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Psychosis and suicide risk by ethnic origin and history of migration in the Netherlands

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ABSTRACT

Background: There is an increased incidence of non-affective psychotic disorders (NAPD) among first- and second-generation migrants in Europe. The purpose of this population-based study was to compare the risk of suicide in Dutch natives and immigrants with or without NAPD.
Methods: Cases of NAPD (n = 12 580) from three Dutch psychiatric registers were linked to the cause of death register of Statistics Netherlands and were compared to matched controls (n = 244 792) from the population register, who had no such diagnosis. Hazard ratios (HRs) of suicide were estimated and adjusted for age and gender by Cox regression analysis.
Results: The presence of NAPD was strongly associated with suicide risk in each ethnic group. However, for all ethnic minority groups the HRs were somewhat lower than among Dutch natives, for whom the HR was 23.4 (95%-CI; 18.5–29.7). A closer examination revealed that suicide risk was influenced by the history of migration. While the risk for immigrants of the first generation, diagnosed with NAPD, was significantly lower than that for native Dutch patients (HR = 0.45; 95%-CI: 0.28–0.73), the risk for those of the second generation was more similar to that for the Dutch (HR = 0.85; 95%-CI: 0.51–1.40) (P value of history of migration = 0.005).
Conclusion: Immigrants diagnosed with NAPD of the first generation appear to be protected against suicide, whereas this protection is waning among those of the second generation. This is the first study worldwide on suicide in migrants with NAPD and the first study of suicide in patients with NAPD in the Netherlands.

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1. Introduction

There have been consistent reports in the literature of an increased incidence of non-affective psychotic disorders (NAPD) among first- and second-generation migrants to Western and Northern Europe (Cantor-Graae and Selten, 2005; Morgan et al., 2010). Since social factors have been suggested to play a large role in the etiology of this phenomenon (Cantor-Graae and Selten, 2005; Morgan et al., 2008, 2010; Veling et al., 2010), one could hypothesize that these factors also contribute to an unfavorable outcome and a higher suicide risk.

On the other hand, the decision to commit suicide is influenced to a large extent by cultural factors (e.g., religion). A study of suicide in the general population of the Netherlands, which did not distinguish between first- and second-generation migrants, reported a lower incidence of suicide among the Moroccan-Dutch and Turkish-Dutch and an increased incidence among the Surinamese-Dutch (vs. Dutch natives) (Garssen et al., 2006). A large investigation in Sweden found a higher suicide risk for second-generation migrants than for their parental generation (Hjern and Allebeck, 2002). This could be interpreted as the result of a weakening influence of family bonds, religiosity, and communalism.

Remarkably, the pertinent follow-up studies of patients with NAPD conducted in the UK and in the Netherlands found no major differences in disease course between ethnic groups. These studies were underpowered to compare suicide risks; four follow-up studies did not provide information on this topic (McGovern and Hemmings, 1994; McKenzie et al., 1995, 2001; Takei et al., 1998) and four studies reported the occurrence of one or two suicides (Sugarman, 1992; Goater et al., 1999; Harrison et al., 1999; Selten et al., 2007).

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In the present study on a large cohort of patients with NAPD and matched controls without such diagnosis, it was examined whether the relationship between ethnicity and history of migration (i.e., first vs. second generation) on the one hand and suicide risk on the other might be influenced by the presence of NAPD. Immigrants diagnosed with NAPD might be at increased, similar or decreased risk of suicide compared to native Dutch with NAPD. This is the first study on suicide risk among patients with NAPD in the Netherlands.

2. Materials and methods

2.1. Databases

A retrospective cohort study was performed using data from three Dutch Psychiatric Case Registers (PCRs): Northern Netherlands (the Provinces of Friesland, Groningen and Drenthe), Rotterdam-Rijnmond (larger Rotterdam), and Middle Netherlands (city of Utrecht and surrounding municipalities). These PCRs receive anonymous information on all patients who attend any of the in-patient or out-patient facilities for mental health care (Smeets et al., 2011). Data from the fourth Dutch PCR (region South Limburg) were excluded from the present analysis as this register uses a code for neighborhood instead of postal code for identification purposes and, hence, linking with the data of Statistics Netherlands (Centraal Bureau voor de Statistiek, CBS) was problematic.

The other databases were the population register and the causes of death register of the CBS. Physicians in the Netherlands are obliged to report the cause of death to the civil register of the municipality where the person died. This information is forwarded to the CBS, where the death report is ICD-10 coded and entered into the database. In the population register, all legally residing citizens of the Netherlands are registered with date of birth, gender, country of birth, country of birth of each parent, place of residence, and a number of household characteristics.

2.2. Patients and data extraction

Data on all patients with a diagnosis of a non-affective psychotic disorder (NAPD) (DSM-IV codes 295.10, 295.20, 295.30, 295.40, 295.60, 295.70, 295.90, 297.10, 297.30, 298.80, 298.90, 293.81, 293.82) with earliest registration during the period January, 2000 until December, 2008 were extracted from the PCR databases. By linking this data to the CBS registers it was often possible to identify the patient's country of birth, the country of birth of his parents, and the cause of death, if applicable. Staff of the CBS performed this linkage for us, using information on the patient's date of birth, sex and part of the postal code. Dutch privacy law allows the use of personal (healthcare) data on behalf of scientific research, provided that the analysis results cannot be traced to a unique person. For that reason, in order to ensure anonymity, staff of CBS removed postal code and day of birth from the analysis files. For 81.5% of the PCR patients (N = 12 581 from a total of 15 445) it was possible to establish a unique match with a record in the population register of the CBS, without important differences by register region (Northern Netherlands: 84.1%, Rotterdam–Rijnmond: 81.8%, Middle Netherlands: 77.5%) (Buizer-Voskamp et al., 2011). Among those patients with a unique match, the proportion of males was somewhat lower (61.5% vs 66.9%), and the proportion of Dutch natives was somewhat higher (72.2% vs 60.0%, data from PCR-MN) than in the total PCR sample. No significant differences were found with respect to age or the distribution of NAPD diagnoses.

The reference group consisted of a random sample from the population register of inhabitants from the PCR regions without a registered NAPD, who were alive and residing in the Netherlands during (a part of the) period 2000–2008. To preclude the possibility that the same person as a control is matched to him/herself as a patient, those with a registered diagnosis of NAPD were removed from the pool of potential control persons. Since the remaining control persons may suffer from other psychiatric disorders, they may be regarded as representative for the general Dutch population without NAPD.

In order to find enough suicide events for comparison, the number of control persons was twenty times the number of patients. For each patient, twenty unique control persons were matched using year of birth, gender, country(ies) of birth of person and parents, and most recent place of residence. For the control persons, the observation time for the analysis started at the date of diagnosis of the patient to match.

2.3. Analysis

History of migration and ethnicity were defined on the basis of the country of birth of the person as well as on the country of birth of his or her parents. A person was considered a first-generation immigrant if he or she was born abroad. A Dutch-born citizen was considered a second-generation immigrant if at least one parent was born abroad. If the parents were born in different foreign countries, the country of birth of the mother was decisive for assignment to a particular group. Dutch natives were defined as Dutch-born citizens whose parents were also born in the Netherlands.

Suicide was defined as cause of death with ICD code Chapter XX, codes X60-X84. The survival time from the start of follow-up until suicide was the outcome variable and it was analyzed using a multivariable Cox regression model. For patients with NAPD, the survival time started at the earliest date of diagnosis during January, 2000–December, 2008. For control persons, the follow-up started at the date of diagnosis of the patient to match, given residence in the Netherlands at that time. The survival time was censored at the time of death from another cause, emigration, or December 31th, 2010, whatever came first. In the first Cox model, suicide rates were analyzed by both presence of NAPD and ethnic origin. Terms for interaction {NAPD × ethnic origin} were included to test whether any differences in suicide rates by ethnic origin were modified by the presence of NAPD. The estimated Hazard Ratio's (HRs) and 95% Confidence Intervals (95%-CI) were adjusted for age and gender. In the second Cox model, history of migration (first or second generation) was used instead of ethnic origin, and the interaction {NAPD × history of migration} was analyzed in a similar way. In the next step of the analysis, it was explored whether any impact of history of migration could be explained by differences in the proportions of specific DSM-IV diagnoses of NAPD or by differences in psychiatric co-morbidity (any other DSM-IV diagnosis than NAPD). The proportional hazards assumption was tested by means of a graphical method, ie, by inspection of the plot of -ln[-ln[S(t)] vs analysis time for different levels of the independent variable of interest and by linear regression of the Schoenfeld residuals on analysis time.

Data-management, record linkage and statistical analyses were performed using SPSS, version 14.0. Testing of the proportional hazards assumption was done with STATA, version 10.0 (procedures stphplot and stphtest) (Cleves et al., 2004).

3. Results

3.1. Study population (Table 1)

The study cohort consisted of 12 580 patients with a diagnosis of NAPD and 244 792 control persons without a registered diagnosis of NAPD. The largest group of non-Dutch and non-Western patients originated from Surinam and the Netherlands Antilles (N = 949). There were more non-Dutch patients of the first (N = 2615) than of the second generation (N = 1262). Schizophrenia was the main DSM-IV diagnosis for 52.8% of the patients. This was schizophreniform, schizoaffective or delusional disorder for 17.9% of them. For 29.3% of

Table 1
Suicide rates (N/100 000 person-years) in Dutch patients with non-affective psychotic disorder and Dutch subjects without such disorder, by region, age, gender, ethnic origin and history of migration, 2000–2010.

	N (%)	Subjects with NAPD[a]		N (%)	Subjects without NAPD[a]	
		N of deaths/Follow-up time[b]	Death rate (N/ppy) and [95%-CI]		N of deaths/Follow-up time[b]	Death rate (N/ppy) and [95%-CI]
Region						
Northern Netherlands	6427 (51.1)	107/37 017.4	289.0 [236.8–349.2]	124 212 (50.7)	97/733 738.2	13.2 [10.7–16.1]
Rotterdam–Rijnmond	1974 (15.7)	19/11 934.9	159.2 [95.8–248.6]	38 498 (15.7)	27/234 379.4	11.5 [7.5–16.7]
Middle Netherlands	4179 (33.2)	60/25 150.2	238.5 [182.0–307.0]	82 082 (33.5)	58/503 932.5	11.5 [8.7–14.8]
Age, categories (years)						
<25	2172 (17.3)	28/13 153.6	212.8 [141.4–307.6]	42 209 (17.2)	19/255 026.9	7.4 [4.4–11.6]
25–<35	3373 (28.8)	51/20 624.8	247.2 [184.1–325.1]	65 098 (26.6)	40/398 237.1	10.0 [7.1–13.6]
35–<45	3255 (25.9)	52/19 203.4	270.7 [202.2–355.1]	63 375 (25.9)	58/384 414.1	15.0 [11.4–19.5]
≥45	3780 (30.0)	55/21 120.5	260.4 [196.1–338.9]	74 110 (30.3)	65/434 372.0	14.9 [11.5–19.0]
Gender						
Male	7743 (61.6)	120/45 275.6	265.0 [219.7–316.9]	149 950 (61.3)	128/894 718.1	14.3 [11.9–17.0]
Female	4837 (38.4)	66/28 826.9	228.9 [177.0–291.2]	94 842 (38.7)	54/577 332.1	9.3 [7.0–12.2]
Ethnic origin						
Native Dutch	8703 (69.2)	148/51 857.4	285.4 [241.2–335.2]	173 951 (71.1)	130/1066 769.8	12.1 [10.1–14.4]
From other Western countries[c]	1222 (9.7)	15/7 030.1	213.3 [119.4–351.9]	23 491 (9.6)	19/134 695.9	14.1 [8.4–22.0]
Turkish-Dutch	326 (2.6)	4/1 887.0	211.9 [57.7–542.7]	5 847 (2.4)	3/34 416.9	8.7 [1.8–25.4]
Moroccan-Dutch	522 (4.1)	4/3 187.1	125.5 [34.2–321.3]	9 458 (3.9)	4/57 481.3	6.9 [1.9–17.8]
Surinamese/Antillean-Dutch	949 (7.5)	5/5 499.8	90.9 [29.5–212.1]	17 014 (7.0)	14/99 004.4	14.1 [7.7–23.7]
Other non-Western countries	858 (6.8)	10/4 640.9	215.4 [103.3–396.2]	15 031 (6.1)	12/79 681.6	15.0 [7.7–26.3]
History of migration						
Native Dutch	8703 (69.2)	148/51 857.4	285.4 [241.2–335.2]	173 951 (71.1)	130/1066 769.8	12.1 [10.1–14.4]
First-generation immigrant	2615 (20.8)	20/14 994.3	133.3 [81.4–206.0]	47 381 (19.4)	31/267 827.8	11.5 [7.8–16.4]
Second–generation immigrant	1262 (10.0)	18/7 250.6	248.2 [147.1–392.3]	23 460 (9.6)	21/137 452.5	15.2 [9.4–23.3]
Total	12 580 (100)	186/74 102.5	251.0 [216.2–289.7]	244 792 (100)	182/1 472 050.2	12.3 [10.6–14.3]

[a] NAPD, non-affective psychotic disorders.
[b] In years.
[c] Europe (excluding Turkey), Northern America, Indonesia, Japan, Australia, and New Zealand.

the patients this was another NAPD, often a "psychotic disorder not otherwise specified". The proportions of schizophrenia diagnoses were somewhat higher among non-Dutch patients than among Dutch patients (49.7%). These proportions were 60.1% for the Turkish-Dutch (first or second generation), 65.1% for the Moroccan-Dutch and 68.2% for the Surinamese- or Antillean-Dutch patients. No substantial difference in the proportion of schizophrenia diagnoses was found between non-Dutch patients of the first (59.2%) and the second generation (60.9%).

3.2. Crude suicide rates (Table 1)

Evaluating the figures at first sight (i.e., without formal statistical testing), the suicide rate among those with NAPD of 251.0 events per 100 000 person-years (N/ppy) was considerably higher than the suicide rate of 12.3/ppy among the control persons without NAPD. Among patients with NAPD, lower suicide rates were found for the non-Dutch, especially among those of Moroccan and Surinamese/Antillean origin. Among control persons, lower suicide rates were found for those from Turkish and Moroccan origin, while for those from Surinamese/Antillean origin a slightly higher suicide rate was observed.

The suicide rate for migrants of the first generation was lower than that for Dutch natives, especially among those with NAPD (133.3/ppy vs. 285.4/ppy). For migrants of the second generation with NAPD, however, the suicide rate was only slightly lower than that for Dutch natives with NAPD (248.2/ppy vs. 285.4/ppy). Among control persons, the suicide rate for migrants of the second generation was even higher than that for the native Dutch (15.2 vs. 12.1/ppy). Among patients with NAPD from Rotterdam–Rijnmond, a lower suicide rate compared to patients from the other two regions was found. However, in a Cox regression model with register and terms for interaction {NAPD × register}, no significant differences were found

(data not shown). In the next steps of the analysis, differences by register region were ignored.

3.3. Multivariable Cox regression for ethnic origin (Table 2.A)

Although lower suicide rates were found for most ethnic minority groups, the HRs by ethnic origin were not statistically significant (P = 0.29). The terms for the effect of interaction {NAPD × ethnic origin} were not statistically significant (P = 0.76), and, thus, were excluded from the model for the final evaluation of the effect of ethnicity. Higher age and male gender were significantly associated with a higher suicide rate.

3.4. Multivariable Cox regression for history of migration (Table 2.B)

In the model comprising both patients with NAPD and control persons, history of migration appeared to be significantly associated with suicide rate (P = 0.026). The terms for the effect of interaction {NAPD × history of migration} were borderline statistically significant (P = 0.055). For those without NAPD, a higher HR for second-generation immigrants was found (HR = 1.30), whereas the HR for the first-generation immigrants was slightly lower (HR = 0.94). Thus, the terms for the effect of interaction indicated a more pronounced and statistically significant effect of history of migration on suicide rates among those with NAPD.

In a similar model but restricted to patients with NAPD, first-generation immigrants had a considerably lower risk of suicide than native Dutch (HR = 0.45, 95%-CI: 0.28–0.73). Second-generation immigrants with NAPD had a slightly lower suicide risk not significantly different from the risk of native Dutch with NAPD (HR = 0.85, 95%-CI: 0.51–1.40)(P value for effect of history of migration = 0.005 (df = 2)).

Table 2
Hazard ratios of suicide by age, gender, presence of NAPD, and ethnic origin (2.A) or history of migration (2.B).

	HR	95%-CI
2.A Model with ethnic origin		
Age (years)	1.011	1.002–1.019
Gender (female vs. male)	0.69	0.55–0.86
Ethnic origin		
Native Dutch — no NAPD	1.00	
Native Dutch — NAPD	23.45	18.53–29.69
From other Western countries — no NAPD	1.15	0.71–1.86
From other Western countries — NAPD	17.56	10.29–29.98
Turkish-Dutch — no NAPD	0.73	0.23–2.31
Turkish-Dutch — NAPD	17.78	6.56–48.21
Moroccan-Dutch — no NAPD	0.58	0.21–1.59
Moroccan-Dutch — NAPD	10.55	3.88–28.62
Surinamese/Antillean-Dutch — no NAPD	1.15	0.66–2.01
Surinamese/Antillean-Dutch — NAPD	7.41	3.03–18.13
From other non-Western countries — no NAPD	1.24	0.68–2.26
From other non-Western countries — NAPD	17.88	9.37–34.10
	P value	
Effect of age	0.015	df = 1
Effect of gender	0.001	df = 1
Effect of NAPD	<0.001	df = 1
Effect of ethnic origin, in model with terms for interaction	0.76	df = 5
Effect of interaction {NAPD × ethnic origin}	0.16	df = 5
Effect of ethnic origin, in model without terms for interaction	0.29	df = 5
2.B Model with history of migration		
Age (years)	1.012	1.003–1.021
Gender (female vs. male)	0.6	0.55–0.87
History of migration		
Native Dutch — no NAPD	1.00	
Native Dutch — NAPD	23.46	18.54–29.70
1st-generation immigrant — no NAPD	0.94	0.64–1.40
1st-generation immigrant — NAPD	10.93	6.82–17.52
2nd-generation immigrant — no NAPD	1.30	0.82–2.08
2nd-generation immigrant — NAPD	21.28	12.94–34.99
	P value	
Effect of age	0.006	df = 1
Effect of gender	0.002	df = 1
Effect of NAPD	<0.001	df = 1
Effect of history of migration, in model with terms for interaction	0.47	df = 2
Effect of interaction {NAPD × history of migration}	0.055	df = 2
Effect of history of migration, in model without terms for interaction	0.026	df = 2

Compared to native Dutch with NAPD, lower rates for all-cause mortality, for natural (somatic) and other non-natural death causes among first-generation immigrants with NAPD were found as well (data not shown).

Significant deviations from the proportional hazards assumption were found (P value of global test in stphtest = 0.013). This finding was explained by the comparison of native Dutch, first-, and second generation NAPD patients with native Dutch persons without NAPD and probably due to the comparatively high suicide rates shortly after diagnosis among NAPD patients. Inspection of the plot of -ln[-ln[S(t)] vs analysis time revealed that the curves of NAPD patients vs native Dutch controls were, indeed, not parallel, but did not cross each other. In the model restricted to patients with NAPD, no deviations from the proportional hazards assumption were found (P value of global test in stphtest = 0.65) and, thus, above-mentioned deviations from the proportional hazards assumption did not influence the comparison between ethnic groups.

3.5. Multivariable Cox regression for history of migration with adjustment for specific NAPD diagnosis and co-morbidity

Among those with NAPD, it was investigated whether the presence of a specific NAPD or psychiatric co-morbidity might explain the differences by history of migration. A diagnosis of schizoaffective disorder was found to be associated with a higher suicide risk (HR = 1.74, 95%-CI: 1.11–2.71) than other diagnoses of NAPD. Presence of an additional diagnosis of bipolar disorder (e.g., because of uncertainty or reconsideration of diagnosis), was also associated with a higher suicide risk (HR = 1.86, 95%-CI: 1.18–2.94). Comorbid mental retardation was borderline-significantly associated with a lower risk of suicide (0.23; 95%-CI: 0.08–0.64). However, the estimates of HRs of suicide by history of migration, adjusted for any specific diagnosis of NAPD or co-morbid diagnosis, were similar to those without adjustment, and without modification of the level of statistical significance (data not shown).

4. Discussion

4.1. Main findings

Our main findings were: (i) a much higher risk of suicide in patients with NAPD than in control persons, within each ethnic group; (ii) compared to native Dutch, a lower risk of suicide in first-generation immigrants, especially among patients with NAPD; (iii) and a similar risk of suicide in second-generation immigrants, both in patients (versus Dutch patients) and controls (versus Dutch controls). These differences could not be explained by differences in age distribution, gender, DSM-IV diagnosis of NAPD or DSM-IV defined co-morbidity. This is the first cohort study with large numbers of patients and control persons to examine suicide risk in immigrants to Western Europe diagnosed with a NAPD.

4.2. Strengths and limitations

The sample of cases is highly representative of patients in the Netherlands who receive treatment for NAPD, because the registration by the psychiatric registers is complete and a high proportion of patients (>80%) could be matched with a record in the civil register of Statistics Netherlands. As patients from the PCR-MN with a foreign origin had a somewhat lower probability to have a record linkage to the CBS data compared to native Dutch patients, immigrants with NAPD are a little underrepresented in the final analyses, but this probably did not influence the found differences in suicide rate. Our data do not cover (i) patients with NAPD who do not receive psychiatric treatment; (ii) patients whose stay in the Netherlands is illegal, because they do not have a record in the civil register; and (iii) some patients (in treatment or not) who are homeless, because they have no postal code. As homeless patients and patients without a residence permit constitute a small part of the population, their omission is unlikely to influence our results. The proportion of patients who do not receive treatment is unknown and may be higher among immigrant groups, because the duration of untreated psychosis is also higher in these groups (Selten et al., 2001; Sterk et al., 2010).

A limitation of our study is the small number of suicides within each ethnic group (Table 1), which renders the estimation of relative risks less precise. Another limitation of our study is the possible effect of other causes of death on the results for suicide. This could be of importance because a lower suicide risk may be explained by a higher risk of other causes of death. However, the risk of cardiovascular and cancer mortality is probably relevant at higher ages and thus, at later stages of NAPD, whereas the suicide risk is more pronounced at earlier stages of NAPD (Palmer et al., 2005). As our analyses were all adjusted for age, competing death risks are unlikely to explain the differences by ethnic origin and migrant status. Furthermore, a first analysis on other death causes showed lower rates for all-cause mortality, natural and other non-natural death causes among first-generation immigrants with NAPD, making misclassification of codes for death cause and/or the effect of competing death causes unlikely as explanation for the found differences by history of migration.

Further analyses are needed to explore ethnic differences in mortality due to other death causes in relation to the presence of NAPD.

An earlier study of CBS data on mortality among ethnic minorities demonstrated that re-migration is an unlikely explanation for differences in mortality (Garssen et al., 2003). In addition, it is unlikely that those from ethnic minorities go back to their country of origin to commit suicide (Garssen et al., 2006).

In the present study, differences in socio-economic status as possible explanation of differences in suicide rates were not taken into account. The observed favorable association between belonging to an ethnic minority, especially in case of the first generation, and suicide rate might have been underestimated, as a lower socio-economic status is associated with a higher risk of suicide (Li et al., 2011). On the other hand, presence of NAPD often leads to social isolation and a lower socio-economic status. Hence, socio-economic status may be regarded as a possible intermediate factor in the causal pathway between NAPD and suicide, especially when present income or characteristics of the last registered neighborhood of the patient is used as proxy. Adjustment for such proxies might lead to over-adjustment and, hence, to an underestimation of the association between NAPD and suicide. Further studies are needed to fully explore the nature of the explanatory factors responsible for differences in suicide rates associated with NAPD and ethnicity and/or history of migration.

4.3. Comparison to previous studies

4.3.1. Persons without NAPD

The suicide rates for Dutch controls agree with those reported in earlier studies (Garssen et al., 2006; Hemert van and Kruif de, 2009). The lower suicide rates for the Turkish- and Moroccan-Dutch controls (versus Dutch controls) and the somewhat higher rates for the Surinamese- and Antillean-Dutch controls agree with the findings of an earlier study of data from Statistics Netherlands (Garssen et al., 2006). The latter study observed a migrant by age interaction, in that the suicide rates for individuals from non-Western countries aged under 35 were similar or higher than those for the native Dutch. This finding concurs with our finding of a higher rate in the second generation. An ethnicity by age interaction was also found among UK-resident people of Caribbean origin and among African-American males in the USA (Willis et al., 2002; McKenzie et al., 2003). In a study of national register data on suicide deaths in Sweden, higher rates were found among second-generation immigrants compared to first-generation immigrants (Hjern and Allebeck, 2002). In an epidemiological survey on suicide ideation and — attempts in the USA, US-born individuals among the 4 large ethnic groups were at increased risk of suicidality compared to their foreign-born parents (Borges et al., 2011), in accordance with earlier published figures on suicide deaths (Singh and Hiatt, 2006).

4.3.2. Patients with NAPD

The risk of suicide for Dutch patients with NAPD was found to be 23 times higher than that for Dutch controls. Since a meta-analytic study of Standardized Mortality Ratios from death by suicide in schizophrenia reported a median value of 12.86 (25%–75% quantile range: 5.90–21.43) (Saha et al., 2007), the figure of 23 is quite high. This estimate may even become higher when persons with other psychiatric disorders (e.g., depression) could have been excluded from the pool of controls.

High SMRs have also been observed in Sweden (15.7 for male schizophrenia patients and 19.7 for female patients) and France (15.8 for male patients and 17.7 for female patients) (Osby et al., 2000; Limosin et al., 2007). It is important to note that a study of suicides within a year of contact with mental health services in England and Wales observed a high suicide risk (versus white counterparts) for black Caribbean and black African men aged 13–24 (Bhui and McKenzie,

2008). However, this study concerned patients with any psychiatric diagnosis.

The lower all-cause and natural mortality among first-generation migrants within the present study indicate that the lower suicide rates in this group are probably not due to misclassification of death causes. Ethnic differences in all-cause and somatic mortality tending to more favorable figures for those with a foreign ethnic origin, especially at older ages, have been reported before in the Netherlands and other Western-European countries (Mackenbach et al., 2005). Underreporting of death events appeared to be an unlikely explanation (Razum et al., 2000; Garssen et al., 2003). The selection of healthy migrants, the well-developed health care system, the higher living standards and the time delay in the adverse effects of exposure to unhealthy factors such as a sedentary lifestyle and unwholesome diet, have been proposed as explanation for the survival benefit of immigrants, especially at higher age.

4.4. Interpretation

The figures of Tables 1–2 do not support the hypothesis that ethnic disadvantage necessarily leads to a higher rate of suicide. As mentioned in the introduction, cultural factors may counterbalance this unfavorable influence among ethnic minorities. This indicates that suicide rates are less suitable for assessing the impact of a low socio-economic position and social defeat for the mental health of those belonging to ethnic minorities, either with or without a diagnosis of NAPD. When evaluating the figures of Tables 1–2, however, it must also be realized that persons with a registered diagnosis of NAPD were excluded from the pool of controls. As a consequence, the figures were estimated conditional on the presence of NAPD and, thus, were partly adjusted for the effect of upward-shifted suicide rates in connection with the higher prevalence of mental disorders among ethnic minorities.

Several factors may explain the lower rates of suicide among certain ethnic minorities, such as stronger family bonds, religiosity, positive ethnic group identity, and communalism (El-Sayed et al., 2011). This interpretation is in agreement with a protective effect of high ethnic density (Neeleman and Wessely, 1999). The higher suicide rates among second-generation immigrants can then be interpreted as a result of the loss of these protective factors. Second-generation immigrants are less likely to adhere to traditional culture and have to survive in a society that is characterized by individualism and dissolving institutions that could provide social support (Willis et al., 2002; El-Sayed et al., 2011).

The lower risk of suicide among first-generation immigrants with NAPD compared to native Dutch patients with NAPD is not in line with the hypothesized reasoning that adverse effects associated with the more stressful position of ethnic minorities, a higher perceived discrimination and lower ethnic density of the geographic area of residence might lead not only to a higher risk of psychotic disorders but also to an unfavorable outcome following the diagnosis of a psychotic disorder. A recent analysis did not show an increased risk of psychotic disorders among second-generation compared to first-generation immigrants in general, but different sources of heterogeneity in effects estimates were present (Bourque et al., 2011). For the Netherlands, it has been reported that, in comparison with first-generation immigrants, second-generation immigrants may experience an added increased risk of psychotic disorders and other mental health problems, possibly associated with lesser family ties and negative identification with the culture of origin (Veling et al., 2006; Selten et al., 2012). Thus, the found differences in suicide rates among immigrants and native Dutch patients with NAPD are in accordance with the more stressful position of immigrants of the second generation in the Netherlands (compared to those of the first generation), but also indicate that there is no 1-to-1 correspondence between factors

underlying the increased risk of psychotic disorders among ethnic minorities and their risk of suicide.

It is difficult to devise an explanation for the large difference in suicide risk between Dutch patients and Dutch controls, because there have not been previous Dutch studies of suicide in this group of patients. It is possible that the sharp decline in the incidence of suicide in the general population of the Netherlands (from 1983 to 2007: 38%) (Hemert van and Kruif de, 2009) is not matched by a similar decline in the population of patients with NAPD.

4.5. Conclusion

In conclusion, immigrants diagnosed with NAPD of the first generation appear to be protected against suicide, whereas this protection is waning among those of the second generation.

This finding contributes to the accumulating evidence of the difficult social position of second-generation migrants and the negative consequences for their mental health.

Contributors

Fabian Termorshuizen carried out the data collection from the PCRs and CBS databases, performed the statistical analyses, and drafted the manuscript. André I. Wierdsma carried out a part of the data collection, participated in the design of the study and helped to draft the manuscript. Ellen Visser carried out a part of the data collection, participated in the design of the study and helped to draft the manuscript. Marjan Drukker carried out a part of the data collection, participated in the design of the study and helped to draft the manuscript. Sjoerd Sytema carried out a part of the data collection, and helped to draft the manuscript. Wijnand Laan participated in the design of the study, and helped to perform the statistical analyses. Hugo M. Smeets participated in the design of the study, and helped to draft the manuscript. Jean-Paul Selten supervised the study, and drafted the manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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