collected the data, and, finally (IV) the relationship between immigrant status and the repetition of suicide attempt was analysed with binary logistic regression, with controls for gender, age, and the method of attempt. The timing of the repetition was controlled for gender, age, and the recommended type of aftercare.

Results: (I) 27 of 56 immigrant groups showed significantly higher SARs than their hosts. Immigrant groups also tended to show similar rates across different Centres. A positive correlation between the immigrant SAR and the country-of-origin suicide rate was found. However, Chileans, Iranians, Moroccans, and Turks displayed high SARs as immigrants despite low suicide rates in the home countries. (II) High SARs were found in non-European immigrant females compared to males. Generalized estimating equation analysis yielded a highly significant difference ($p < 0.0005$) in gender ratios of suicide attempts between hosts (ratio 1.52) and both non-European (ratio 2.32) and Russian immigrants (0.68), but not the Western immigrants. Excluding male-majority groups, the correlation between female and male SARs was relatively high among the European immigrants ($r = 0.74$, $p < 0.0005$) and lower among the non-European immigrants ($r = 0.55$, $p < 0.03$). (III) Eastern European and non-European immigrants were more often than host populations discharged without further recommendation of care. If care was offered, non-European immigrants were more likely to be recommended non-psychiatric care. The chance to be recommended inpatient care was significantly lower for non-European immigrants. Sex, age, and the method of the attempted suicide had mostly significant crude effects on the type of recommended care, but they could not explain immigrants' probability of being recommended different types of care. However, clear disparities were found in the recommendations of care between the European Centres included in the study. (IV) Lower odds to repeat attempted suicide were found in Eastern European (OR=0.50,

p<0.001) and non-European immigrants (OR=0.68, p<0.05) as compared to the hosts. Similar patterns were identified in the gender-specific analysis. Repetition also tended to decrease with age and among females, it was more likely among those using harder methods in their index attempt (OR=1.26, p<0.01). Large variations in the general repetition frequency were found between the data-collecting Centres, which influenced the results. In general, 32% of all repetition occurred within 30 days. Eastern European immigrants tended to repeat their attempt later than hosts (OR=0.58, p<0.05).

Conclusions: Suicidal behaviour is strongly related to culture but it seems also to be influenced by the immigration process itself. Immigrants tend to show a higher risk of suicidal behaviour compared to non-immigrant populations. The higher suicide-attempt rates among immigrants, and especially in non-European females, compared to the host populations, may be indicative of difficulties in acculturation processes. On the other hand, the fact that non-European and East European immigrants repeat their suicide attempts less often than both hosts and Western immigrants comes in clear contrast to their generally higher tendency to attempt suicide. It is possible that immigrants who harm themselves do so impulsively in response to stresses related to their experiences as immigrants, rather than in association with a persistent psychiatric illness or other known risk factors for suicide. In addition, clear disparities exist in the care recommendations for immigrants and hosts after a suicide attempt. This compilation of studies mapping the suicide attempts rates of immigrant groups, indicating their distinct repetition patterns, identifying specific risk groups, and showing possible inequalities in the care management of immigrants provide a contribution to the existing evidence base.

LIST OF PUBLICATIONS

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:

I. Cendrine Bursztein Lipsicas, Ilkka Henrik Mäkinen, Alan Apter, Diego De Leo, Ad Kerkhof, Jouko Lönnqvist, Konrad Michel, Ellinor Salander Renberg, Isik Sayil, Armin Schmidtke, Kees van Heeringen, Airi Värnik, Danuta Wasserman. Attempted suicide among immigrants in European countries: an international perspective. *Social Psychiatry and Psychiatric Epidemiology*. 2012, Feb; 47(2):241-51. Epub 2011 Jan 1. PubMed PMID: 21197530.

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II. Cendrine Bursztein Lipsicas, Ilkka Henrik Mäkinen, Danuta Wasserman, Alan Apter, Ad Kerkhof, Konrad Michel, Ellinor Salander Renberg, Kees van Heeringen, Airi Varnik, Armin Schmidtke. Gender distribution of suicide attempts among immigrant groups in European countries--an international perspective. *The European Journal of Public Health* 2012; doi: 10.1093/eurpub/cks029.

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III. Cendrine Bursztein Lipsicas, Ilkka Henrik Mäkinen, Danuta Wasserman, Alan Apter, Julio Bobes, Ad Kerkhof, Konrad Michel, Ellinor Salander Renberg, Kees van Heeringen, Airi Värnik, Armin Schmidtke. Immigration and recommended care after a suicide attempt in Europe: Equity or bias?(Submitted)

IV. Cendrine Bursztein Lipsicas, Ilkka Henrik Mäkinen, Danuta Wasserman, Alan Apter, Ad Kerkhof, Konrad Michel, Ellinor Salander Renberg, Kees van Heeringen, Airi Värnik, Armin Schmidtke. Repetition of attempted suicide among immigrants in Europe (Manuscript).

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LIST OF ABBREVIATIONS

CI	Confidence interval
CIT	Citizenship
COB	Country of birth
DSH	Deliberate self-harm
GP	General practitioner
ICD-10	International Classification of Diseases and Causes of Death, 10th edition
MONSUE	Monitoring Suicidal Behaviour in Europe
NSSI	Non suicidal self-injury
OR	Odds ratio, the ratio between two odds
OECD	Organization for Economic Cooperation and Development
SAR	Suicide attempt rate
WHO	World Health Organization

1 INTRODUCTION

The literature on immigration and suicidal behaviour as separate subjects is abundant and growing; however, very little research has focused on the relation of these. Yet, with the growing amount of immigrants to European countries, the impact of migration on mental health and specifically suicide is an issue of increasing societal importance that has attracted the attention of researchers and policy makers in Europe (Carta, Bernal et al. 2005).

In general, research on the relation between immigration and suicide shows mixed results. Some studies suggest that immigration is positively related to suicide, others indicate the opposite. Data on other suicidal behaviours such as ideation and attempts in this group are scarce.

The aim of this thesis is to provide better understanding of the characteristics of suicide attempts and the factors related to them among immigrant groups in European countries, which may be different from those seen among their native European hosts. Such gain in knowledge can help the development of targeted preventive and treatment interventions after attempted suicide for immigrants and ethnic minorities in Europe.

1.1 SUICIDAL BEHAVIOUR

Suicidal behaviour is described as a continuum by some researchers (Bertolote and Wasserman 2009; Hawton, Arensman et al. 1998; Pfeffer 1985), while others refer to it as a set of non-continuous and heterogeneous spectrum of behaviours (Apter, King et al. 2008; Levi, Horesh et al. 2008). The term suicide behaviour includes: suicidal ideation, suicidal threats, gestures, self-cutting, low-lethal suicide attempts, interrupted suicide attempts, near-fatal suicide attempts, and actual suicide (Bursztein and Apter 2009). When describing a deliberately initiated act of self-harm with a non-fatal outcome, it includes different acts with differing intent. Self-injurious behaviour may thus be labelled as suicide attempt, parasuicide, intentional self-harm, deliberate self-harm or non-suicidal self-injury (NSSI) (Silverman 2011). The following introduction will focus on suicide and attempted suicide, the latter being the main theme of this work.

1.1.1 Epidemiology

Suicide

Suicide is a major public health concern worldwide. Every year approximately 1 million people die from suicide, making it the 10th leading cause of death worldwide (WHO 2012), and in some countries, the leading cause of death in persons aged 15-34 years (Bertolote and Fleischmann 2009). The estimated annual suicide mortality rate is 14.5 deaths per 100,000, which corresponds to one death every 40 seconds (Bertolote and Fleischmann 2009).

Suicide rates vary greatly between the countries of the world. In general, rates are highest in Eastern Europe, i.e. in the Russian Federation, Belarus, Lithuania, and to a lesser extent, in Finland, Hungary, and Latvia. Similarly high rates are found in countries with very

different sociocultural characteristics, in Cuba, Japan, and Sri Lanka (Bertolote and Fleischmann 2009). Generally, the lowest rates are found in countries that follow Islamic traditions, including some Central Asian republics that were parts of the former Soviet Union. Low rates are also found in Central and South America. The United States, Western Europe, and some Asian countries have rates falling in the middle category (Bertolote and Fleischmann 2009; Nock, Borges et al. 2008). In Europe, variations of rates range between 2.9 and 37.0 per 100,000 (European Commission 2008).

On a global perspective, suicide rates tend to increase with age although more young than elderly persons die of suicide, with 55% of all suicides committed by people aged 5-44 (Bertolote and Fleischmann 2009).

Suicide attempts

Suicide attempts are probably 20 to 30 times more frequent than completed suicides (Wasserman 2001). In different community survey studies that have assessed lifetime prevalence among adults in individual countries, estimates for suicide attempts have varied between 0.4% and 5.1%. As for the 12-month prevalence of attempts, these varied between 0.1% and 3.8%. Estimates were consistently higher among adolescents for the lifetime prevalence of attempts, 1.5% to 12.1%, as well as for the 12-month prevalence, which varied between 1.8% and 8.4% (Nock, Borges et al. 2008).

Three international register-based studies of suicidal behaviour provide cross-national data on suicide attempt rates (SARs) and their characteristics: (I) the WHO World Mental Health Survey, which presents data on the epidemiology of suicidal behaviours in 28 countries in each of the six WHO regions (the Americas, Europe, Asia, Africa, the Middle East, and the Pacific) (Nock, Borges et al. 2008); (II) the WHO Multisite Intervention Study on Suicidal Behaviours (SUPRE-MISS) that contains community samples in eight countries across the six WHO regions (Fleischmann, Bertolote et al. 2005; Fleischmann, Bertolote et al. 2008); and (III) the WHO/EURO Multicentre Study of Suicidal Behaviour, followed by the MONSUE study (Platt, Bille-Brahe et al. 1992; Schmidtke, Bille-Brahe et al. 1996; Schmidtke, Weinacker et al. 2004; MONSUE report 2010), gathering cases treated in medical centres in the European region specifically. The latter data were analysed in the present work and will be described in detail below.

All three studies show that there exist wide cross-national variations in the frequency of suicide attempts. For example, analyses of 17 of the World Mental Health Survey countries ($n = 84,850$) found lifetime prevalence estimates for suicide attempts varying from 0.5% to 5.0 %, which is consistent with the estimates found in the community surveys described above. Substantial variations were also found in a community survey conducted between 2002 and 2004 as part of the SUPRE-MISS. That survey reported lifetime prevalence of suicide attempts ranging from 0.4% in Hanoi (Vietnam) to 4.2% in both Brisbane (Australia) and Karaj (Iran) (Bertolote, Fleischmann et al. 2005).

It should be noted that registration-based studies focusing on medically treated suicide attempters represent only a part of the problem, since all suicide attempts do not require or result in medical interventions (Windfuhr and Kapur 2011). It is estimated that the

attempted suicides not reaching health-care services add 10%-50% to the recorded number (Westman, Hasselstrom et al. 2003) (Arensman, Kerkhof et al. 1995).

Variations in rates exist even within a single WHO region such as Europe. In the WHO/EURO Multicentre Study of Suicidal Behaviour, up to nine-fold differences could be found between the various European Centres included in the study. For example, between 1995 and 1999 the highest SARs for men were found in Helsinki, Finland (327 per 100,000), and the lowest in Ankara, Turkey (35 per 100,000). In the most recent data analysis of the ten European Centres taking part in the MONSUE study between 2005 and 2009, it was found that the Eastern European countries, such as Hungary and Estonia, had the highest rates and the South European countries (Italy and Spain) the lowest (MONSUE report 2010).

These studies also show that suicide attempts are generally more common in women than men, and in younger rather than older adults. In particular, young women aged 15-24 and young men aged 25-29 have the highest rates of suicide attempts (Schmidtke, Bille-Brahe et al. 1996; Schmidtke, Weinacker et al. 2004).

1.1.2 Gender

Gender differences in both suicidal behaviour and suicide mortality are common in all cultures (Bhugra 2006). Despite the wide variability, the suicide rates are usually higher among men than women, with men more often dying from suicide at a ratio of 2:1–7.5:1 (Nock, Borges et al. 2008). Higher ratios are normally observed in the more developed, mostly European countries (with East-European showing the higher end ratios), and lower ones in developing, mostly Asian countries (Bertolote and Fleischmann 2009; Bhugra 2006). In European countries, the female-to-male suicide-attempt ratio is 1.5:1, while the male-to-female completed-suicide ratio is 2-4:1 (Canetto and Sakinofsky 1998).

Although males die more frequently from suicide in many cultures, females outnumber males in the total number of suicidal acts, because suicide attempts in females are more numerous than completed suicides. This phenomenon, the “*gender paradox of suicide*” (Canetto and Sakinofsky 1998) is a dominant, although not entirely universal pattern. For example, in India the male-to-female suicide rate ratios is less pronounced (1.3:1); in China, both fatal and non-fatal suicidal behaviour is more common among women (Canetto 2009); and in some countries in Central America and Asia, young females' suicide exceeds that of young males (Canetto 2009).

Seeking to explain this phenomenon, some studies present evidence for the argument that there is a difference in the social acceptability of completed vs. attempted suicide between the sexes, which protects women against completed suicide (Bhugra and Hicks 2004) but predisposes them to attempted suicide that is considered to be a “feminine” behaviour (Canetto 2008).

The differences in the gender ratio are often attributed to the use of more lethal suicide attempt methods, greater aggressiveness, and higher intent to die among men (Beautrais 2002; Nock and Kessler 2006). Nevertheless, the lethality of the gender-specific methods may vary cross-nationally, a fact influencing the gender ratio of completed suicide (see in

the following section on methods of suicide). Also, in some non-Western societies (e.g., China, India, and various communities of Papua New Guinea), high rates of suicide in females seem to be accompanied by a cultural belief that suicide is an act of the powerless (Canetto 2008). Hence, together with the high rates of suicide in these societies, we often also find high rates of nonfatal suicidal behaviour in women.

There are, however, also locations where males are in majority in suicide attempts. The WHO/EURO Multicentre Study of Suicidal Behaviour mentioned above found such majorities in Helsinki (Finland) and Tallinn (Estonia) (Värnik, Kupersepp et al. 2004).

1.1.3 Methods of suicide and suicide attempts

Common methods of suicide include hanging, self-poisoning, and jumping from a height, although the methods of choice vary substantially by sex and country. For example, WHO data show that hanging is the most common method among men, but self-poisoning among women (Ajdacic-Gross, Weiss et al. 2008). However, more variability in method selection can be found between countries than between genders, possibly suggesting that the availability of a method is an important determining factor in the choice of method for both male and female suicide (Windfuhr and Kapur 2011).

Different studies show that most suicide attempters use so-called soft poisoning that includes intoxication with different kinds of medications such as anticonvulsants, antidepressants, benzodiazepines etc. (in ICD-10, the methods coded X60-X65) (Duffy 2009; Kapur and Gask 2009; MONSUE report 2010). Generally, there are international differences in the type of substances used (Windfuhr and Kapur 2011) and these differences in self-poisoning reflect the ease of access and the prevailing prescription patterns. For example, in the United Kingdom, paracetamol ingestion is one of the most common means of attempts (Kapur and Gask 2009) while in developing countries and in rural areas agro-chemicals are most common (Eddleston 2000). The use of highly lethal agro-chemicals such as organophosphates in suicide attempts in developing countries accounts for the majority of fatalities there (Sri Lanka, Thailand, Taiwan) (Eddleston, 2000). Thus, the choice of method (influenced by its availability) influences the lethality of the attempt.

Hard methods (cutting, jumping, and hanging) are more frequently used by males than by females (Nock, Borges et al. 2008; MONSUE report 2010). Self-injury, the most common method used by adolescents, may include non-suicidal self-injury (NSSI), which is sometimes difficult to differentiate from suicide attempts. There is a significant overlap between NSSI and suicide attempts in adolescents (Nock, Joiner et al. 2006). Both NSSI and suicide attempt involve deliberate injury to the body, but they are differentiated by the presence or absence of suicidal intent (Andover, Morris et al. 2012), which may be difficult to determine (Silverman 2011).

1.1.4 Risk factors for suicidal behaviour

Of the many risk factors associated with suicide, attempted suicide is considered as one of the strongest and the most universal of all known predictors for completed suicide (Hawton

and van Heeringen 2009; Miranda, Scott et al. 2008; Windfuhr and Kapur 2011). Based on hospital-admitted or -treated populations, individuals who have attempted suicide have a 30 to 200-fold greater risk of suicide in the year following the episode, compared to those who have not attempted suicide (Cooper, Kapur et al. 2005; Owens, Horrocks et al. 2002). Those who repeat attempted suicide are at even greater risk to die by suicide compared to those who have attempted only once (Miranda, Scott et al. 2008; Zahl and Hawton 2004) (see further details in the next section).

There is substantial overlap in the risk factors predicting suicide and attempted suicide (Beautrais 2003; Nock and Kessler 2006), although some studies have reported differences in them (Brent, Perper et al. 1993; Horesh, Levi et al. 2012). Most risk factors reported have been observed across many countries. Described below are the main demographic, social, and cultural risk factors, as well as psychiatric, psychological and biological factors.

Demographic and socio-economic risk factors. Main demographic risk factors for suicide include male sex, being an adolescent or older adult (Nock, Borges et al. 2008), while the risk factors for suicide attempts entail being female, younger, single, divorced or widowed, having lower educational attainment, and being unemployed (Bertolote, Fleischmann et al. 2005; Madge, Hewitt et al. 2008; MONSUE report 2010; Nock, Borges et al. 2008). Apart from gender, the other demographic factors mentioned may represent increased risk associated with social disadvantage, although the mechanisms through which these factors may lead to suicidal behaviour are not yet understood (Nock, Borges et al. 2008).

Cultural risk factors. Suicide can be understood as a form of behaviour susceptible to cultural influences. This can be seen most clearly in the culturally specific types of suicide such as the traditional Indian *sati* (self-immolation) and Japanese *seppuku* (stomach-cutting/ disembowelment) (Mäkinen 2009). However, other more universal findings point to the possibility that culture may be a much more influential factor on suicide than previously thought. Such findings include the difficulty to identify stable socio-structural correlates to the varying suicide rates between societies, and the sometimes century-long continuities in the patterns of suicide rates internationally, within countries, and within groups of people (Mäkinen 1997; Mäkinen 2009).

Epidemiological studies show that indigenous populations around the world (i.e. Alaska Natives, Pacific Islanders, and Native Americans) have higher rates of suicide than non-indigenous (Alcantara and Gone 2007; Else, Andrade et al. 2007). Also, some ethnic minorities show distinct patterns of suicidal behaviours. In the United States rates of suicide among African Americans were historically lower than White Americans of European origins, but these have been rising since the 1980s, contributing to a convergence of rates (Utsey, Hook et al. 2007). In England and Wales, it has been shown that South Asian males have lower suicide rates compared to White males, while South Asian women have slightly elevated suicide rates compared to their white counterparts (McKenzie, Bhui et al. 2008).

It has been proposed that religion, spirituality, greater familial and social ties, as well as collectivist and communitarian ideals promoted by many religious belief systems may contribute to the lower suicide rates in various ethnic groups (Leong, Leach et al. 2007;

Utsey, Hook et al. 2007). However, factors associated with risk of suicide, such as stigma of mental health problems and less contact with mental health services (Lindert, Schouler-Ocak et al. 2008), as well as substance misuse, are thought to affect some ethnic groups and contribute to higher suicide rates (Windfuhr and Kapur 2011).

Psychiatric factors: Psychiatric disorders are among the most consistently reported risk factors for suicidal behaviour (Kessler, Borges et al. 1999; Nock, Borges et al. 2008; Borges, Nock et al. 2010), especially in Western countries. Psychological autopsy studies show that 90–95% of the people who die from suicide have a diagnosable psychiatric disorder at the time of their suicide (Cavanagh, Carson et al. 2003), although this percentage is lower in non-Western countries such as China and India (Phillips, Yang et al. 2002; Vijayakumar 2005). Mood, impulse-control, alcohol/substance-use, psychotic, and personality disorders convey the highest psychiatric risks for both suicide and suicidal behaviour (Mann, Waternaux et al. 1999; Nock, Hwang et al. 2009; Nock and Kessler 2006; Vijayakumar and Rajkumar 1999), and comorbidity is associated with especially elevated risk (Nock, Hwang et al. 2009). Older suicide attempters tend to be diagnosed as suffering from affective disorders while the younger ones are more frequently diagnosed as having adjustment disorders (MONSUE report 2010).

Psychological factors: Researchers try to understand the more specific constructs that may explain exactly *why* psychiatric disorders are associated with suicidal behaviour. Psychological risk factors include the presence of hopelessness (Beck, Steer et al. 1985; Brown, Beck et al. 2000; Brezo, Paris et al. 2006), anhedonia (Nock and Kazdin 2002), impulsiveness (Fawcett 2001; Mann, Waternaux et al. 1999; Zouk, Tousignant et al. 2006), and high emotional reactivity (Dour, Cha et al. 2011; Nock, Wedig et al. 2008), each of which may increase psychological distress to a point that leads a person to seek escape via suicide (Fawcett, Busch et al. 1997; Rasmussen, Fraser et al. 2010).

Biological factors: Family-genetic studies have an important role in suicidology. Suicidal behaviour is highly heritable. Twin and adoption studies have shown that both completed and attempted suicide form part of a clinical phenotype that is transmitted in families. Thus, suicide attempt rates are elevated in the families of suicide completers and suicide rates are elevated in family members of attempters (Brent and Melhem 2008). This is so even after adjusting for the presence of psychiatric disorders in the proband and family, indicating that suicide is inherited distinctively from the psychiatric illness (Brent and Mann 2005). It is possible that impulsive aggression is the basic psychological dimension which is passed on (Bursztein and Apter 2009). Researchers have identified some genetic loci for suicide in molecular genetic studies (Wasserman, Sokolowski et al. 2009). Biological correlates of suicidal behaviour may arise through gene-environment interactions (Caspi, Sugden et al. 2003; Currier and Mann 2008; Wasserman, Sokolowski et al. 2008; Ben-Efraim, Wasserman et al. 2011).

Stressful life events: Most theoretical models of suicidal behaviour propose a diathesis-stress model in which the psychiatric, psychological, and biological factors predispose a person to suicidal behaviour, while stressful life events interact with such factors to increase risk (Wasserman 2001). Consistent with such a model, suicidal behaviours often are preceded by stressful events, including family and romantic conflicts and the presence of legal or disciplinary problems (Brent, Perper et al. 1993; Phillips, Yang et al. 2002; Vijayakumar and Rajkumar 1999; Yen, Pagano et al. 2005). More distal stressors, such as

perinatal conditions and childhood trauma, including child abuse, have also been linked to subsequent suicidal behaviour (Bursztein and Apter 2009; Joiner, Sachs-Ericsson et al. 2007; Riordan, Selvaraj et al. 2006).

There is evidence for a range of other risk factors, including access to lethal means such as firearms and high doses of medication (Agerbo, Gunnell et al. 2007; Mann, Apter et al. 2005), chronic or terminal illness (Stenager and Stenager 2009), homosexuality (de Graaf, Sandfort et al. 2006; Marshal, Dietz et al. 2011), the presence of suicidal behaviour among one's peers (Burke, Galfalvy et al. 2010; Gould 2001; Joiner 2003), being exposed to bullying (Brunstein Klomek, Sourander et al. 2010; Klomek, Sourander et al. 2009), and more.

1.1.5 Repetition of suicide attempts

A history of one or more suicide attempts increases the likelihood of both further attempts (Miranda, Scott et al. 2008) and completed suicide (Hawton, Arensman et al. 1998; Zahl and Hawton 2004). Within 5-35 years of follow-up, studies show that about 10% of those who have attempted suicide will commit suicide (Skegg 2005).

Also, approximately half of all individuals presenting to hospital following an attempt (self-poisoning or self-injury) have a history of previous self-harm (MONSUE report 2010; Schmidtke, Bille-Brahe et al. 1996), with 7-35% of patients engaging in a further episode within the next 12 months (Arensman, Corcoran et al. 2011; Owens, Horrocks et al. 2002).

The risk of repetition is found to be highest immediately after discharge from the hospital, with one in three suicidal patients repeating the attempted suicide within 30 days (Kapur, Cooper et al. 2006). Also, half of all repeated events occur in the first three months and almost two thirds (64%) within the first six months (Perry, Corcoran et al. 2012).

Higher rates of repetition have been found among individuals who presented with self-cutting (Cooper, Kapur et al. 2005; Kapur, Cooper et al. 2006; Lilley, Owens et al. 2008; Perry, Corcoran et al. 2012), while among those who used more lethal methods such as hanging, drowning and poisoning by chemical substances, the repetition rates were lower (Perry, Corcoran et al. 2012). On the other hand, other studies have found that the use of more violent methods in previous suicide attempts increased the risk of repetition (Hultén, Jiang et al. 2001; Kapur, Cooper et al. 2006; Schmidtke, Bille-Brahe et al. 1996).

The risk factors found to be associated with repetition of suicidal behaviour are of varying nature, including demographic (female sex, younger age, being single), socio-economic (unemployment, low level of education/skills), and psychological (hopelessness, hostility, impulsivity) factors, substance misuse, previous suicide attempts, and psychiatric symptoms and history (Kapur, Cooper et al. 2006; Scoliers, Portzky et al. 2009). The risk factors for repetition are mostly similar to those of other suicidal behaviour and in clinical assessment they tend to have poor discriminative predictive value (Kapur and Gask 2009).

Due to the largely overlapping risk factors described above, it is not yet clear whether repeaters can be considered as a specific subpopulation among suicide attempters, or even as multiple subpopulations, as there may also be differences between one-time repeaters and multiple repeaters (Haw, Bergen et al. 2007).

1.1.6 Care recommendations after suicide attempt

The aftercare of persons who have attempted suicide has been found to be of importance in the prevention of further suicidal behaviour (Mann, Apter et al. 2005). Up until recently no clear procedures for care after suicide attempt in hospital emergency settings existed in Europe. This situation has now been remedied with the recent publishing of guidelines on the care of suicidal patients by the European Psychiatric Association (Wasserman, Rihmer et al. 2012).

Clinical characteristics of a suicidal patient largely determine the type of recommended care, given the health-care facilities available. A few studies on the determinants of referral of suicide attempters in emergency settings to psychiatric consultation in Helsinki, Finland, show that older age, psychotic disorder, mood disorder, lack of alcohol consumption preceding the attempt, somatic illness, suicide attempt on a weekday, previous psychiatric treatment, psychiatric consultation, and the hospital treated the suicide attempt were the main predictors of the type of care recommended (Suominen and Lonnqvist 2006; Suominen, Isometsa et al. 2004). Males making non-violent attempts and suicide attempters with no previously recognised major mental disorder were usually less likely to receive treatment after the attempt (Suominen, Isometsa et al. 2002).

In a study conducted in Madrid, Spain, factors similar to the above-mentioned, as well as the use of a lethal method, were found to be predictive of psychiatric hospitalization (Miret, Nuevo et al. 2011). A study of young (15-19 yrs.) suicide attempters in Europe showed that previous attempts and the use of "hard" methods (i.e. other than self-poisoning) were significantly associated with being recommended some form of aftercare, compared to not being recommended any (Hultén, Wasserman et al. 2000).

Apart from the clinical characteristics, a study on the WHO/EURO monitoring study (used also in the current work), showed a lack of uniformity with regards to care recommendations for young people after a suicide attempt. The differences between Centres, especially regarding gender and previous suicide attempts, may thus be attributed to differing cultural traditions of care (Hultén, Wasserman et al. 2000).

1.2 IMMIGRATION

Since the mid-1990's, the number of immigrants to European and other Western countries has grown dramatically, reflecting the political and economic instability of their home countries (Kosic 2004). To that is added an increasing migration between the EU countries. The estimated number of international migrants in Europe in 2009 was almost 70 million, representing approximately 9.5% of the entire European population (UN, 2009). These figures include people moving for a variety of reasons - travelling for studies, seeking better employment, or fleeing from political and religious persecution.

The process of migration is extremely heterogeneous and not all migrants are likely to face similar experiences before or after migration (Bhugra 2004). For some, resettling in the new country will be a smooth process. For others, it will be the most radical experience of their life, and can rightly be considered as a crisis situation for the individual. In their new country, the immigrants often have to adapt to new norms, values, and lifestyles that are sometimes very distant from those prevailing in their culture of origin. They may be faced with radical changes in social roles, their own social status included. They need to cope with two cultures and may suffer from social marginalization (Bhugra 2005). They may also be exposed to prejudice and discrimination by the host population (Shoval, Schoen et al. 2007). Children and adolescents may also have to cope with the stress of assimilating into the host country's culture on the one hand, while seeking to remain loyal to their original ethnic culture on the other. This often constitutes a source of family conflict (Pumariega, Rothe et al. 2005). Even pre-migratory circumstances, such as the reasons for and motivation to migration, and pre-migration trauma such as perilous travel or coming from a country at war may influence the course and the mental outcomes of the migration process (Bursztein Lipsicas and Mäkinen 2010).

1.3 SUICIDAL BEHAVIOUR AND IMMIGRATION

1.3.1 Suicide among immigrants

Immigration has been linked to psychological distress, mental disorders, as well as to suicidal behaviour (Hjern and Allebeck 2002; Mäkinen and Wasserman 2003; Carta, Bernal et al. 2005; Mirsky, Kohn et al. 2008; Mirsky, Kohn et al. 2011). Unemployment, unmarried status, poor social integration, and experiences of xenophobia, amongst others, have been identified as risk factors for poor mental health and suicidality among immigrants (Kposowa, McElvain et al. 2008; Mirsky, Kohn et al. 2011; Tinghog, Hemmingsson et al. 2007).

The relationship between immigration and suicide has been studied in various societies (Burvill, Woodings et al. 1982; Kliwer and Ward 1988; Merrill and Owens 1988; Sainsbury and Barraclough 1968; Sorenson and Golding 1988; Whitlock 1971). However, comparisons of immigrants' suicide rates to those of the native populations have produced divergent results (Shoval, Schoen et al. 2007). Some large surveys, including immigrants from various countries, have reported that suicide rates in the general immigrant population are substantially lower than among those born in the country (Greenfield, Rousseau et al. 2006; Singh and Hiatt 2006).

However, the aggregated figures can hide major variations in suicide rates between different immigrant groups. A Swedish study (Westman, Sundquist et al. 2006), using a cohort of 4.5 million individuals living in Sweden and followed during six years, found that suicide rates varied greatly according to one's country of birth: among men, only those born in Finland had a significantly higher risk of suicide compared to Swedish men (age-adjusted suicide rate of 64.1 versus 34.2 per 100,000), while those born in Southern Europe (age-adjusted suicide rate of 23.7 per 100,000), the Middle East (20.2) and in other non-

European countries (21.4) had substantially lower risk of suicide. Among women, the highest risk of suicide was found among those from Poland (29.4 per 100,000), Finland (23.4), and Eastern Europe (20.2), while the lowest risk was found among women from the Middle East (4.1). These findings stress the importance of treating the immigrant population as heterogeneous: each immigrant group has its own suicide epidemiology (Shoval, Schoen et al. 2007).

Other studies report divergent rates of suicide also within immigrant groups of common area of origin: Soni Raleigh (1996) compared the rates of different foreign-born groups to UK-born groups (all were British citizens) and found significantly lower suicide rates among men born in Bangladesh, Sri Lanka, and Pakistan, regardless of age. On the other hand, the rates were higher among young men (and all women) born in India. A review of studies (Patel and Gaw 1996) on suicide among immigrants from the Indian subcontinent (India, Pakistan, Bangladesh, and Sri Lanka) to Great Britain, South Africa, Fiji, Singapore, and Malaysia found consistently higher suicide rates among young female immigrants when compared to young women in the indigenous populations of the countries to which they immigrated (Haynes 1984; Soni Raleigh and Balarajan 1992). The authors also described a disproportionately high number of Hindu immigrants who committed suicide, when compared to Muslim immigrants from the Indian subcontinent (Haynes 1984; Soni Raleigh, Bulusu et al. 1990).

One possible reason for the differences in suicide patterns between the different immigrant groups is their varying religious and cultural background. As mentioned earlier, cultural factors have important influence on the prevalence and characteristics of suicidal behaviour, and may explain something of the tenacity that seems to characterize it at a collective level (Mäkinen 1997). Others point to possible influences of genetic factors on this relation (Voracek and Loibl 2008). Generally, it has been reported that immigrants from nations with low suicide rates (e.g., Arab countries, many Mediterranean and South American countries) tend to maintain the low suicide rates in their new country, while those from nations with higher suicide rates (e.g., Eastern and Northern Europe) also tend to keep their high rates even in their new countries (Burvill 1998; Morrell, Taylor et al. 1999).

However, other studies comparing suicide rates of various immigrant groups with the corresponding rates in their countries of origin have shown that immigrants also have somewhat higher suicide rates in their new environment (Merrill and Owens 1988; Sainsbury and Barraclough 1968; Whitlock 1971). A middle position between the cultural and environmental influences is taken by studies, where the immigrants' suicide rates have been found to tend to converge over time with those of the host country (Kliewer and Ward 1988; Sorenson and Golding 1988). However, this has not been confirmed by all (Burvill, Woodings et al. 1982; Mäkinen and Wasserman 2003).

At the individual level, it has also been suggested that some of the immigrants who exhibit suicidal behaviour in the new country had suicidal tendencies, some degree of depression, or certain maladaptive personality traits in their country of origin, which may in turn be

related to a general susceptibility manifesting itself at times of severe distress (Sher 2010), e.g., the immigration process itself.

Summing up, people from different locations, all with their own cultural and individual psychosocial background and suicide characteristics, immigrate for different reasons to various countries, which in turn receive them in different ways. The existing evidence suggests that when compared to the host population, the suicide rates among immigrants seem to depend on their countries of origin, but also on their individual and group-wise acculturation processes.

1.3.2 Suicide attempts among immigrants

In contrast to the more extensive research conducted on immigration and suicide, few studies have focused on *suicide attempts* among immigrants, even though attempted suicide is a serious public-health problem on its own right.

Of the few studies on suicide attempts in immigrants conducted in Europe, one focused on Swedes and foreign-born persons in Sweden in general (Bayard-Burfield, Sundquist et al. 1999), investigating suicide-attempt-related admissions to the Lund University Hospital in Southern Sweden between 1991 and 1994. It was found that the foreign-born had a higher risk of attempted suicide than the Swedes, even after adjusting for the different age and sex distributions. Two studies on suicide attempts among immigrants in the United Kingdom, however, found lesser risk of suicide attempts for them than for the host population (Burke 1978; Neeleman, Jones et al. 1996).

As to specific groups, Wasserman et al. (1994) reported that Finnish citizens in Sweden have exceptionally high suicide attempt rates when compared with Finns living in Finland. In 1989, the suicide-attempt rates in Helsinki were 329 per 100,000 men and 236 for 100,000 women, compared to 576 and 573 for Finnish men and women living in Stockholm (Wasserman, Fellman et al. 1994).

More information on attempted suicide in foreign-born groups in Sweden comes from the large cohort study (Westman, Hasselstrom et al. 2003; Westman, Sundquist et al. 2006) mentioned earlier. This study included data on all individuals in the Swedish Population Register aged 25 to 64 years at the baseline in 1993, tracked until the end of 1998. Labour migrants from Finland and other OECD countries, as well as refugees from Poland and Iran had higher hazard ratios of attempted suicide than the Swedish-born subjects, even after taking into account differences in socio-economic status (Westman, Hasselstrom et al. 2003). Women born in Latin America, Asia, and Eastern Europe had significantly higher hazards of attempted suicide than Swedish-born women, almost a double risk. In contrast, men born in Southern Europe and Asia had significantly lower hazards of attempted suicide, about half of that of Swedish men (Westman, Hasselstrom et al. 2003).

Another study from Denmark showed an overrepresentation of immigrants among 580 patients admitted with Paracetamol poisoning to a specialized hepatology department over a five-year period. A significant overrepresentation of immigrants from Turkey, Iran, Pakistan, and Lebanon was found (Schmidt and Dalhoff 2001).

Only one general, cross-European study on suicide attempts among immigrants has been conducted so far (Devrimci-Özguven, Sayil et al. 2004). The study was based on the WHO/EURO Multicentre Study on Suicidal Behaviour (Platt, Bille-Brahe et al. 1992; Schmidtke, Bille-Brahe et al. 1996), and its conclusions pointed to the fact that immigrants in the European area tended to have a rather high frequency of suicide attempts compared to the native-born. Yet, the authors could not calculate rates of suicide attempts due to lack of data on the number of immigrants in the various geographical areas under study (Devrimci-Özguven, Sayil et al. 2004).

In conclusion, the studies above highlight the fact that the risk of attempted suicide among immigrants varies considerably depending on their ethnic background. Nevertheless, due to a lack of an international comparative overview they provide us only with a partial picture of suicidality in immigrants living in Europe.

1.3.3 Gender and attempted suicide among immigrants

Studies comparing the gender distribution of suicide (or attempts) among immigrants to the one in their countries of origin are missing, although gender distribution has been a topic in several previous studies on immigrant suicide (Bhugra, Desai et al. 1999; Bhui, McKenzie et al. 2007; Burger, van Hemert et al. 2009; Handy, Chithiramohan et al. 1991 Merrill and Owens 1986; van Bergen, Smit et al. 2008). Research in specific locations in Europe and elsewhere in Western countries has found higher rates of suicide attempts in female immigrants compared to non-immigrants, and especially in young women arriving from culturally more traditional into more individualistic societies (Bhui, McKenzie et al. 2007; Bursztein Lipsicas and Mäkinen 2010).

One possible explanation to the high frequencies of suicide attempts among immigrant women is related to their conflicts with their families due to their less traditional views compared to their families (Bhugra 2002). These differences may relate to their cultural identity and more "modern" opinions (acceptance of interracial relationships, sex before marriage etc.) During the time young women from immigrant families are forming their identity they are faced with the stress of assimilating into the host country's culture on the one hand while remaining loyal to their original ethnic culture on the other. Hence, when the individuation process starts they are urged to comply with parental and familial pressures, while also wishing to be part of the mainstream modern society in which they live. Some have interpreted their acts of self-harm as an opportunity for a "time-out" from these stressors (Bhugra 2004; Thompson and Bhugra 2000).

Westman and colleagues' studies mentioned above (Westman, Hasselstrom et al. 2003; Westman, Sundquist et al. 2006) indicate that suicide attempts do not occur only among younger women from traditional societies. Thus, men from Finland and other OECD countries, Iranian and Polish men, had higher hazard ratios of attempted suicide than Swedish-born men, while Asian and Southern European men had hazard ratios about half of those of the Swedes (Westman, Sundquist et al. 2006).

In some of the studied immigrant groups, not only do the females show a higher prevalence of suicidal behaviour than the non-immigrant females, but the gap between females and

males within the group is also much larger than among the non-immigrants. For example, the SAR in female South Asians in the UK is seven times higher than that of males in the same group (Sharma and Bhugra 2009). The SAR of the Turkish female immigrants in the Netherlands is more than three times larger than that of the Turkish males, while the difference between in-born Dutch females and males is far smaller (Burger, van Hemert et al. 2009).

2 STUDY AIMS

The purpose of the current study is to investigate suicide attempts among immigrants in Europe compared to their hosts.

Study I investigates the general occurrence of suicide attempts in immigrant groups in Europe including: suicide attempt rates (SARs) in these populations, possible differences in SARs between various immigrant and host groups, and whether any covariation exists in the levels of suicidality between immigrants and their countries of origin.

Study II investigates the occurrence of suicide attempts among immigrants in Europe by gender, including possible differences in SAR gender distribution between immigrants and hosts, and between immigrants from different countries. The study also investigates whether the gender patterns of suicidal behaviour among immigrants relate to those in their country of origin.

Study III analyses the possible differences in the recommendations of care given by medical personnel at first contact after an attempted suicide to immigrants and hosts, and whether such differences are influenced by cultural distance between the hosts and the immigrants.

Study IV investigates suicide attempt repetition patterns of immigrants compared to the European host populations. Specifically, the study compares the general tendency to repeat suicide attempts within a period of 12-months from the index attempt. The study also investigates whether there are differences in the timing of the repetition within the 12-month period after the index attempt between immigrants and hosts.

3 MATERIALS AND METHODS

3.1 DESIGN OVERVIEW

Table 1 provides an overview of the four studies included in this thesis.

3.2 DATA SOURCES

Suicide attempts

The data on suicide attempts in European countries were obtained from the WHO/EURO Multicentre Study on Suicidal Behaviour, initiated in 1988, and the ensuing MONSUE (Monitoring Suicidal Behaviour in Europe) project that ended in 2010. The master file contains data from 28 participating Centres in 20 countries (Ankara, Turkey; Bern, Switzerland; Bordeaux and Rennes, France; Brussels and Gent, Belgium; Dobrich, Bulgaria; Emilia and Padua, Italy; Guipuzcoa and Oviedo, Spain; Helsinki, Finland; Holon, Israel; Innsbruck, Austria; Leiden, The Netherlands; Leipzig and Wurzburg, Germany; Ljubljana and Maribor, Slovenia; Odense, Denmark; Odessa, Ukraine; Oxford, UK; Pecs and Szeged, Hungary; Sör-Trøndelag, Norway; Stockholm and Umeå, Sweden; Tallinn, Estonia) that have participated in the study. The catchment areas of the Centres involved comprise together nearly 6,000,000 persons (age 15 and over), having on the average approximately 250,000 inhabitants, and ranging in size from 110,000 in Guipuzcoa to more than a million in Odessa.

All Centres collected data on all suicide attempts that came in contact with any institution in the catchment area health-care system (including hospitals, counselling services, GPs, prisons, crisis centres, etc.) Each Centre was required to provide standardized information about the individual cases on the basis of a monitoring form that has been translated, back-translated, culturally adapted, and pilot-tested at each site (Schmidtke, Weinacker et al. 2004). The form included a whole range of demographic, psychological, and socio-economic variables, detailed information on the method(s) of attempted suicide, its location, and other circumstances. Key persons from each site involved in the project were trained in collecting information according to the monitoring questionnaire. The participating Centres used a common definition of attempted suicide (see below), common methods of sampling, and a similar, standardized methodology of interviewing (Schmidtke, Weinacker et al. 2004).

Population

For the purpose of calculation of suicide attempt rates, data on the catchment area population for each Centre were collected from regional population databases for the relevant years and population groups (total population, specific immigrant groups by country of birth and/or citizenship, the native-born and/or those with native citizenship), and for study II also by gender.

Completed suicide

The annual rates of completed suicide were available from the WHO Annual World Statistics database (WHO, 2008).

3.3 DEFINITIONS

Attempted suicide

Based on the WHO definition, the WHO/EURO Multicentre Study on Suicidal Behaviour defined an attempted suicide as *an act with non-fatal outcome, in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at realizing changes that the person desires via the actual or expected physical consequences* (Platt, Bille-Brahe et al. 1992; Schmidtke, Weinacker et al. 2004). The studies here are based on materials collected by using this definition.

Immigrant status

Immigrant refers to a person entering a new country with the purpose of resettlement (IOM, 2004). For the purposes of the present studies, an "immigrant" was a person who, when asked about her/his country of birth and citizenship gave an answer indicating another country than the actual location of the interview. The monitoring form included a direct question on both these items, and the collecting Centres used one or both of these variables.

3.4 VARIABLES AND MISSING DATA

Immigrant groupings

For the purposes of the present work, and due to the small number of immigrants from single countries, the immigrants in studies II-IV were divided into larger groups according to their general area of origin, with the purpose of forming groups with more or less similar degree of cultural distance to the mostly Western European host groups. The group of "hosts" was defined as including persons who had the local citizenship *and* were born in the country in which they attempted suicide. In study II one of the larger immigrant groupings included all European and US immigrants, a second grouping the Russian immigrants, and a third grouping the non-European immigrants. In studies III and IV the three immigrant groupings were West European and US immigrants, Eastern European immigrants (which included a majority of Russians and some immigrants from other East European countries), and non-European immigrants.

This division is based on research that has shown that immigrants cannot be considered as a homogeneous group with regard to suicidal behaviour (Shoval, Schoen et al. 2007). They very often differ on the basis of their origin (see further discussion in methodological discussion of results).

Study I-II

Study I analysed the SARs (suicide attempt rates) in the immigrant groups and their hosts as well as completed suicide rates in countries of origin. Study II analysed SARs by gender.

Attempted suicide

In a few of the Centres where it was not possible to collect data from all institutions in the health-care system (Ghent, Wurzburg), or for entire years (Helsinki), specific estimation factors had been computed annually in relation to the size of the sample of reporting institutions, the catchment area, and the time periods covered during the year (Schmidtke, Weinacker et al. 2004). These were even used by the current studies where appropriate.

Population

For most catchment areas, population data at regional statistics offices were available by either country of birth or citizenship. The analyses could only be based on the variable available. Linear-development estimates of the group sizes were employed when population data were not available for all years for most Centres included in the analysis (except for Ankara, Turkey; Ghent, Belgium; Umeå, Sweden which had population data available for all years). In some cases the numbers had to be estimated based on other data sources (for example, national data in Wurzburg or partial catchment area data for Greek and Norwegian immigrants in Stockholm).

Annual gender-divided immigrant population data for the catchment areas were needed for study II. They were based on the same population data as in study I (see above). Gender-divided data were not fully available from all statistical offices at the different Centres. The proportions of males and females in the immigrant groups were in some cases estimated either from a limited sample (e.g., data on specific years applied to all years in Leiden) or based on other data sources (national data on the sex distribution in specific groups in Umea and Stockholm Centres as well as in Leiden).

Immigrant status

In study I and II the immigrants were studied group-wise at the different Centres. In study II, the immigrant groups were also divided into three larger groups based on their general region of origin: European and US immigrants (Finland, the countries of the former Yugoslavia, Germany, Greece, Italy, Norway, Poland, Portugal, Romania, Spain, USA); non-European immigrants (Chile, Curacao, Egypt, Indonesia, Iraq, Iran, Libya, Morocco, Sri Lanka, Suriname, Turkey); and Russian immigrants.

Completed suicide

For the countries with no data available from the WHO Annual World Statistics database (WHO 2008) (Curacao, Ethiopia, Ex-Yugoslavia, Iraq, Libya, and Morocco), the rates were taken from other sources (articles and local databases).

Study III

The study analysed the association of immigration (and specifically the immigrants' region of origin) with recommended care, adjusting for relevant background factors including gender, age, and the method used in the suicide attempt, as well as the location of care.

Recommended care after a suicide attempt

The dependent variable in this study, the recommended aftercare, was classified into four categories: (1) no recommended aftercare, (2) non-psychiatric aftercare (emergency department treatment, general practitioner, or medical/somatic inpatient/outpatient care), (3) psychiatric or psychotherapeutic outpatient aftercare and/or counselling services, and (4) psychiatric or psychotherapeutic inpatient aftercare. Data on recommended care were missing in 21% of the cases.

Immigrant status

In addition to analysing immigrants as a whole, the immigrant group was divided by region of origin into three major categories: West European and US immigrants (n=543; 11 countries of origin), East European immigrants (n=1702; 18 countries of origin), and non-European immigrants (n=695; 64 countries of origin). These were compared to the (European) host group (n=8865).

The information was unavailable in 8.1% of the cases.

Suicide attempt method

The variable describing the method used in the suicide attempt was divided into two categories, based on the ICD-10 coding. Methods X60-X69 are those that may be designated as “soft”, including self-poisoning with medication, illegal drugs, or other substances. Methods X70-X84 refer to the violent (“hard”) methods, including hanging, jumping, cutting by sharp objects, drowning etc. (Held, Hawellek et al. 1998; Hultén, Wasserman et al. 2000). The missing values for method amounted to 0.4%.

Location of care (Centre)

The Centre in which the suicide attempt was registered was also included as an independent variable. The distributions of the types of recommended after care in the collecting Centres were different. Based on a principal-component analysis, the Centres were divided in three groups based on their different strategies of care recommendation after suicide attempts: Leiden and Oviedo, where the use of inpatient care was rare but outpatient care more frequent than elsewhere, Tallinn, where non-psychiatric care was almost never recommended, and the other Centres which, while showing differences, were still similar enough to be treated as belonging basically to the same type.

Study IV

The study analysed the effect of immigration (and also specifically the immigrants’ region of origin) on the repetition of suicide attempt within 12 months as well as the effect on a rapid (within 30 days) repetition within that period, adjusting for relevant background factors including gender, age, and the method used in the suicide attempt (in the 1st analysis) or the recommended care after the attempt (in the 2nd analysis).

1st analysis

Repetition of suicide attempts

The dependent variable divided the data into persons who repeated their suicide attempt within 12 months and those who did not do so.

Independent variables

Similarly to study III, the independent variables comprised immigration status, gender, age, and the method of suicide attempt.

As in study III, in addition to analysing immigrants as a whole, the immigrant group was divided by general region of origin into three major categories: West European and US immigrants (n=584; 11 countries of origin), East European immigrants (n=1801; 18 countries of origin), and non-European immigrants (n=664; 64 countries of origin). These were compared to the (European) host group (n=10574).

The information on immigrant status was unavailable in 5.3% of the cases.

Only very few cases were missing gender and age (0.6% and 1.3% respectively).

The variable describing the method used in the suicide attempt was divided into two categories alike those in study III. The missing values here amounted to 11.2%.

Previous suicide attempt

Self-reported previous suicide attempts was of interest to further establish the propensity of immigrants to repeat suicide attempts, in addition to the prospective analysis of repetition.

2nd analysis

Rapid repetition of suicide attempts

The dependent variable was based on the number of days which had elapsed between the index attempt and the repeated attempt. It was divided into 'rapid repetition' (up to 30 days) cases and 'non-rapid repetition' (31-365 days). There were 0.6% missing cases.

The independent variables comprised immigration status (described above), gender, age, and the recommended care after the suicide attempt.

The immigrant groupings formed according to the general region of origin as described above included: 55 West European and US immigrants, 108 East European immigrants and 53 non-European immigrants. These were compared to 935 (European) hosts.

Data on immigration status in this analysis was missing in 3.8% of the cases. There was only one case missing gender and one missing age.

In this study, the recommended care variable was classified into three categories as opposed to four in study III due to both small number of cases and the specific interest in the categories of (1) no recommended aftercare and (2) psychiatric or inpatient aftercare. A third category comprised other types of care (non-psychiatric aftercare psychiatric or psychotherapeutic outpatient aftercare, and/or counselling services.) Data on recommended care were missing in 11.3% of the cases.

3.5 DATA FORMATION AND MODIFICATION

In all studies in this thesis, Centres with large (>20%) amounts of missing data on *both* the respondents' country of birth and their citizenship were excluded from further analyses.

In studies I and II, the immigrants were studied group-wise at the different Centres. Centres with fewer than 20 person-cases of suicide attempts by immigrants, and those with very heterogeneous immigrant populations, where no immigrant group would account for more than 0.5% of the attempts total, were excluded. However, in study I, native persons at three Centres (Ankara, Helsinki, and Padua), whose citizens were found at other Centres as immigrants, were included for comparison purposes.

In studies III and IV, the cut-off for Centres to be included in the analysis was set at 30 immigrant suicide attempters per Centre.

In all four studies, some years were left out of the analysis for several Centres due to missing data or serious inconsistencies. The years and Centres vary between the studies depending on the variables of interest of the analyses (see more details further).

Data included in the final analyses

Study I

Totally 74 studied groups, including 22,888 (host) and 4,160 immigrant suicide attempt person-cases during altogether 28.6 million person-years, remained in the analysis. These were taken from eleven Centres in ten European countries, each for the mentioned years: Ankara (Turkey), 1998-2000; Bern (Switzerland), 1989-1991, 1993-1999; Ghent (Belgium), 1996-1999; Helsinki (Finland), 1989-1997; Holon (Israel), 1997, 1999, 2002; Leiden (Netherlands), 1989-1992; Padua (Italy), 1989-1996; Stockholm (Sweden), 1990-2003; Tallinn (Estonia), 1995-2000; Umeå (Sweden), 1989-1995; and Wurzburg (Germany), 1989-2003.

Study II

The analysis included 17,662 (host) and 3,755 immigrant suicide attempt person-cases in altogether almost 24 million person-years. The data were taken from the same Centres and years as described in study I, save for Ankara, Helsinki, and Padua, leaving eight Centres in seven European countries with 64 studied (host) and immigrant groups in the analysis.

Study III

The analyses comprised 8,865 (host) and 2,921 immigrant suicide attempt person-cases, divided in four groups based on their general region of origin were included in the analysis (see further in the methods). Eight Centres in seven European countries were included in the final analysis: Bern (Switzerland), 1989-1991; 1994-1995; 2004-2009; Ghent (Belgium), 1996-1999; Leiden (The Netherlands), 1989-1992; Oviedo (Spain), 2003, 2008-2010; Stockholm (Sweden), 1989-2005, 2007-2010; Tallinn (Estonia), 1995-2000, 2008-2010; Umeå (Sweden), 1989-1995; Wurzburg (Germany), 1994-2010.

Study IV

The final analysis comprised 10,574 (host) and 3,032 immigrant suicide attempt person-cases in the first analysis, and 935 (hosts) and 214 immigrants in the second analysis. The persons were divided into four groups based on their general region of origin (see further details below). Eight Centres in seven European countries were again analysed. These included: Bern (Switzerland), 1989, 1993-1997; Ghent (Belgium), 1996-1999; Holon (Israel), 1990-1996, 2005; Leiden (Netherlands), 1989-1991; Stockholm (Sweden), 1989-2004, 2007-2009; Tallinn (Estonia), 1995-1999, 2008-2009; Umeå (Sweden), 1989-1994; and Wurzburg (Germany), 1989-2003, 2008.

3.6 STATISTICAL ANALYSES

All analyses were performed using SPSS statistical software.

Study I

Annual person-based suicide attempt rates (SARs; cases per 100,000) were calculated at each Centre for both the immigrant groups and the host population, based on the suicide attempters in the database during the relevant period and the corresponding catchment area population, while taking into account the above-mentioned estimation factors.

The SARs of the foreign-born/foreign citizens were compared to those of the local-born/local citizens at the single Centres, and the differences were tested for significance assuming a Poisson distribution of rates.

Differences in SARs between groups with the same COB (country of birth) and the same CIT (citizenship) at the same Centre were similarly assessed where possible. Further, the SARs of the specific immigrant groups (by country of birth or citizenship) were compared across the Centres.

In order to assess the relationship between the completed-suicide rate in the country of origin and the SAR in the immigrant group, a rank-correlation analysis was performed using Kendall's tau-b coefficient.

Study II

Annual person-based SARs were calculated in the same way as in study I for males and females separately.

Gender ratios of SARs were then calculated for the groups by relating the female SAR to that of the males. The statistical significances of the differences between the gender ratios of various groups were assessed by using them as interaction terms in a Generalized Estimating Equations (GEE) model with a Poisson assumption. The GEE model allows for correlation in the data, which was useful because the groups based on COB and CIT were partly overlapping. In addition, correlations between male and female SARs were assessed while controlling for the influence of overlapping groups by COB and CIT.

In order to assess the relationship between the gender ratios of the completed suicide in the country of origin and that of attempted suicide in the immigrant groups, here again, rank-correlation analyses were performed using Kendall's tau-b coefficient.

Study III

The relationship between immigrant status and the type of aftercare recommended was analysed with binary logistic regression analyses, one for each of the recommended-care categories, along with controls for gender, age, the type of the method of the attempt ("soft" or "hard"), and the Centre at which the data was collected (divided into three groups based on the principal-component analysis described above). For each type of recommended care three models were presented in addition to the crude (unadjusted) effects: Model I with the immigrant group, gender and age; Model II, where the method of the attempt was added to the variables in Model I; Model III comprising all the above mentioned variables (immigrant group, gender, age and method of attempt) as well as the Centre at which the attempt was registered. The effects are presented as odds ratios (OR) along with 95% confidence intervals (CI) to these.

Study IV

The relationship between immigrant status and the repetition of suicide attempt within 12 months was analysed with binary logistic regression for males and females separately and together, along with controls for gender, age, type of the method of the attempt ("soft" or "hard"). The models presented in addition to the crude (unadjusted) effects are model I with immigrant group, gender and age, and model II, where the method of the attempt is added to these. The analysis was performed for immigrants as a whole as well as divided into groups according to region of origin. The effects are given as odds ratios (OR) along with 95% confidence intervals (CI) to these.

The proportions of respondents reporting previous suicide attempts were compared between the immigrant groups and hosts using t-tests of proportions.

In the second analysis, the differences in the timing of the repetition within a 12-month period after the index attempt between immigrant and host groups were assessed. For this purpose, another series of binary logistic regressions was performed for immigrants both as a whole and grouped according to the regions of origin, with controls for gender, age, and the recommended type of aftercare.

3.7 ETHICAL ASPECTS

All the research in this thesis has been conducted according to the ethical principles defined in the World Medical Association Declaration of Helsinki and the Ethical committee in Stockholm, Sweden. Ethical permission for this study was given in each country participating in the collection of the data on suicide attempters.

4 RESULTS

4.1 STUDY I

Suicide attempts among immigrants and host populations in Europe

Totally 56 immigrant groups were compared with the host groups at 11 centres in 10 countries. In the comparison, 27 of them had significantly higher SARs than the hosts (2-5 times higher) and 25 had similar ones. Only four immigrant groups had significantly lower SARs than the host group.

Finns, Italians, and Turks were found as hosts at one Centre but as immigrants at another. Comparing their SARs in the two positions showed that they were of similar magnitude for Finns and Italians, but not for the Turkish immigrants. Their rates were significantly higher - and in most cases many times higher - than those of the Turks in Ankara.

Suicide attempts among the foreign-born vs. foreign citizens

In Leiden (The Netherlands), Stockholm (Sweden), Tallinn (Estonia), and Umeå (Sweden), the SARs of persons born abroad were compared to those of the persons who carried the citizenship of the same country, without necessarily having been born there. Although these populations were certainly not entirely overlapping, the rates of these two groups were generally of similar magnitude.

Same immigrant groups at different European locations

Thirteen immigrant groups observed at more than one Centre were compared across different Centres. The levels of the SARs for six of them were fairly similar. However, comparisons between similar immigrant groups at various Centres with those in Holon (Israel), consistently found lower rates among the latter.

Immigrant suicide attempts and completed suicide in countries of origin

A positive relationship was found between the SARs of immigrants (by COB) to European countries and the completed-suicide rates in their native countries (Kendall's tau-b=0.47, p=0.007). In 14 out of 19 cases, the SARs of immigrants coincided with the completed-suicide rates in their native countries. Among Chileans, Iranians, Moroccans and Turks, a pattern of low completed-suicide rate in the country of origin and a high SAR among the immigrants was observed.

The relation between the SARs of foreign citizens and the completed-suicide rates in their citizenship countries was not significant.

4.2 STUDY II

Gender distribution of SARs among single immigrant and host groups

Despite widely varying SAR levels, all but one of the host populations had similar gender ratios of 1.52 female suicide attempts per 1 male attempt on the average. In Tallinn (Estonia), on the other hand, there was a male majority, with a female-to-male ratio of 0.82.

The gender ratios of the immigrant groups varied much more, ranging from 0.52 for Russian immigrants in Tallinn to 5.98 for Turkish immigrants in Ghent.

Specifically, out of 51 comparisons of the individual immigrant groups with their host populations, 22 showed a difference of at least 50% in gender ratio (sometimes higher and sometimes lower than the host ratio). However, in only eight comparisons (Finnish born versus local-born in Stockholm, Sweden; Russian born versus local-born in Tallinn, Estonia; Iranian-born and Iranian citizens versus locals in Umeå, Sweden; Iranian-born versus local-born in Holon, Israel; Turkish citizens versus local citizens in Ghent, Belgium as well as in Wurzburg, Germany; Turkish-born versus local-born in Stockholm, Sweden) were the numbers of cases large enough to allow statistical significance to be established. Immigrants from Morocco, Turkey, Yugoslavia, and Chile tended to have higher female-to-male gender ratios, whereas those from Finland, Spain, Italy and, especially, Russia and Iran, had lower ratios.

Gender distribution of SARs among immigrants grouped by general regions of origin

The immigrant groups were further grouped into three major categories according to their general region of origin: European and US immigrants, non-European immigrants, and Russian immigrants. After excluding the single groups with male majorities (those from Curacao, Iran, Libya and Sri Lanka) from the non-European immigrants and also from hosts (Tallinn, Estonia), significant ($p < 0.0005$) differences in gender ratio were found between the hosts (female-to-male ratio 1.52) and both the non-European immigrants (2.32) and the Russian immigrants (0.68). There was no significant difference between the hosts and the European immigrants (1.59).

Common variation between male and female SARs

The correlation of the SARs for females and males was very strong among the host groups ($r = 0.88$, $p < 0.001$) and among the European immigrant groups ($r = 0.74$, $p < 0.0005$). When excluding the single groups with a male majority from the non-European immigrant groups, the correlation there was of medium magnitude ($r = 0.55$, $p < 0.03$). This pattern also showed in the average differences between female and male SARs, which were larger among the non-European immigrants (84 more female than male suicide-attempt cases per 100,000) than among the European immigrants (64 more cases per 100,000) or the hosts (22 cases per 100,000).

Gender distribution patterns in immigrant groups and their country of origin

No correlation was found between the gender ratio for completed suicide in the country of origin and the SAR gender ratio in the immigrant groups.

4.3 STUDY III

A clear effect could be identified for immigrant status although in all analyses, the location of care had the most significant effect on the recommendation of care practices.

Immigrants from East Europe and from non-European countries had significantly higher odds for not being recommended any care (OR=1.57, $p < 0.001$; OR=1.32, $p < 0.05$, respectively) compared to people from the host country. On the other hand, West

European (and US) immigrants were significantly less likely than the hosts not to be recommended any further care (OR=0.67, $p<0.05$).

Also, non-European immigrants were found to be 33% more likely to be recommended non-psychiatric care after a suicide attempt, while other immigrant groups had odds similar to those of the hosts.

West European immigrants seemed to have significantly higher odds (OR=1.27, $p<0.05$) of being recommended outpatient care compared to hosts.

Finally, the chance of being recommended inpatient care seemed to be higher for immigrants as a whole, but after adjusting for the control variables, especially location, the odds turned out to be significantly *lower* for non-European immigrants (OR=0.73, $p<0.001$), and there was no difference to hosts in the odds of East or West European immigrants.

Overall, the predictive power of the location was substantial, while that of the other variables was smaller, although often significant. Sex, age, and the method of the attempted suicide had mostly significant crude effects on the type of recommended care, but they did not explain immigrants' probability of being recommended different types of care.

4.4 STUDY IV

A comparison of all immigrants to all hosts, while controlling for gender and age (Model I), and then also for the method used in the index attempt (Model II) showed almost 40% lower odds for immigrants, compared to hosts, for repeating their suicide attempt within a 12-month period ($p<0.001$). The same pattern was observed among both male and female immigrants (OR= 0.70, $p<0.01$ and OR=0.57, $p<0.001$, respectively).

Divided by general region of origin, both male and female immigrants from Eastern Europe had lower odds for repeating their attempt, especially the females (OR=0.42, $p<0.001$). Also, lower odds were found for non-European immigrant females, with almost 40% lower odds for repetition ($p<0.05$). There was no statistically significant effect for the males of that group.

In all these analyses, no significant (or even large) differences were found between the Western immigrants and the host populations in the propensity of repeating a suicide attempt.

A complementary analysis of respondents' self-reported previous suicide attempts seemed to replicate the findings of the main analysis, indicating that immigrants also reported fewer previous attempts than did the hosts ($t=3.57$; $p<0.0001$). Excluding Centres with larger amounts of missing data on previous suicide attempts (Ghent, Holon, and Tallinn),

the analysis showed significantly less previous suicide attempts only for the non-Western immigrants ($t=3.14$; $p<0.01$).

Of the control variables, only age was found to have a consistent significant effect on the odds for repetition in all analyses, with clearly diminishing chances for repetition with increasing age.

The analysis by gender revealed an interesting difference in the effects on repetition of the method used in the index attempt. Females using harder methods had significantly higher odds for repetition ($OR=1.26$, $p<0.01$) than those employing softer methods. Males showed an opposite pattern with higher tendency to repeat among those who used soft methods. However, this effect was only marginally significant when adjusted for other factors.

The second aim of this study was to investigate possible differences in the timing of the repetitions of suicide attempts within the 12-month period. 32% of the repetitions were 'rapid' (within 30 days), and 68% were not. Eastern European immigrants were significantly less likely to repeat their suicide attempt rapidly than the hosts when controlling for other variables ($OR=0.58$, $p<0.05$).

Also, female attempters were approx. 30% less likely to repeat an attempt within 30 days of the index attempt. The age of the attempter and the type of recommended aftercare had no effect on how fast the attempt was repeated.

5 DISCUSSION

5.1 MAJOR FINDINGS

5.1.1 Summary

Most immigrant groups studied in this thesis tended to have higher (or similar) SARs than their hosts. The immigrants also tended to have similar rates across different European Centres. Moreover, a positive correlation between the immigrant SAR and the country-of-origin suicide rate was found. However, Chileans, Iranians, Moroccans, and Turks displayed high SARs as immigrants despite low suicide rates in the home countries (Study I).

Non-European female immigrants showed higher SARs compared to Europeans (both immigrants and the host population). Clearly standing out of the other groups, the majority of suicide attempters among the Russians in Estonia and the Estonian hosts were male. This was also true for immigrants from Curacao, Iran, Libya, and Sri Lanka, although these groups were very small in the current sample. Female and male SARs showed somewhat more common variation among the European immigrants and hosts than among the non-European immigrants. A highly significant difference was found in gender ratios of suicide attempts between hosts and both non-European immigrants and Russian immigrants, but not the European immigrants (Study II).

Eastern European and non-European immigrants were more often than host populations discharged from the hospital after a suicide attempt without further recommendation of care. If care was offered, non-European immigrants were more likely to be recommended non-psychiatric care, and their chance to be recommended inpatient care was significantly lower compared to hosts. Sex, age, and the method of the attempted suicide had mostly significant crude effects on the type of recommended care, but they did not explain immigrants' probability of being recommended different types of care. However, both hosts and immigrants were influenced by the different recommendation policies at the Centres included in the study (Study III).

There were consistent differences in the repetition frequencies between host and immigrant populations with a clearly lower propensity to repeat suicide attempts within 12 months in the latter. Specifically, both male and female immigrants from Eastern Europe had a lower chance of repeating their attempt when compared to the European hosts, as did non-European female immigrants. In addition, when repeating an attempt, East European immigrants were less likely than the hosts to do this rapidly (within 30 days).

On a more general note, there was a gender difference in the relationship between the choice of method used in the index suicide attempt and the tendency to repeat the attempt. Females using harder methods tended to repeat their attempt within 12 months more often than those using softer ones, while males showed an opposite pattern (however, the latter

effect was only marginally significant when adjusted for other factors). Also, female suicide attempters tended to repeat their attempt less often rapidly (within 30 days) than males (Study IV).

5.1.2 Suicide attempts among immigrants in Europe (studies I and II)

Immigration as a risk factor for suicide attempts

The finding that immigrants had, in most cases, significantly higher rates of suicide attempts (2-5 times higher) when compared to the hosts at the individual Centres, and in only a few cases significantly lower rates, lends support for the results from previous studies showing that immigration in itself is a risk factor for suicidality (Ferrada-Noli 1997; Johansson, Sundquist et al. 1997; Westman, Hasselstrom et al. 2003; Mirsky et al. 2011). Thus, it is possible that the similarity in culture may bring people to similar reactions to stress, regardless of the variations in the specific conditions in the host country.

Another finding pointing to the possibility that an immigrant background puts a person at higher risk of suicidal behaviour is the similarity found between the suicide attempt rates of those born in the country of origin and those who still hold that country's citizenship. It could be expected that those who changed their citizenship would have rates more similar to the hosts in the country, which was not the case. Thus, earlier hypotheses of naturalisation as a positive factor in acculturation and integration (see Mäkinen and Wasserman 2003), possibly leading to a convergence in suicidal behaviour, in this case attempted suicide, could not be supported since such an effect would have created a difference between those who had changed their citizenship and those who had not.

In any case, causality cannot be inferred because more detailed information of the characteristics of the specific immigrant groups (and the population of their countries of origin) regarding age, gender, integration in the host country, socioeconomic status, and reasons for migration would be needed to establish a causal relationship between immigration and increased suicidality.

Continuity or interruption in the patterns of suicidal behaviours of immigrants

In study I, strong continuity in patterns of suicidal behaviour was found. The SARs of the immigrant groups from the same country of origin generally showed more similarity than discrepancy when compared across the different data-collecting Centres. Also, a positive correlation was found between the completed-suicide rates of the countries of origin and the SARs of the corresponding immigrant groups.

These results may be explained within two main theoretical frameworks: The genetic make-up which focuses on genetic risk factors for suicidal behaviour, and cultural continuity which refers to the enduring influences of cultural origin (Mäkinen 1997; Canetto and Sakinofsky 1998; Mäkinen 2009). Both may influence patterns of suicidality in immigrants, although the influences of one's culture of origin may fade over time, while the influence of genetic factors does not.

Although some current evidence points to a possible importance of genetic influences on suicidal behaviour even at the aggregate level (Ben-Efraim, Wasserman et al. 2011; Brent and Melhem 2008; Voracek and Loibl 2008; Voracek, Loibl et al. 2007; Voracek, Loibl et al. 2009; Wasserman, Sokolowski et al. 2008; Wasserman, Sokolowski et al. 2009), there is a clear lack of research on this relation at a population level. In two studies relating country of birth and immigrant suicide rates, Voracek and colleagues (Voracek and Loibl 2008; Voracek, Loibl et al. 2009) raise the issue of a genetic influence on suicide in immigrant populations. Yet, lacking the evidence on varying gene distributions in different immigrant groups, these findings are certainly not conclusive and hardly override the importance of cultural influences.

To this can be added the finding that there were four major immigrant groups with a distinct pattern that did not follow the general tendency: Chileans, Iranians, Moroccans, and Turks displayed high SARs as immigrants despite low suicide rates in their country of origin. Other local European studies have also shown high SARs for Turks (Burger, van Hemert et al. 2009; Westman, Hasselstrom et al. 2003), Iranians, Chileans, and Moroccans (Westman, Hasselstrom et al. 2003), although these were mainly found among females. This discontinuity in pattern is hard to explain within the genetic assumption framework and is preferably interpreted in cultural terms. It could be hypothesized that in these groups a non-Western cultural background possibly interacts with immigration as a risk factor for suicidality. In other words, the immigration process in itself and difficulties in acculturation in a more culturally dissimilar host country result in high suicidal behaviour. Further inquiry is needed to understand why these specific groups showed such a distinct pattern as immigrants (i.e. high SARs as immigrants and low suicide rates as natives in their countries of origin), while other non-Western immigrant groups did not.

On a more general note, the current results lend support to the continuum approach on suicidal behaviour showing that a connection at the most general level does exist between the tendency to attempt and complete suicide (Miranda, Scott et al. 2008; Otto 1972), and that attempted suicide is a reliable predictor of completed suicide. The results also indicate a cultural influence on the overall levels of suicidal behaviour.

Gender patterns of suicide attempts in immigrants and host populations

Study II showed that the differences in the SARs of male and female non-European immigrants were clearly larger than those of the hosts. Non-European immigrant women tended, on average, to have more than double the SAR of immigrant men in the same groups. Also, male and female SARs were highly correlated in the host groups but less so in the immigrant groups. These findings suggest that the factors influencing SARs may vary more between males and females within an immigrant group compared to host groups. It is possible that the high SARs of these women reflect some gender-dependent features in the acculturation process.

The current findings may be clarified by other reports identifying such gender-dependent features. Studies from non-Western countries have shown that suicidal behaviour in females is related to socio-cultural factors such as low social status, societal insecurity, stress of non-sustainable income, adaptation to new culture and environment, acute stress

due to family conflicts, and domestic violence (Canetto 2008; Vijayakumar, Nagaraj et al. 2005). Some of these factors have been advanced as possible explanations for the high SARs also among non-Western immigrant females in European countries (Bhugra 2002; Sharma and Bhugra 2009; van Bergen, Smit et al. 2006; van Bergen, Smit et al. 2008). Other studies described parental and familial conflicts and overregulation, lack of autonomy, and cultural alienation as recurrent narratives of immigrant female suicide attempters (Patel and Gaw 1996) (Bhugra 2002; Bergen, Murphy et al. 2010; Cooper, Murphy et al. 2010; van Bergen, Smit et al. 2008).

It is possible that the high SARs in immigrant females and the large differences found between males and females in the non-European groups (i.e. large gender ratios) may have “immigrated” with these groups (although this is not supported by the current results). Yet, regardless of whether the patterns of suicidal behaviour are imported from the countries of origin (where there may also be clashes between more traditional views and the changing society) as such or whether they are exacerbated by the immigration process and stresses, the emerging patterns are of interest.

In the European immigrant groups, on the other hand, the female-male difference was much smaller and very similar to that in the (European) hosts. This finding may reflect a generally similar gender pattern of attempted suicide among Europeans, and also the generally lesser impact of immigration on culturally closer ethnic groups.

Groups with male majorities among suicide attempters

Contradictory to the dominant gender pattern of suicidal behaviour, a male majority of suicide attempts was found among the Russian immigrants (mainly found in Estonia in this study). A similar pattern of male majority was also found in one host population (Estonians in Tallinn). These results confirm those of a previous study in Tallinn (Värnik, Kupersepp et al. 2004), however adding the division of immigrant and host populations. Some explanations for the higher SARs among Russian and Estonian males relate to the dissolution of the former USSR, including stress reactions to unemployment, consumption of alcohol, and low acceptability of psychological support, which may all be more prominent among males (Värnik and Mokhovikov 2009).

The male-majority pattern, observed in immigrants from Curacao, Iran, Libya, and Sri Lanka, as opposed to the very high SARs of females in other non-European groups, may reflect the greater cultural variance among immigrants from outside Europe. Yet, it should be mentioned that apart from the Iranian immigrant sample, the other groups had very few cases. Further investigation of these sharp deviations from the usual pattern, alike the rare female-majority patterns in completed suicide (Canetto 2008) could illuminate the mechanisms underlying the gender paradox of suicide.

The changing gender patterns of suicidal behaviour of immigrants

Despite the clear patterns of cultural continuity in terms of levels of suicidality reported in study I, the pattern of gender distribution among suicide attempters follows, at least partly, a different dynamic. Although overall SARs in immigrants were found to relate to the suicide rates of their countries of origin (study I), no such relationship was found for the

gender distributions of suicide and attempted suicide. In other words, a large female majority of attempted suicide did not indicate a smaller male predominance, let alone female majority, in completed suicide. Yet, although no general relationship could be identified, it is still possible that the male majority found in the Russian immigrant suicide attempters reflects the large male majority of suicide completers in Russia (Mäkinen 2000). Likewise, Finnish immigrants tend towards low gender ratios, and there is a male majority in attempted suicides in Helsinki as well (Schmidtke, Weinacker et al. 2004).

Summing up, although underlining the importance of shared cultural background, the results of study I and II results indicate that there are counterforces, probably pertaining to the quality of the immigrants' acculturation in the new country or to their generally disadvantaged socio-economic situation, that keep their suicidal behaviour at higher levels.

5.1.3 Differential care recommendations for immigrant and non-immigrant suicide attempters in Europe (study III)

The care management for immigrants and host populations after a suicide attempt in Europe was found to be clearly different, possibly because immigrants are perceived as being culturally different from the host populations. The findings showing that Eastern European and non-European immigrants were more often discharged without any further recommendation of care compared to host population and to West European immigrants, may have different explanations for each of these groups.

Recommended care for non-European immigrants

Regarding the non-European grouping, the results correspond to those found by Cooper et al. (Cooper, Husain et al. 2006; Cooper, Murphy et al. 2010) on the differences in the clinical management between the Black and minority ethnic groups and the White population in the UK. Specifically, the studies found that South Asians were more likely to be discharged from emergency department without referral to other services, or alternatively, be referred to their GP (non-psychiatric care); they were also less likely than Whites to be referred to medical, surgical, or psychiatric services. Similar findings were reported for Black minorities (Cooper, Murphy et al. 2010; Hawton, Bergen et al. 2007).

Another finding in the current study was that the chance of being recommended inpatient care was higher for immigrants as a whole, which was reminiscent of certain findings in other studies showing higher representation of non-Western immigrants. Yet, it has also been shown that there are differences in inpatient care depending on the specific origin of the immigrant (Lay, Nordt et al. 2007). In the current study, adjusting for sex, age, the method of suicide attempt, and location revealed that the chance to be recommended inpatient care was significantly *lower* for non-European immigrants compared to the hosts and not different for the other groups of immigrants. It is possible that pooling together data on immigrants from different origins and lack of control for covariates provide inaccurate results, which may be misleading the planning of specific prevention and care management for suicidal immigrants and ethnic minorities.

There are a few potential explanations that could clarify the above-mentioned findings of differences in care management in the study:

Clinical "low-risk" characteristics. Clinical management of suicidal patients is expected to be guided by knowledge of risk factors from epidemiological studies put into context of individual patient presentation. It may be that the immigrant groups present with 'low-risk' clinical characteristics, as put forward by Cooper et al. (2010). The known suicide risk indicators such as suicidal ideation, depressive symptoms, emotional distress, and hopelessness were found to be more common among Whites than among ethnic minorities (Bhui, McKenzie et al. 2007). Other risk factors such as living alone, use of alcohol with the self-harm attempt, and having a previous psychiatric history or history of self-harm were also less prevalent in these groups (Cooper, Husain et al. 2006; Cooper, Murphy et al. 2010).

Communication of distress by immigrants and the cultural competence of staff and services. A further explanation for low-risk management (no recommended care and non-psychiatric recommended care) might be related to how individuals from different ethnic groups communicate distress. Due to the effect of culture on the expression of symptoms and illness behaviour (Bhugra 2005; Kirmayer, Narasiah et al. 2011), the idioms of distress of some immigrant groups (in other words, the manner in which they communicate their distress) may differ from those in their host culture, e.g. through more concrete expression about their body, emotions, social and life situation (Baarnhielm and Ekblad 2000; Kirmayer and Young 1998). Also, the contextual circumstances (e.g. those related to differences in cultural norms and values) that put immigrants at increased risk for suicidal behaviour may be different from host populations. The staff may misunderstand the symptoms of immigrants or interpret them as less serious due to cultural distance or communication problems related to language barriers, and may discharge them without a suitable referral.

To this add the attitudes towards mental health problems and suicide of immigrants themselves, who may refuse referral to aftercare services due to fear of stigma, or previous negative experiences with health services (Ahmed, Mohan et al. 2007; Carta, Bernal et al. 2005; Cooper, Murphy et al. 2010; Crawford, Nur et al. 2005; Lindert, Schouler-Ocak et al. 2008) and lack of information on the existing available services (Lindert, Schouler-Ocak et al. 2008).

Another possible explanation could be the lack of aftercare services with necessary linguistic and cultural adaptation (Carta, Bernal et al. 2005; Lindert, Schouler-Ocak et al. 2008) that might be forcing the staff to discharge immigrants after a suicide attempt without adequate referral. In other words, differential referral could be explained by structural barriers in the access to health-care or biased policy within health-care systems concerning immigrants in Europe.

Recommended care for East European immigrants

As mentioned, compared to the hosts, East European immigrants tended to be discharged without any recommendation of care. The fact that people from the former Soviet Union,

which form the majority of the East European immigrants in this study sample, more frequently use alcohol in connection with the suicidal act (Stickley, Jukkala et al. 2011; Wasserman and Varnik 1998), could have influenced their referral patterns. It has been shown that health-care personnel harbours negative attitudes toward patients with alcohol abuse and dependence and suicidal people (Ramberg and Wasserman 2003; Saunders, Hawton et al. 2012), which may result in discharge without any aftercare recommendation (Suominen, Isometsa et al. 2004; Suominen and Lonnqvist 2006).

This possibility comes in addition to the above mentioned communication problems and reluctance to use mental health care facilities and other structural barriers making the access to immigrants difficult.

Recommended care for Western immigrants

As opposed to other, culturally more different groups, West European immigrants were more often recommended outpatient care, even as compared to hosts. It is possible that this population, coming from more affluent countries with a more similar cultural background, is economically more privileged and better acquainted with the treatment of mental health problems (Tinghog, Hemmingsson et al. 2007), and is also better insured compared to immigrants originating from other regions.

Summing up, there is evidence that the quality of health and psychosocial care for migrants may be affected by access barriers, such as the administrative structures or financing of health care, linguistic or communicative skills, demands or lack of demands of the migrants, the cultural distance or similarity to the host country culture, and the expectations of health-care providers. The results of this study are generally in line with such assumptions, focussing on the recommendation of care by medical staff in the emergency situation after an attempted suicide, which has seldom been investigated.

This study specifically highlights the need for further comparative investigation of the health-care routines in European countries in order to understand and discern between the potential sources related to differential referral of immigrants: does it convey a sound clinical judgement, or rather lack of cultural competency (Anderson, Scrimshaw et al. 2003; Brach and Fraser 2000), or maybe even an expression of bias of health-care planners (Alda Diez, Garcia Campayo et al. 2010; Bhui, Warfa et al. 2007)?

5.1.4 Repetition of suicide attempts among immigrants and European hosts (study IV)

Repetition of suicide attempts among non-Western immigrants

Non-Western immigrants were found to repeat their suicide attempts less often than both hosts and West European immigrants. This was the case for both male and female immigrants from Eastern Europe, and non-European female immigrants.

These immigrants' lower rate of repetition could be explained by their generally greater mobility, which could be thought to prevent their repetitive attempts from being registered at the various Centres. However, the finding that both East European and non-European

immigrants themselves also reported significantly fewer previous suicide attempts strengthens the assumption that they indeed have a lower tendency to repeat their attempts.

Western European immigrants, on the other hand, did not differ from the hosts in their registered tendency to repeat a suicide attempt, nor in their reporting of previous suicide attempts.

These results come in clear contrast to immigrants' higher tendency to attempt suicide, shown in previous studies, including the present work. Specifically, Russian immigrants (who constitute the majority of Eastern European immigrants), especially males, tend to have markedly higher SARs compared to their hosts (Bursztein Lipsicas, Mäkinen et al. 2012; Westman, Hasselstrom et al. 2003). Another deviating group in this respect is that of non-European females, who in many studies have shown to have clearly higher suicide attempt rates in comparison to non-immigrant females (Bhugra 2002; Burger, van Hemert et al. 2009; Bhui, McKenzie et al. 2007; Bursztein Lipsicas and Mäkinen 2010; van Bergen, Smit et al. 2008; Westman, Hasselstrom et al. 2003), and who in this study reported fewer previous attempts and also had fewer repetitions.

Thus, the present study identifies a distinct feature of certain non-Western (East European or non-European) immigrant suicide attempters: although they may have a higher tendency to attempt suicide, they do not seem to repeat their attempt more often than others. These results seem to correspond to most of the (mostly UK) studies indicating fewer repetitions of suicide attempts among non-European immigrants and minority ethnic groups (Bhui, McKenzie et al. 2007; Cooper, Husain et al. 2006). On the other hand, no previous studies have been found on Eastern Europeans.

Possible explanations for this pattern are further elaborated below:

Clinical "low-risk" characteristics and situational stress. Cooper and colleagues (2006, 2010) have, as mentioned previously, proposed that immigrants' lower repetition frequency might be a result of their generally lower amount of known risk factors for suicide attempt. Considering the results of the current study, it could be hypothesized that immigrants who harm themselves do so impulsively in response to life events, possibly in connection to their experiences as immigrants, rather than in association with a persistent psychiatric illness or similar (Bhui, McKenzie et al. 2007; Bursztein Lipsicas and Mäkinen 2010; Sharma and Bhugra 2009).

Initial experiences of immigrants with local mental health services. Another possible explanation is that immigrants' lower reported repetition frequency may be explained by their negative experiences with mental health services at the initial presentation, which might affect their willingness for further contact (Cooper, Murphy et al. 2010; Raleigh, Irons et al. 2007). Yet, the fewer self-reported previous attempts among both East European and non-European immigrants here speak against this assumption, strengthening the hypothesis that non-Western immigrants are truly a low-risk population for repetition of suicide attempts.

Repetition of suicide attempts and recommended care for immigrants:

It would seem that the distinct repetition pattern in immigrants may partly be explained by some hypotheses put forward in relation to the differential recommendation of care practices toward immigrants in Europe discussed above. Specifically, the lower tendency to repeated suicide attempts in non-European immigrant groups goes hand in hand with the finding that immigrants tend to be discharged without any further recommendation following a suicide attempt (Bursztein Lipsicas, Mäkinen et al. unpublished manuscript).

Timing of the repetition attempt in immigrants

Within the 12-month period, Eastern European immigrants repeated their attempt less rapidly (less often within 30 days) compared to the host population. Clarifying this result is the finding that repetition occurs most rapidly among persons who have previously attempted suicide (Gilbody, House et al. 1997). Eastern Europeans do fit into this pattern, since they reported less often having made previous attempts, while they also had a generally weaker tendency to repeat their attempts.

General findings on repetition of suicide attempts

On a more general note, there were additional interesting findings concerning both immigrants and non-immigrants.

Age. The likelihood for repetition of a suicide attempt within 12 months decreased with age, a result that corresponds to several other reports (Corcoran, Keeley et al. 2004; Heyerdahl, Bjornaas et al. 2009; Perry, Corcoran et al. 2012).

Method of attempt. There was a gender difference in the relationship between the methods used in the index attempt and the probability of a repetition. Females using harder methods in their index attempt were clearly more likely to repeat their attempt within 12 months than those who chose to use softer methods.

Here, the results of this study diverge from those of a previous study that employed the same source of data (the WHO/EURO monitoring study dataset), but which did not find any differences in the type of methods used by *adolescent* males and females who repeated their suicide attempts (Hultén, Jiang et al. 2001). Certain similarities to our results can however be found in a more recent study by Perry and colleagues (2012). Using a national registry in Ireland, they found that acts involving self-cutting (identified as a “hard method” here) were associated with an elevated risk of repetition for both genders, but in cases where cutting was the sole method employed, the increased risk of repetition among female patients was significantly higher than that among males.

It could be assumed that these findings are related to the levels of intent in female (as well as male) repeaters and non-repeaters, although studies on the relationship between method of attempt and intent have shown contradictory results (Bergen, Hawton et al. 2012; Denning, Conwell et al. 2000; Horesh, Levi et al. 2012; Nordentoft and Branner 2008), and some have even concluded that repetition is not related to the lethality of the method, nor to the level of intent of the index attempt (Haw, Hawton et al. 2003)

5.2 METHODOLOGICAL CONSIDERATIONS

Accuracy of the registration of suicide attempts at the collecting Centres. The attempted suicides not reaching health-care services are estimated to add 10-50% to the recorded number (Vijayakumar, Nagaraj et al. 2005), a fact that needs to be acknowledged. As regards the medically treated suicide attempts, the WHO/EURO Multicentre Study was designed to minimize underestimation of their number by taking non-response and missing information in the catchment area of the study into consideration by using an estimation factor.

Another factor influencing the accuracy of registration is that different ethnic groups have different patterns of help-seeking behaviour and health-service utilisation (Lindert, Schouler-Ocak et al. 2008). It is likely that the SARs in some ethnic groups are underestimated due to their less frequent use of mental-health services (Lindert, Schouler-Ocak et al. 2008). Such methodological problems often occur in studies involving suicide attempts and have to be considered as a limitation demanding caution in interpretation of the results.

As to matter of repetition of suicide attempt, it is possible that some persons repeated their attempt *after* moving away from the catchment area included in the current study, a fact resulting in some degree of underestimation in the frequency of repetition.

Immigrant population data registries. As described in the methods part, the population data for some of the Centres were only partially available, and missing years had sometimes to be estimated with the assumption of a linear development. Consequently, there may be some inaccuracies in these figures.

Lack of national registries of attempted suicide. Few countries in the world have systematic data registration of attempted suicide, forcing research on the topic to rely on local studies, which employ differing methodologies and even different definitions. One of the consequences is the difficulty to compare the levels and trends of suicide attempts between different countries. The WHO/EURO monitoring study has a common definition of suicide attempt, as well as a standardised methodology. It provides unique opportunities for multi-site comparisons, overcoming at least the problem of differing methodology and definitions of suicide attempt between countries and studies (Bertolote and Wasserman 2009).

Quality of the national registration of completed suicide. Regarding data on completed suicide in the countries of origin used in the analyses of studies I and II, it should be noted that their quality and reliability is sometimes questioned. Data from developed countries are collected and updated on a regular basis on the WHO website, but most developing countries report on a less regular basis. Yet, the WHO data still constitute the most reliable and comprehensive international dataset available.

Representativeness of the sample. Due to the local nature of the study the catchment areas cannot be considered to be representative of the countries involved, and the immigrants living within them may not be representative of the immigrants to those countries.

However, since this study has been made using the largest European data material at hand it could point towards possible areas of future development.

Immigrant group definitions and sub-divisions. Host and immigrant populations defined in this study may not always be clear-cut. Thus, they may change over time as illustrated by the situation in Tallinn. Russians in Estonia lived for decades as a “domestic” minority under the former Soviet regime. Being Soviet citizens, they were not categorised as Russian immigrants until the Estonian independence (Värnik, Kolves et al. 2005). Consequently, although more than half of the immigrants in the Estonian part of the monitoring dataset were actually born in Tallinn, they hold a foreign (Russian) citizenship.

As to the division of the immigrants into large groups based on their region of origin (described in Methods), it was done following restrictions related to the data: on the one hand, it was not possible to investigate single groups due to small sample sizes, while on the other hand, analysing all immigrants as one large group would have resulted in the masking of differences between culturally dissimilar immigrants.

The division into the large groups was roughly based on geographic and cultural distance from the Western European host countries. Ethnicities and cultures can always only be approximated with register-based data, and the availability of country of origin as a proxy variable. Probably the most culturally heterogeneous group in the current study is that of the non-European immigrants, however, this was the best division that could be achieved with the material at hand.

As to the slight differences in the division of immigrant groups between study II and studies III-IV, it related to the differing objectives of these. In study II the large size of the Russian group as well as the fact that it had a clear male majority singled it out. Studies III-IV divided the immigrant groups solely according to their perceived cultural distance, and all of Eastern Europe went together.

Statistical power. The small number of cases in some of the analyses (especially in studies I and II investigating suicide attempts in the specific immigrant groups at the specific Collecting Centres) made it difficult to establish significant differences between many of the single immigrant groups and the hosts, even when the gaps were large. Hence, rather than the single results, the findings should be viewed as indicative of emerging general patterns that should be the focus of attention and the basis for further research.

Differences in repetition of suicide attempts between sites. It should be noted that the general frequency of repetition of attempted suicide within 12 months in the collecting Centres varied¹. The reasons for the differences between Centres are not known, which is why they were not controlled for in the analyses.

¹ Holon, Tallinn and Wurzburg had a relatively low frequency of repetition; Bern, Ghent, Leiden and Stockholm had a medium amount, while Umeå (Northern Sweden) had a high proportion of repetitions. The influence of the relative frequency of repetition attempts at the monitoring Centre was investigated separately and there were large effects (ORs between 2.4 and 3.5; $p < 0.0001$) in the main regression analysis.

6 CONCLUSIONS

6.1 SUMMARY

The main conclusions of this work may be summarized as follows:

The findings strengthen the view that suicidal behaviour is strongly related to culture, but it is also exacerbated by the immigration process itself.

The picture that emerges in the European context is one of a high risk of suicidal behaviour in individuals with a foreign background, in addition to any other specific risk factors that may influence levels of suicidality in these groups.

A higher risk of suicide attempts is especially marked in female immigrants from non-European countries and Russian male immigrants. On the other hand, East European and non-European immigrants, and especially women in these groups, repeat their suicide attempts less often than both hosts and West European immigrants. This finding stands in clear contrast to the immigrants' generally higher tendency to attempt suicide. The current findings point to the possibility that immigrants' suicidal behaviour may be impulsive and related to immigration and acculturation stresses.

While the risk for suicide attempts has been clearly identified, there may be potential inequity in care management after suicide attempts in the health-care routines in Europe. In fact, there is a clear difference in the recommended care for immigrants compared to host populations, especially for those perceived as being culturally different.

6.2 SOME CONCLUDING REMARKS

Today, the consideration of potentially distinct needs of specific immigrant groups is still lacking in the clinical assessment and suicide prevention policies in Europe. This may partly be explained by the fact that the evidence base is scarce and the existing data are not always easily accessible nor integrated enough to guide clinicians and policy makers. This compilation of studies, mapping the suicide attempt rates of immigrant groups, indicating their distinct repetition patterns, identifying specific risk groups, and showing possible inequalities in the care management of immigrants provides a contribution to the existing evidence base.

Thus, this work provides points to consider when planning prevention policies and specific programs for immigrants (for example, increasing educational activities about suicide prevention and mental health promotion adjusted to culturally diverse groups, gatekeeper programs and trainings to mental health services in contact with immigrant populations).

Clear guidelines for care after suicide attempt in hospital emergency settings such as have recently been published by the European Psychiatric Association (Wasserman, Rihmer et al. 2012) are needed also in the specific care of immigrants, as their initial contact with the

medical system immediately after their suicide attempt may constitute the best opportunity to receive a proper referral to psychiatric and psychosocial help in their suicidal crisis. At a more general level, the challenge seems to be to structure more culturally sensitive and competent services, by writing clear referral guidelines and training the staff to be inter-culturally competent.

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