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Gender distribution of suicide attempts among immigrant groups in European countries—an international perspective

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Background: Studies report high rates of suicide attempts for female immigrants. This study assesses variations in the distribution of suicide attempts across gender in immigrant and non-immigrant groups in Europe. **Method:** Data on 64 native and immigrant groups, including 17 662 local and 3755 immigrant person-cases collected, between 1989 and 2003, in 24 million person-years were derived from the WHO/EURO Multicentre Study on Suicidal Behaviour. Female-to-male ratios of suicide attempt rates (SARs) were calculated for all groups. **Results:** The cases were combined into four major categories: hosts; European and other Western immigrants; non-European immigrants; and Russian immigrants. The non-European immigrants included higher female SARs than the Europeans, both hosts and immigrants. Unlike the other groups, the majority of suicide attempters among the Russian immigrants in Estonia and Estonian hosts were male. This was also true for immigrants from Curaçao, Iran, Libya and Sri Lanka. When the single groups with a male majority were excluded, 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 ($r = 0.55$, $P < 0.03$). 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 immigrants (ratio 2.32) and Russian immigrants (0.68), but not the European immigrants. **Conclusions**: The higher suicide attempt rates in non-European immigrant females compared with males may be indicative of difficulties in the acculturation processes in Europe. Further understanding of factors underlying suicidal behaviour in immigrant and minority groups is necessary for planning effective prevention strategies.

Introduction

Immigration and suicidal behaviour

The estimated number of international migrants in Europe in 2009 was almost 70 million, representing ~9.5% of the whole European population.[1] Yet, data on suicide and suicide attempts in immigrants are scarce.[2] A previous study based on a large international database[3,4] compared suicide attempts rates (SARs) between European immigrants and their host populations.[4] The study also compared suicidal behaviour between immigrants and natives of their countries of origin. The results suggested positive correlations in suicidal behaviour between immigrants and natives of their countries of origin. However, some groups displayed high SARs as immigrants despite low suicide rates in their countries of origin. Hence, there may be several still unrecognized factors that play a role in this relationship.[4]

Gender and suicidal behaviour

Gender differences in suicidal behaviour and suicide mortality are characteristic of all cultures.[5] Generally, suicidal ideation and attempts are more common among females, but completed suicides are more common among males. In Western countries, the female-to-male suicide attempt ratio is 1.5:1, and the male-to-female completed suicide ratio, is 2.4:1.[6] This 'gender paradox of suicide'[6] might be explained by differences in the social acceptability of completed vs. attempted suicides between the sexes, which protects women against completed suicide.[7] The tendency of males to use more lethal methods such as firearms may also be a factor.[8] Nevertheless, this pattern is not entirely universal, and in some areas, such as Helsinki (Finland) and Tallinn (Estonia), suicide attempters are predominantly male.[9]

The role of gender in attempted suicide among immigrants

Studies of suicide attempts among immigrants in specific locations in Europe and other Western countries reported higher rates for female immigrants than non-immigrants, especially in young women who moved from traditional to more individualistic societies.[2,10–15] One possible explanation is conflicts of women with their families due to their less traditional views.[16–18] However, attempts do not occur only among those from traditional societies, and not only among women. A study from Sweden[19] showed a higher hazards ratio of attempted suicide among male immigrants from Finland and other countries of the Organization of Economic Cooperation and Development (OECD), in addition to Iran and Poland, than in native-born male Swedes, even after controlling for socio-economic status. In contrast, male immigrants from Asia and southern Europe had hazard ratios about half of those of native Swedish men.

In some immigrant groups, the gap between females and males within the group is also much larger than for non-immigrants. For example, the SAR in female South Asians living in the UK is seven times higher than that of males in the same group.[20] In the Netherlands, the SAR of Turkish female immigrants is more than three times the rate for Turkish males, whereas in the native population, the difference between females and males is much smaller.[10]

Aims of the study

The main research questions of the present study were as follows: (i) Is there a difference in the gender distribution of suicide attempts between immigrants and host populations? (ii) Does the male–female difference in SARs differ among immigrants from different countries? (iii) How do gender distribution patterns of suicidal behaviour among immigrants relate to those in their country of origin?

Methods

Data collection

The data on suicide attempts were derived from the WHO/EURO Multicentre Study on Suicidal Behaviour, initiated in 1988 and described in detail elsewhere.[3,4] The data were collected in a standardized manner by 25 participating centres in 20 countries. The catchment areas together have a population of nearly six million. The present study was based on 58 622 suicide attempts made from 1989 through 2003. To assess the relationship of gender patterns of suicidal behaviour between immigrants and natives in their country of origin, we used the established rates of completed suicide for the countries of origin, because SARs were generally not available. The rates were taken from the WHO Mortality Database (http://apps.who.int/whosis/database/mort/table1.cfm) for the relevant years.

Exclusion criteria

Ukrainians were excluded from the analysis because a previous study based on the same source[4] found that they were probably miscategorized in two centres (Holon, Israel and Wuerzburg, Germany). We also excluded Moroccan and Turkish immigrants living in Leiden, the Netherlands, who could not be compared with local citizens owing to a lack of comparable population data. Centres with few (<20) suicide attempts by immigrants and centres with very heterogeneous immigrant populations, in which no immigrant group could account for >0.5% of the attempts, were excluded as well. The final analysis comprised eight centres in seven European countries including 64 local and immigrant groups (by birth or by citizenship), or 17 662 local and 3755 immigrant person-cases in 24 million person-years (table 1).

Methods

Annual person-based SARs (cases per 100 000) were calculated at each centre for males and females in the immigrant groups and in the host population, separately by country of birth and by citizenship.[4] The monitoring form included a direct question about the respondent's country of birth and citizenship, and the collecting centres used one or both of these variables. The calculation was based on the number of suicide attempters in the group in question registered in the database during the relevant period and the catchment area population found at regional offices databases for the relevant years and groups. At most centres, population data in the regional statistics offices were available either by country of birth or by citizenship. In those cases where the population data were not available for all relevant years, linear development estimates of the group sizes were created. In addition to this, annual gender-divided immigrant population data for the catchment areas were not fully available for all centres. The proportions of males and females in the immigrant groups were then estimated either from a limited sample (e.g. data on specific years applied to all years) or based on other data sources (national data on the sex distribution in specific groups, for example).

Statistical significances of the differences in gender ratios in various groups were assessed by estimating the interaction terms between gender and group (i.e. the specific immigrant or host group) in a series of analyses using generalized estimating equation (GEE) models with a Poisson assumption. In addition, correlational analyses of male and female SARs were adjusted to control for the influence of overlapping groups by country of birth and citizenship. To assess the relationship between gender ratios of attempted suicides in the immigrant groups and

Table 1 Centres, years, missing data and number of suicide attempters in the final analysis

Centres	Missing data for country of birth (%)	Missing data for citizenship (%)	Suicide attempters, local born, M/F	Suicide attempters, foreign-born, M/F	Suicide attempters, local citizens, M/F	Suicide attempters, foreign citizens, M/F
Bern (Switzerland) 1989–91, 1993–99	42.1	1.1	–	–	437/701	82/91
Ghent (Belgium) 1996–99	3.1	2.8	–	–	739/1133	14/62
Holon (Israel)[a] 1997, 1999, 2002	9.2	6.0	90/142	55/80		
Leiden (Netherlands) 1989–92	3.2	3.2	208/349	10/22	–	–
Stockholm (Sweden) 1990–2003	15.1	10.9	795/1314	197/396	912/1562	130/243
Tallinn (Estonia) 1995–2000	3.1	2.8	1191/1163	344/292	753/785	778/655
Umeå (Sweden) 1989–95	0.6	0.2	429/635	34/39	449/635	25/39
Wuerzburg (Germany) 1989–2003	10.5	7.9	–	–	1238/1961	57/113

– Large amounts of missing data for the variable/data not collected by the centre
a: Citizenship is given automatically to all Jews; hence, country of birth is used as the indicator of immigration

completed suicides in their countries of origin, we performed rank-correlation analyses using Kendall's tau-b coefficient.

Results

Gender distribution of suicide attempts in immigrants and host populations

When all immigrants were compared with all hosts, there was no statistically significant difference in the gender ratio of suicide attempts. However, the ratio for the hosts (1.33 females:1 male) was larger than for the immigrants (1.03:1), indicating a more even gender distribution for the immigrants.

In contrast, comparison of the individual immigrant groups with their host populations yielded marked differences. For example, Turkish immigrants had a significantly higher gender ratio than their hosts in Ghent (Belgium), Stockholm (Sweden) and Wuerzburg (Germany); Finnish immigrants had a significantly lower gender ratio than their hosts in Stockholm; Russian immigrants had a significantly lower gender ratio than their hosts in Tallinn (Estonia); and Iranian immigrants had a considerably lower ratio than their hosts in Umeå (Sweden). Table 2 shows the gender ratios of SARs for immigrants by country of origin and their host populations. Of the 51 comparisons, 22 yielded a difference of at least 50% in gender ratio. The ratio of the immigrant groups was sometimes higher and sometimes lower than the host ratio, depending on the group and site. In 14 comparisons, there was a >100% difference, but in only 7 was the difference statistically significant (table 2). The lack of significance was generally due to the small numbers in the single immigrant groups, which are specifically highlighted in table 2.

We then divided the groups by general region of origin into four major categories: hosts (Belgium, Estonia, Germany, Israel, The Netherlands, Sweden, Switzerland); European and other Western immigrants (Finland, Former Yugoslavia, Germany, Greece, Italy, Norway, Poland, Portugal, Romania, Spain, the USA); non-European immigrants (Chile, Curaçao, Egypt, Indonesia, Iraq, Iran, Libya, Morocco, Sri Lanka, Suriname, Turkey); and Russian immigrants. Comparison of each of the three large immigrant categories with the hosts category revealed that the gender ratio of the hosts was significantly higher than that of the Russian immigrants, but it did not differ significantly from the gender ratio of the European (and other Western) immigrants or the non-European immigrants.

The correlation of the SARs for females and males was very robust in the hosts category ($r = 0.88$, $P < 0.001$) and significantly different for the immigrant categories ($r = 0.45$, $P < 0.001$). In the hosts, females made 22 more suicide attempts per 100 000 than males; for immigrants, the corresponding figure was 46.

Gender differences of suicide attempts among immigrant groups

Despite the widely varying SAR levels of the different host populations, they had remarkably similar gender ratios of 1.52 females:1 male on average. The sole exception was noted in Tallinn (Estonia), where males were in the majority (ratio = 0.82). However, on comparison of the individual immigrant groups (taking only the more numerous ones into account), gender ratio varied from 0.52 females: 1 male for Russian immigrants in Tallinn to 5.98:1 for Turkish immigrants in Ghent. Immigrants from Morocco, Turkey, Yugoslavia and Chile tended to have higher gender ratios whereas immigrants from Finland, Spain, Italy and, especially, Russia and Iran had lower ratios. We then regrouped the individual immigrant groups into the three major categories of European and other Western immigrants, non-European immigrants and Russian immigrants. Further comparison showed that both the European and non-European immigrants had a significantly higher gender ratio than the Russian immigrants ($P < 0.0005$).

Besides the Russian immigrant group and the Tallinn host group, males constituted the majority of suicide attempters in a few immigrant groups from non-European countries—Curaçao (F:M ratio = 0.90), Iran (ratio = 0.41), Libya (ratio = 0.00) and Sri Lanka (ratio = 0.81). (The rates for immigrants from Curaçao and Libya were however based on small numbers) When we excluded the groups with male majorities, the GEE model yielded a significant difference in gender ratio between European and non-European immigrants ($P < 0.05$), with the latter having the higher ratio.

Prompted by this finding, we then excluded the single groups with male majorities (where Russian immigrants formed one large group by themselves) from the comparison of the major immigrant categories with the hosts category. Using the GEE model, we found significant differences in gender ratio between the hosts (ratio = 1.52) and both the non-European immigrants (ratio = 2.32) and the Russian immigrants (ratio = 0.68) ($P < 0.0005$). There was no significant difference between the hosts and the European immigrants (ratio = 1.59) (Figure 1).

The correlation between the female and male SARs was relatively high for the European immigrants ($r = 0.74$, $P < 0.0005$) but not for the non-European immigrants. Excluding the single groups with a male majority strengthened the correlation ($r = 0.55$, $P < 0.03$). The average difference between female and male SARs was larger in the non-European immigrant groups (84 cases per 100 000) than in the European groups (64 cases per 100 000).

Gender distribution patterns in immigrant groups and their country of origin

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

Table 2 Gender ratios of suicide attempt rates: comparison of hosts and immigrants in each centre (by country of birth or citizenship)

Centre	Native	SAR ratio	No. of suicide attempters in the analysis (female/male)	Foreign	SAR ratio	No. of suicide attempters in the analysis (female/male)
Bern[a]	Switzerland	1.39	701/437	Portugal	(2.92)	8/3
				Ex-Yugoslavia	1.62	22/16
				Turkey	1.41	13/12
				Spain	1.34	14/13
				Italy	1.31	17/17
				Germany	1.25	10/10
				Sri Lanka	0.81	7/11
Ghent[a]	Belgium	1.42	1133/739	Turkey	5.98**	53/9
				Morocco	2.08	9/5
Holon[b]	Israel	1.57	142/90	Egypt	(3.32)	4/1
				USA	(2.78)	2/1
				Turkey	(2.14)	5/2
				Poland	1.99	11/5
				Morocco	(1.87)	9/4
				Romania	(1.54)	8/4
				Iraq	(1.23)	4/3
				Russia	1.09	35/26
				Iran	(0.23)*	2/8
				Libya	(0.00)	0/1
Leiden[b]	Netherlands	1.61	349/208	Morocco	(5.02)	8/2
				Suriname	(4.70)	6/1
				Indonesia	(1.71)	2/1
				Turkey	(1.11)	4/4
				Curacao	(0.90)	2/2
Stockholm[a]	Sweden	1.66	1569/912	Greece	(6.18)	4/1
				Ex-Yugoslavia	2.03	18/10
				Turkey	1.84	53/27
				Chile	1.79	20/12
				Finland	1.31	126/66
				Norway	1.26	7/6
				Poland	1.00	15/8
Stockholm[b]	Sweden	1.61	1314/795	Greece	(4.55)	7/2
				Turkey	2.65**	92/40
				Ex-Yugoslavia	1.90	33/19
				Chile	1.87	45/24
				Norway	1.42	11/6
				Poland	1.27	36/16
				Finland	1.11**	172/90
Tallinn[a]	Estonia	0.80	785/753	Russia	0.81	655/778
Tallinn[b]	Estonia	0.84	1163/1191	Russia	0.52**	292/344
Umeå[a]	Sweden	1.48	669/449	Finland	(2.49)	6/2
				Norway	(2.28)	7/3
				Iran	0.43**	7/20
Umeå[b]	Sweden	1.48	635/429	Norway	(2.41)	10/3
				Finland	1.37	20/11
				Iran	0.57*	9/20
Wuerzburg[a]	Germany	1.46	1961/1238	Poland	(4.33)	12/3
				Turkey	3.19**	49/18
				Ex-Yugoslavia	2.96	21/8
				USA	1.44	20/20
				Russia	0.99	11/8

a: Analysis by citizenship
b: Analysis by country of birth. Values in parenthesis are based on less than five male or female cases *Significance of difference to the highest rate $P<0.05$. **Significance of difference to the highest rate $P<0.01$

Discussion

Gender distribution of suicide attempts in immigrants and hosts

The present study investigated the gender distribution of suicide attempts in immigrants and their host populations. The gender ratios in the non-European immigrants were found to be clearly larger than those of the hosts, in agreement with other reports. Studies from non-Western countries have shown that suicidal characterization 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.[21,22] Some of these factors have been advanced as possible explanations for the high suicide attempt rate among non-Western immigrant females in European countries.[10,16,20,23]

The gender ratio of Russian immigrants is especially interesting because it seems to be contradictory to most gender patterns of suicidal behaviour. We also found a male majority in one host population (Estonians in Tallinn). An earlier study reported that the female-to-male gender ratio of suicide attempts in Tallinn was equal to or lower than 1.[24] In both Estonia and Russia, the rate of completed suicide is very high in males, as well as high M:F ratios.[25]

Male and female SARs were highly correlated in the host groups but less in the immigrant groups. This finding suggests that the factors influencing SARs may be similar for males and females in the non-immigrants but may vary substantially in immigrants. Thus,

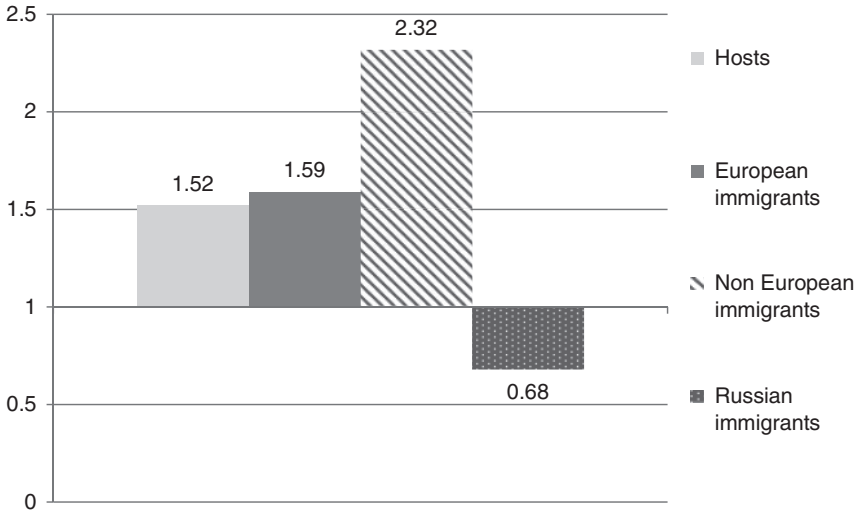

Figure 1 Female-to-male gender ratios of suicide attempt rates in immigrants and hosts (single male-majority groups excluded)

the mechanisms of attempted suicide may differ between male and female immigrants.

Gender differences in suicide attempts among immigrant groups

Among the host groups, the gender ratios of attempted suicide were very similar in seven of the eight comparisons; however, they varied much more among the different immigrant groups, especially between the Russian immigrant group (which had a male majority) and the others. Non-European immigrant women tended, on average, to have more than double the SAR of immigrant men in the same groups, whereas in the European immigrant groups, 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.

The difference between European and non-European immigrants was present only when the single groups with a male majority of suicide attempters were excluded. The male-majority pattern, observed in Russian immigrants and in immigrants from Curaçao, Iran, Libya and Sri Lanka, may reflect the greater cultural variance among immigrants from outside Europe. These sharp deviations from the norm warrant further monitoring and research, at least in the large Iranian immigrant group. Like the rare female-majority patterns in completed suicide,[22] these exceptional situations could illuminate the mechanisms underlying the gender paradox of suicide.

The average difference between male and female SARs was larger among non-European immigrant groups than the European ones after the removal of the male-majority groups. The correlation between male and female SARs was also smaller among the non-European immigrants and the amount of common variation in male and female SARs smaller still. A more detailed investigation showed that in the non-European immigrant groups, there was a slight tendency for low male SARs to appear together with not only medium level but even high female SARs (for example, the SAR of Turkish women in Ghent was 328/100 000 compared with 55 in men of the same group).

Gender patterns in the countries of origin and among immigrants

Overall suicide attempt rates in immigrants are known to relate to the suicide rates of their countries of origin,[4] but no such relationship has been found for the gender distribution of suicide. Despite the lack of a general relationship, it is still possible that the male majority of the Russian immigrant suicide attempters reflect the large male majority of suicide completers in Russia.[25] Likewise, Finnish immigrants tend towards low gender ratios, and there is a male majority in attempted suicides in Helsinki as well.[9] The effects of immigration are likely to appear in the context of the specific cultures of the country of origin.

Limitations of the study

The material used in this study could not be productively divided by age distribution owing to the already small sizes of the groups. In addition, the definitions of host and immigrant populations are not always clear-cut and may change over time, as illustrated by the situation in Tallinn. Russians in Estonia lived for decades as a 'domestic' minority under the Soviet regime. Being Soviet citizens, they were not categorized as immigrants until Estonian independence.[26]

It should also be noted that the catchment areas cannot be considered representative of the countries they are a part of, and the immigrants living within them may not be representative of the whole immigrant population in those countries. Nevertheless, we used material from the largest European database at hand.

The small number of cases made it impossible to establish significance for the differences between many of the single immigrant groups. Hence, the findings should be viewed as indicative of emerging general patterns that should be the focus of attention.

Regarding data on completed suicide in the countries of origin, it should be noted that the question of their quality and reliability always surfaces. Data from developed countries are collected and updated on a regular basis on the WHO website, while most developing countries report on a less regular basis. In these countries, when available, figures on suicide are underestimated and may not always be reliable due to underreporting resulting of inefficient civil registration systems. There are also variations in coroners, doctors and hospital practices when issuing death certificates.[21] Yet, the WHO data still constitute the most reliable and comprehensive data set available.

Conclusions

The main conclusion of this study is that the gender ratio of suicide attempters is larger for non-European immigrants than that for Europeans, both hosts and immigrants. Russians and Estonians

strongly deviate from this norm, as do some other male-majority immigrant groups from around the world.

Despite the clear patterns of cultural continuity in terms of levels of suicidality reported in the previous study,[4] the pattern of gender distribution among suicide attempters follows, at least partly, a different dynamic. Hence, it is possible that immigration per se plays a role in gender patterns of attempted suicide. We suspect that the high suicide attempt rates of women in some of the groups reflect some gender-dependent features in the acculturation process.

There may be one or more still unidentified processes that influence both male and female suicide attempts within a group. Furthermore, in some groups (notably non-European immigrants), there seem to be additional factors that increase the frequency of female attempts specifically. Several previous studies based on the narratives of immigrant female suicide attempters pointed to common factors that placed these women at risk of suicidal ideation and behaviour, namely parental and familial overregulation, lack of autonomy and cultural alienation.[12,16,27]

The lack of knowledge regarding immigrant and minority groups is a major obstacle in planning suicide prevention strategies at a European level.[28] A better understanding and updating of the data of suicidal behaviour of immigrants in Europe is needed in order to develop policies that are culturally specific and informative. There is also a great need for more systematic data on the immigrants in Europe and their distress, as manifested specifically in suicidal behaviour, particularly in women.

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Conflicts of interest: None declared.

Key points

- Non-European immigrant women show much higher suicide attempt rates compared with non-European immigrant men, reflecting gender-dependent features in the acculturation process that specifically increase the frequency of female attempts.
- Immigration *per se* may play a role in the gender patterns of attempted suicide among immigrants.
- Among Russian immigrants, there is a large male majority in suicide attempters, possibly reflecting the large male majority of suicide completers in Russia.
- There is a lack of knowledge regarding the suicidal behaviour of immigrant and minority groups in Europe impeding the development of culturally specific and informative suicide prevention policies.

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