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ORIGINAL ARTICLE

Ethnicity, socio-economic status and self-harm in Swedish youth: a national cohort study

B. Jablonska[1]*, L. Lindberg[1], F. Lindblad[2,3] and A. Hjern[4,5]

[1] *Stockholm Centre for Public Health, Sweden*
[2] *Stress Research Institute, Stockholm University, Sweden*
[3] *Department of Neuroscience, Child and Adolescent Psychiatry, University Hospital of Uppsala, Sweden*
[4] *Centre for Epidemiology, National Board of Health and Welfare, Stockholm, Sweden*
[5] *Department of Children's and Women's Health, Uppsala University, Uppsala, Sweden*

Background. Previous studies have shown an elevated risk for self-harm in adolescents from ethnic minorities. However, potential contributions to this risk from socio-economic factors have rarely been addressed. The main aim of this article was to investigate any such effects.

Method. A national cohort of 1009 157 children born during 1973–1982 was followed prospectively from 1991 to 2002 in Swedish national registers. Multivariate Cox analyses of proportional hazards were used to estimate the relative risk of hospital admission for self-harm. Parental country/region of birth was used as proxy for ethnicity.

Results. Youth with two parents born outside Sweden (except those from Southern Europe) had higher age- and gender-adjusted hazard ratios (HRs) of self-harm than the majority population (HR 1.6–2.3). The HRs decreased for all immigrant groups when socio-economic factors were accounted for but remained significantly higher for immigrants from Finland and Western countries and for youth with one Swedish-born and one foreign-born parent.

Conclusions. Socio-economic factors explain much of the variation by parental country of birth of hospital admissions for self-harm in youth in Sweden.

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Key words: Adolescents, ethnicity, self-harm behaviour, socio-economic status, young adults.

Introduction

In Sweden, as in many other countries, adolescents and young adults have the highest hospital admission rate for self-harm behaviour (National Board of Health and Welfare 2006*a*). According to the recent statistics, the number of female adolescents (15–24 years old) treated for self-inflicted injury increased from approximately 200/100 000 inhabitants in 1998 to approximately 300 in 2004. A similar trend has been observed among male adolescents, with an increase from 65/100 000 inhabitants in 1998 to almost 100 in 2004.

Some previous studies have indicated that adolescents from ethnic minorities may constitute a particularly vulnerable group with respect to self-harm behaviour (de Jong, 1994; Karmi, 1997; Bayard-Burfield *et al*. 1999; Ponizowsky *et al*. 1999; Engström *et al*. 2004). This has often been explained in terms of acculturative stress and perceived cultural incompatibilities between the home and host cultures (Hovey & King, 1996, 1997). For example, in the study by Lau *et al*. (2002), a lower level of acculturation together with youth–parent conflict predicted suicidal behaviours among Asian American youths.

Numerous studies have found socio-economic disadvantages, such as long-term unemployment of the parent(s), low family income, and single-parent households, to be independent risk factors for self-harm behaviours among young people (de Jong, 1994; Cantor *et al*. 1995; Beautrais *et al*. 1996; Fergusson *et al*. 2000; Tomori *et al*. 2001; Johnson *et al*. 2002; Christoffersen *et al*. 2003; Weitoft *et al*. 2003; Engström *et al*. 2004). Such disadvantages may explain part of the increased risk for self-harm in young individuals from ethnic minorities because the socio-economic position of their parents is generally lower than that of their native counterparts (Franzén, 2003; Ministry of Health and Social Affairs, 2004; National Board of Health and Welfare, 2006*b*). A Dutch study demonstrated that rates of suicide were significantly higher among children of immigrants compared

* Address for correspondence: B. Jablonska, B.Sc., Stockholm Centre for Public Health, Stockholm County Council, Box 17533, SE-118 91, Stockholm, Sweden.
(Email: beata.jablonska@sll.se)

with the general population during a period of high unemployment among immigrants (de Jong, 1994). However, although social inequalities have been previously suggested to underlie differences in health across ethnic groups (Hjern, 2004; Syed *et al*. 2006; Tinghög *et al*. 2007), there are only a very limited number of studies addressing the issue of socio-economic status (SES) as a possible explanation for self-harm in immigrant youth.

As Sweden has become a multi-ethnic and multi-cultural society, with a quarter of the children below 17 years of age having one or both of their parents born abroad (Statistics Sweden, 2006), it is important to understand the association between self-harm and ethnic minority status. However, adolescents of ethnic minorities should not be viewed as a homogeneous group, as has often been the case. Immigration will vary with, and may have an influential role on, the SES and health status of the individual. According to Swedish data the risk of poverty differs not only between ethnic minorities and the native population but also between various ethnic minorities groups, and is significantly higher among non-European immigrants than among immigrants from Scandinavia and Europe (National Board of Health and Welfare, 2001). Similarly, rates of self-harm behaviour appear to vary across ethnic groups. An Australian study has reported that rates of suicide and attempted suicide were lower among young immigrants (15–24 years old) from East Asia, Southern Europe and the Middle East than the Australian-born population, but higher among those from Western and Eastern Europe (McDonald & Steel, 1997). Swedish studies, although not restricted to the young population, indicate a similar ethnic variation in mental health outcomes (Hjern & Allebeck, 2002; Westman *et al*. 2003). There is reason to believe that immigrants who arrive in the country of resettlement as teenagers may be a more vulnerable group in terms of self-harm behaviour than those who were born in the host country or immigrated as pre-school children. Higher age at immigration may serve as a proxy for lower acculturation level, which, in turn, may increase the risk for self-harm (Hovey & King, 1996, 1997). A recent study found that first-generation immigrants who settled in Sweden at an age of $\geqslant 7$ years ran a higher risk of poor self-rated health than second-generation immigrants (Saraiva Leao & Sundquist, unpublished observations). Other studies of solely mental health outcomes, including self-harm, have found a reversed pattern with better outcomes in first-generation immigrants (Sorenson & Golding, 1988; Hernandez & Charney, 1998; Hjern & Allebeck, 2002).

In summary, socio-economic conditions have been shown to influence the risk for self-harm behaviour in youth. Because adolescents and young people from ethnic minority families face socio-economic adversity to a greater extent than the host country population it is plausible that they may constitute a particularly vulnerable group with respect to self-harm behaviour. In this study we examined socio-economic factors as confounders of the association between ethnicity and risk of hospital admission for self-harm in Sweden.

Method

This study was based on data from national registers held by the Swedish National Board of Health and Welfare (NBHW) and Statistics Sweden. The key to these registers is the unique personal identification number that follows each Swedish resident from birth to death. This number was used to link data from the registers to each participant.

Study groups

The study population consisted of the entire Swedish population born between 1973 and 1982 ($n = 1009\,157$) who resided in Sweden in November 1990 according to the Swedish Population and Housing Census of 1990. The cohort was followed in the National Hospital Discharge Register from 1991 to 2002. Individuals with adoptee background ($n = 1711$) were excluded from the study because they, although in one sense being immigrants, have a different background and favoured socio-economic prerequisites (e.g. Hjern *et al*. 2002). To minimize the problem of a numerator–denominator bias because of unrecorded migration in foreign-born residents (Weitoft *et al*. 1999), we excluded years of individuals with no income from work or social welfare in the household from the total time in the study.

Ethnic background

Information about country of birth of the individuals in the study population and their parents, obtained from the Register of the Total Population in 1990, was used as to create proxies for ethnicity. The study group was divided into three groups as follows:

Majority. The study subject and both his/her parents were born in Sweden.
Minority. No parent born in Sweden.
Mixed. One parent born in Sweden and one parent born in another country.

The minority study group was further subdivided by the maternal country of birth into Finnish, Southern European, Eastern European, Middle Eastern/North African, African (south of Sahara) Central Asian/Far Eastern and Latin American. A Western category

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was added, which included Western Europe, North America, Australia and New Zealand. If the information about the maternal country of birth was not available, the paternal country of birth was used for this categorization or, if that information was not available, the country of birth of the study subject.

Age at migration

Age at migration to Sweden was calculated as the difference between the year of migration of the head of the household registered in the Swedish Population and Housing Census 1990 and the child's year of birth. Age at migration was then grouped into three categories: born in Sweden; 0–6 years; ⩾7 years.

Sociodemographic variables

Sociodemographic variables were created by linkage to (1) the Swedish Population and Housing Census 1990: year of birth, sex, SES of the household, single parent household, housing, and geographical location of the home (residency). SES was defined according to the classification used by Statistics Sweden, which is based on occupation but also takes educational level of occupation, type of production and position of work of the head of the household into account. Six categories of SES were created: unclassified, manual labour, skilled labour, and three levels of white-collar occupations. (2) The Total Enumeration Income Survey for 1990: social welfare benefit received in 1990 by the head of the household in the census of 1990.

Outcome variable

The outcome variable, hospital admission because of self-harm, was obtained through linkage of individual records to the National Hospital Discharge Register from January 1991 to December 2002. Self-harm was defined according to the ninth revision of the World Health Organization (WHO) International Classification of Diseases (ICD-9) (intentional self-harm E950–959 and event of undetermined intent E980–989) during 1991–1996 and according to the WHO ICD-10 (intentional self-harm X60–84 and event of undetermined intent Y10–34) during 1997–2002.

The ICD definition of self-harm includes: purposely self-inflicted poisoning or injury, suicide (attempted). Classification codes for intentional self-harm/event of undetermined intent contain injuries resulting from: self-poisoning, hanging, strangulation, suffocation, drowning, submersion, discharge of gun/firearms, explosive material, smoke, fire/flames steam, hot vapours/hot objects, sharp/blunt object, jumping from a high place, jumping/lying before moving object, crashing of motor vehicle, other specified and unspecified means.

Statistical methods

Multivariate analyses were calculated by Cox regression of proportional hazards of time to event with hospital admission at least once because of self-harm as the outcome variable. Time in the study was calculated from date of hospital admission, date of death from the National Cause of Death Register and date of emigration from the Total Enumeration Income Survey.

Year of birth was considered as a continuous variable in the regression models in accordance with the linear relationship of this variable with the outcome. Other sociodemographic variables were entered as dichotomized variables into the models, when necessary with the use of dummy variables. SPSS version 14.0 (SPSS Inc., Chicago, IL, USA) was used in all statistical analyses.

Results

The cumulated incidence of hospital admission because of self-harm at least once during 1991–2002 was 0.8% for men and 1.8% for women in the entire cohort. The incidence of hospital admission because of self-harm was highest among men from Finland (1.9%) and among women from the mixed group Central Asia/Sweden (4.0%) (Table 1).

The non-European immigrant households had the least satisfactory socio-economic situation in term of SES, number of social welfare recipients and housing conditions (Table 2). The socio-economic situation of other ethnic minority households was better than the non-Europeans, but less satisfactory than the Swedish majority population. Living in a one-adult household was most common among immigrant households from Africa and Latin America.

The first model in the multivariate analysis, adjusted for age and gender only, revealed that individuals from ethnic minorities (except the Southern Europeans) had higher hazard ratios (HRs) of self-harm than the Swedish majority (HR 1.5–2.3) (Table 3).

In the second model, where possible socio-economic confounders were introduced, the HRs decreased for all ethnic minorities, but remained significantly higher for immigrants from Finland, Western Europe/other Western countries and those in the mixed group. The immigrants from Southern Europe had significantly lower HRs than the Swedish majority (Table 3).

The risk for self-harm increased with decreasing parental SES (HR ranged from 1.1 for white-collar II to 1.5 for manual labour), uptake of social welfare benefits (HR 2.0), and one-adult household (HR 1.5) (Table 3). Individuals living in their own apartment or

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Table 1. *Crude rates of hospital admission related to self-harm by ethnicity*

	n	Cases	Men (%)	Women (%)
Swedish majority	817 360	9586	0.7	1.6
Minority				
Finland	25 250	643	1.9	3.2
Western	8369	141	1.1	2.3
Southern Europe	12 149	147	0.9	1.6
Eastern Europe	10 368	188	1.3	2.4
Middle East + North Africa	22 239	496	1.1	3.5
Africa south of the Sahara	2721	60	1.7	2.8
Central Asian	4625	79	0.6	2.8
Latin America	8586	188	1.5	3.0
Mixed				
Finland/Sweden	33 814	655	1.3	2.6
Western/Sweden	33 523	586	1.2	2.4
Southern Europe/Sweden	9941	203	1.3	2.7
Eastern Europe/Sweden	9032	176	1.0	2.9
Middle East + North Africa/ Sweden	4214	83	0.9	3.1
Africa south of the Sahara/ Sweden	1662	40	1.7	3.1
Central Asian/Sweden	2720	72	1.4	4.0
Latin America/Sweden	2584	53	1.6	2.5
Total	1 009 157	13 396	0.8	1.8

house ran a lower risk for self-harm (HR 0.8 and 0.7 respectively) than those living in a rented apartment and residents of rural areas ran a lower risk than residents of metropolitan regions (HR 0.9).

The multivariate analysis of age at immigration to Sweden and hospital admission because of self-harm (results not shown as a table) revealed that those who settled in Sweden at an age of $\geqslant 7$ years had higher odds than those immigrants who were born here (HR 1.2, 95% CI 1.1–1.4). However, this relationship did not remain significant once the socio-economic variables were jointly accounted for (HR 1.0, 95% CI 0.8–11).

Discussion

This register study in a national cohort of Swedish youth demonstrated an increased risk of self-harm behaviour in ethnic minorities (except those from Southern Europe). When socio-economic conditions were also adjusted for, however, increased risks remained only for Western youth including Finnish and for those with a mixed origin. This indicates that socio-economic disadvantage is the main explanation for the increased risk of self-harm in minority youth in Sweden. A similar conclusion has been reached previously with regard to other health outcomes (Hjern, 2004; Syed *et al*. 2006; Tinghög *et al*. 2007).

There are several mechanisms by which social factors may increase risk of self-harm. First, children in socially disadvantaged families are more likely to be exposed to multiple stressors, increasing their susceptibility to mental health problems (McLeod & Shanahan, 1996). Second, lack of material and social resources may be associated with a wide array of negative consequences for parents, such as mental and/or physical ill-health and substance abuse (Eamon & Zuehl, 2001), that may affect the quality of parenting (McLanahan & Sandefur, 1994). A third mechanism may be social exclusion caused by of lack of family assets, which may lead to lowered self-esteem and feelings of isolation as well as depressive symptoms during adolescence (von Rueden *et al*. 2006), which in turn are known causes of self-harm and suicide (Beautrais, 2003).

The relationship between ethnicity and self-harm remained, after adjustment for socio-economic variables, for ethnic minorities from Finland, other Western European countries and those in the mixed group. Self-harm for these groups may have been influenced by patterns of self-harm in the parental country of origin. A number of studies have documented high rates of self-harm behaviour in Finland and other

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Table 2. *Socio-economic indicators by ethnicity* (%)

	Swedish majority (n = 817 360)	Finland (n = 25 250)	Western (n = 8369)	Southern Europe (n = 12 149)	Eastern Europe (n = 10 368)	Middle East/ North Africa (n = 22 239)	Africa (n = 2721)	Central Asia/ Far East (n = 4625)	Latin America (n = 8586)	Mixed (n = 97 490)
Gender										
Males	51.3	51.1	51.1	52.6	52.4	53.0	54.0	51.3	52.2	51.0
Female	48.7	48.9	48.9	47.4	47.6	47.0	46.0	48.7	47.8	49.0
Socio-economic status										
Unclassified	17.9	24.6	33.7	37.5	33.8	62.3	47.9	41.8	31.8	22.3
Manual labour	19.2	31.4	20.8	35.0	20.2	19.4	29.1	28.2	37.5	19.7
Skilled labour	16.7	21.4	15.7	17.3	15.6	9.3	8.2	15.2	15.4	15.3
White collar I	11.1	6.5	5.4	3.5	6.4	2.3	4.9	4.2	4.0	10.5
White collar II	18.6	11.0	10.5	4.7	12.1	4.4	5.2	6.0	7.3	17.3
White collar III	16.3	5.1	14.1	2.0	11.9	2.4	4.6	4.6	4.0	14.9
Received social welfare 1990										
Yes	5.1	15.0	17.2	10.6	24.9	56.6	58.7	34.6	44.8	9.4
Single adult household 1990										
Yes	11.1	18.8	15.9	11.7	19.5	10.9	26.1	11.5	24.6	18.8
Housing										
Unclassified	2.3	4.0	8.8	5.8	6.7	5.6	9.7	6.7	7.0	4.6
Rents apartment	18.4	40.1	38.1	63.0	56.4	82.3	76.1	65.3	76.6	30.0
Owns apartment	6.7	12.5	7.3	9.9	11.1	6.0	5.5	9.6	7.8	9.8
Own house	72.5	43.4	45.8	21.3	25.8	6.2	8.7	18.3	8.6	55.7
Residency										
Metropolitan area	24.8	39.7	33.7	57.8	57.1	46.9	55.3	54.2	58.1	38.1
Smaller city	52.2	46.7	45.4	37.7	36.4	45.9	35.5	40.0	33.2	45.5
Rural	23.1	13.5	20.9	4.4	6.5	7.2	9.3	5.8	8.7	16.4

Table 3. *Cox regression models of ethnicity, socio-economic factors and hospital admission for self-harm as the outcome variable*

	Model I HR (95% CI)	Model II HR (95% CI)
Gender		
Male	Reference	Reference
Female	2.2 (2.1–2.3)	2.2 (2.1–2.3)
Ethnicity		
Swedish majority	Reference	Reference
Minority		
Finland	2.3 (2.1–2.5)	1.7 (1.6–1.9)
Western	1.8 (1.5–2.1)	1.4 (1.2–1.7)
Southern Europe	1.1 (0.9–1.3)	0.8 (0.7–0.9)
Eastern Europe	1.6 (1.4–1.9)	1.1 (1.0–1.3)
Middle East/North Africa	2.0 (1.8–2.2)	1.0 (0.9–1.1)
Africa south of Sahara	2.0 (1.6–2.6)	0.9 (0.7–1.2)
Central Asia/Far East	1.5 (1.2–1.9)	1.0 (0.8–1.2)
Latin America	2.1 (1.8–2.4)	1.1 (0.9–1.3)
Mixed	1.7 (1.6–1.7)	1.4 (1.4–1.5)
SES		
White collar III		Reference
White collar II		1.1 (1.1–1.2)
White collar I		1.2 (1.1–1.3)
Skilled labour		1.4 (1.3–1.5)
Manual labour		1.5 (1.4–1.6)
Unclassified		1.4 (1.3–1.5)
Received social welfare 1990		
Yes		2.0 (1.9–2.1)
Single adult household 1990		
Yes		1.5 (1.4–1.5)
Housing		
Rents apartment		Reference
Owns apartment		0.8 (0.8–0.9)
Own house		0.7 (0.7–0.7)
Residency		
Stockholm, Malmö, Gothenburg		Reference
Other city		1.0 (0.9–1.0)
Rural		0.9 (0.9–1.0)*

HR, hazards ratio; CI confidence interval; SES, socio-economic status.

All analyses adjusted for year of birth; Model I included gender and ethnicity; Model II included gender, ethnicity, SES, receiving social welfare 1990, single adult household 1990, housing, and residency.

*Statistically significant.

Western European countries as well as high suicide mortality among Finns (Schmidtke *et al*. 1996; Chishti *et al*. 2003; Mäkinen & Wasserman, 2003). The high rate of alcohol abuse, a well-known risk factor for self-harm (Berman & Schwartz, 1990; Deykin & Buka, 1994; Beautrais *et al*. 1996), described in immigrants from Finland as well as in the Finnish population in Finland (Hallberg & Mattsson, 1991; Hjern & Allebeck, 2003), may be an important mediator of this higher risk.

Ethnic minorities with origins in Southern Europe ran lower risks for self-harm than the majority population, as reported previously (Hjern & Allebeck, 2002; Westman *et al*. 2003). This may again reflect the rates of self-harm behaviours in the countries of origin, given the low frequencies reported in this region (Schmidtke *et al*. 1996; Chishti *et al*. 2003).

The finding of a higher risk of self-harm among the ethnic minorities who settled in Sweden at an age of $\geqslant 7$ years compared to those who were born here is along the same line as the findings from a previous Swedish study demonstrating increased risk of poor self-rated health with age at immigration in immigrants 16–34 years old (Saraiva Leao & Sundquist, unpublished observations). In contrast to the cited survey, the effect of age at immigration was not prominent in the context of socio-economic factors. This result should, however, be interpreted with caution because the first time in a new country is usually characterized by an unfavourable socio-economic position.

The use of hospital discharge data to create the outcome variable of self-harm makes selective referral and ethnic patterns of help-seeking a possible bias in this study. Previous reports, however, have suggested that ethnic minorities in Sweden have a similar consumption of care, after adjustment for health status, to that of the majority population (Hjern *et al*. 2001). More detailed information about ethnic origin may have brought forward complementary nuances about ethnic patterns of self-harm even though the main findings would have been similar. One merit of the study is that whole national cohorts were included and that the attrition rates in the registers used are almost negligible.

To conclude, the increased risk for self-harm among youth in non-Western ethnic minorities in Sweden seems to be explained mainly by socio-economic factors. Reducing socio-economic inequalities in Sweden society thus seems to be an important strategy to prevent self-harm in these populations.

Declaration of Interest

None.

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