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Increased rates of psychosis among immigrants to Sweden: is migration a risk factor for psychosis?

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ABSTRACT

Background. Previous studies have shown high rates of psychosis among Afro-Caribbean immigrants to the UK and immigrants to the Netherlands. Rates of schizophrenia-like psychoses (SLP), i.e. schizophrenia or other non-affective psychosis, among the native-born and immigrant populations were assessed in Malmö, the city in Sweden with the highest proportion of immigrants.

Methods. All adult patients admitted for in-patient psychiatric treatment in Malmö during the course of a 1-year period ($N = 1162$) were studied with regard to ethnicity and SLP diagnosis. A smaller sample consisting only of first-onset SLP cases (regardless of in- or out-patient status) was also studied ($N = 56$). Risks for admission and first-onset were calculated on the basis of current background population figures for Malmö.

Results. Compared with those who were native-born, immigrants had increased risk for admission for SLP, with a similar tendency for increased risk for first-onset of SLP. Relative risk for SLP admission was most markedly increased in immigrants from East-Africa. Background factors specifically associated with migration (e.g. extreme duress) did not appear to contribute strongly to SLP in immigrants.

Conclusion. While the current results add to the growing body of evidence showing increased risk for psychosis in immigrants, vulnerability to psychosis may have been determined by factors other than the migration process.

INTRODUCTION

Among the outstanding epidemiological findings in recent years are reports of increased rates of schizophrenia and schizophrenia-like psychoses in ethnic minority groups in Britain (Harrison *et al.* 1988; Wessely *et al.* 1991; King *et al.* 1994; Van Os *et al.* 1996) and in first-generation immigrants to the Netherlands (Selten & Sijben, 1994; Selten *et al.* 1997). These results are not likely to be due to systematic diagnostic error or diverse filtering effects, and Mortensen *et al.* (1997) did not find that selective referral was the sole explanation for increased rates of schizophrenia among immigrants in a nationwide Danish study based on hospital admissions.

Thus, the question of possible cause continues to provoke speculation.

Aetiological factors invoked for increased psychosis among immigrants include negative selection of predisposed individuals, adverse psychosocial experiences related to migration or its after-math, and possibly psychoactive substance abuse, although its contribution to psychosis remains unclear (Cantor-Graae *et al.* 2001). Increased exposure to some unknown biological influence operating in the host country may also play a role, e.g. novel viruses (Harrison, 1990) or, as recently suggested, low prenatal vitamin D in dark-skinned migrants moving to cold climates (McGrath, 1999).

High rates of schizophrenia found among second-generation African-Caribbeans in Britain (Sugarman & Craufurd, 1994; Hutchinson *et al.* 1996) indicate that factors specifically

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associated with migration, whatever these may be, are not a causal explanation in this particular group. Such findings provocatively suggest that migration may not even be relevant for the supposed 'ethnic' dimension of increased risk for psychosis in first-generation immigrants. Indeed, the specific risk-generating aspect of migration and/or 'ethnic vulnerability' continues to remain elusive (Sashidharan, 1993). For example, while Ödegård (1932) found that increased incidence of schizophrenia among Norwegian immigrants to the United States was due to negative selection and not adaptation problems, Selten *et al.*'s (1997) immigrant findings are not interpretable in terms of negative selection due to the large-scale migration of Surinam's population to the Netherlands. While Ödegård's studies remain exemplary in this field, migration patterns since then have changed considerably, with increasing numbers of individuals moving from developing countries to those that are more developed. Presumably, the adaptation required is far more difficult and potentially more stressful. Thus, it may be fruitful to reconsider Ödegård's vulnerability model in more current terms.

While the stress-of-adjustment hypothesis (Leff, 1988) is plausible and potentially relevant for both first- and second-generation immigrants, it is still unclear that stress would specifically result in elevated rates of psychoses. The aetiological contribution of stress to schizophrenia or schizophrenia-like psychoses in the absence of other risk-modifying factors remains doubtful (Chung *et al.* 1986; Hare, 1987), and the notion that stressful life circumstances could induce this type of psychosis would seem refuted by the putative worldwide uniform incidence of schizophrenia (Sartorius *et al.* 1986; Jablensky *et al.* 1992), frequently cited as one of the strongest arguments for the primacy of a genetic aetiology for these disorders. Evidence that those ethnic groups with elevated rates of psychosis have experienced more adversity during migration or resettlement generally remains sparse, albeit the perception of adversity could vary according to one's ethnic background (Sharpley & Peters, 1999).

The absence of clarity regarding migration as a risk factor suggests the need for further investigation in a setting with a large and highly varied immigrant population. Malmö is

Sweden's third largest city (population: 251 408) and well-suited for a hypothesis-generating study of the relationship between psychosis and migration due to the sizeable concentration of immigrants in the population (28% foreign-born, and among these, fully 88% with non-Nordic origins). Additional methodological advantages are the existence of one centralized in-patient psychiatric treatment facility (which contains the city's sole psychiatric emergency facility) and access to reliable and detailed background population data for Malmö. The current study is an assessment of all psychiatric hospital admissions in Malmö during the course of a 1-year period, utilizing clinical, demographic, and migration history information obtained for each patient. The aim of the study is to determine whether immigrants are at greater risk than the native-born population for admission for psychiatric disorder and/or specifically for schizophrenia-like psychoses (SLP), i.e. schizophrenia and other non-affective psychoses. As a complement to the admission sample where a limited number of first-onset SLP patients might reasonably be expected, we also conducted a 1-year survey of all first-onset SLP cases in Malmö, regardless of whether the patient was seen in hospital or an out-patient clinic. In addition, the study explores whether factors related to migration, e.g. exposure to adversity/extreme duress during migration, language difficulty, reason for emigration, may contribute to increased risk of SLP in immigrants.

METHOD

Sample

The admissions-based sample comprised all patients, regardless of diagnosis, who were admitted to any adult psychiatric in-patient treatment unit in Malmö during the period 1 April 1997 to 31 March 1998. Patients who had occupied bed space for at least 1 day at the psychiatric emergency treatment unit were also included in the admissions sample. A list was also generated of all SLP patients, who, because of psychotic symptoms, had their first-in-lifetime contact (whether primary or referred by another helping agency) with any of the out-patient sector clinics in Malmö during the period 1 January 1998 to 31 December 1998 (this specific

interval chosen for administrative reasons). In order to increase the likelihood of identifying all SLP cases, sector clinics supplied information on all patients age 18–64 who might fulfil the diagnostic criteria. Patients were excluded from both samples if they were not residents in Malmö, thereby also excluding tourists or asylum-seeking immigrants without residency status, as these would not have been included in the background population (see below).

The first author (K.Z.) re-diagnosed all cases in a standardized manner according to the DSM-IV on the basis of case-notes and complementary information from attending doctors. A pre-test of diagnostic reliability between K.Z. and a senior psychiatrist (G. Johansson) was performed on a random selection of patients with psychoses and non-psychotic disorders and yielded satisfactory diagnostic agreement ($\kappa = 0.871$, $P < 0.001$). SLP was defined as cases meeting DSM-IV criteria either for schizophrenia (including 295.70), schizophreniform disorder or for other non-affective psychosis (297.1, 298.8, 298.9). Risk of admission was also calculated for the narrow category 'schizophrenia' (including 295.70), and for affective disorders broadly defined (296.xx, 311.00, 300.40) and separately for 'bipolar disorder' (e.g. 296.4, 296.5, 296.6) and 'major depressive disorder' (296.2, 296.3).

Ethnicity

For the purpose of the study 'immigrant' was defined as foreign-born of non-Swedish ethnicity. Ethnicity for each patient was established by a research secretary without knowledge of the individual's diagnostic status, utilizing information obtained from the Malmö Municipal Person Registry. Every resident is required by law to report to this registry within 2 weeks of address change, and the registry contains detailed information on place of birth, parentage, country of citizenship, and arrival date in Sweden for foreign-born residents. Information from this registry is compiled on a yearly basis by the Swedish Central Office of Statistics, thus providing a time-specific description (stratified by gender, age, country of origin) of the foreign-born population in Malmö. The resident population of Malmö (≥ 18 years) on 1 January 1998 (201 777 of which 47 118 were foreign-born) was used for calculations pertaining to the

admissions-based sample, and the corresponding resident population on 1 January 1999 (204 303 of which 49 395 were foreign-born) was used for the first-episode sample, as the latter interval corresponded more closely to that data collection period. Applicants for asylum who lack residence permits are not required to register with the Municipal Person Register, and there is no information with regard to the number of such applicants in Malmö at any given time (Malmö Immigration Board). Therefore, such patients were excluded from the study.

Measures

Information was collected for each patient on: (a) demographic background (age, highest education or occupational level, current civil status, type of residence, number of persons in current household); (b) clinical background (age at first contact with psychiatric services, for psychoses patients age at first contact for psychotic symptom, current episode status – chronic/acute, number of voluntary and compulsory hospitalizations during the study year, total in-patient treatment days during the study year, type of in-patient treatment ward – maximum/normal security, emergency ward/standard ward, referral pathway to admission – patient/family/police/social welfare/medical practitioner, history of psychotic disorder in a first- or second-degree relative, history of substance abuse, history of somatic trauma including chronic illness); and, for immigrant patients, (c) migration background (reason for emigration – family reunification, asylum, or work/studies, age at arrival and duration of stay in Sweden, previous contact with psychiatry or psychiatric illness before arrival in Sweden, adversity/extreme duress prior to or during migration – exposure to military conflict, famine, imprisonment, or torture/prolonged physical abuse, level of Swedish language competency as determined by attending personnel – fluent, adequate, or poor, and use of interpreter service when hospitalized). The primary source of information was the patient's attending psychiatrist, supplemented by case-notes, and for details concerning migration background, patient interviews performed by attending personnel. Swedish medical records routinely contain information on family history of psychiatric disorder, derived from patients'

relatives. Information on substance abuse was determined on the basis of information contained in the records and from laboratory tests when available. Social class was determined on the basis of the patient's highest level of occupation or education attained. The study was approved by the Lund University Board of Research Ethics.

Statistical analyses

Statistical analyses were performed using SPSS for Windows 8.0 (SPSS, 1997) and SAS Version 6 (SAS, 1990). Chi-square and independent *t* tests were used for the analysis of category and numerical variables, respectively. Non-normally distributed numerical data were analysed by Mann-Whitney-Wilcoxon tests. Age- and sex-adjusted relative risks for hospital admission for psychiatric disorder and for illness debut with SLP (in- or out-patient status) were calculated using Poisson regression analysis with age (six categories: 18–24, 25–34, 35–44, 45–54, 55–64, ≥ 65 years) and sex entered as independent variables in the Poisson regression model. The sample sizes of the population strata in these sex and age categories varied between 2179–5843 for foreign-born and between 8439–26190 for native-born Swedes. Statistical significance was accepted at $P < 0.01$, two-tailed.

RESULTS

Risk for psychiatric disorder among immigrants

During the one-year study period a total of 1162 patients (897 native-born, 265 immigrants) received in-patient psychiatric treatment in Malmö. The mean age in the total sample was 52.3 (s.d. 19.9). Table 1 shows the age- and sex-adjusted relative risks obtained for immigrants for hospital admission *per se*, compulsory admission and for the separate diagnostic categories, based on background population rates (Poisson regression). Immigrants had significantly increased risk for admission for SLP (RR 1.42, 95% CI 1.14–1.77, $P = 0.002$), but not for any of the other diagnostic categories, including admission or compulsory admission for any diagnosis. Immigrants showed a tendency towards reduced risk for admission for personality disorders ($P < 0.06$), substance abuse-related disorders ($P < 0.06$), and for the broad category represented by affective disorders ($P < 0.07$).

The total number of first-onset (ever in lifetime) SLP cases (in- or out-patient) in Malmö during the 1-year study period was 56 (22 first-generation immigrants, 34 native-born), with mean age at illness debut 28.6 (s.d. 9.2) years and 32.1 (s.d. 11.8) years, respectively. Five of these patients (three immigrants, two native-born) had also been included in the admissions sample as the two sample periods partially overlap. The age- and sex-adjusted relative risk for first-onset SLP for immigrants based on background population rates was 1.88 (95% CI 1.10–3.22, $P = 0.02$). Mean length of stay in Sweden prior to illness debut for first-onset SLP immigrants was 11.3 years (s.d. = 7.2, range 2–30). The regions represented by countries of origin were: former Yugoslavia and eastern Europe ($N = 10$), Africa ($N = 3$), Middle East ($N = 3$), other Nordic ($N = 2$), Asia ($N = 2$), and South America ($N = 2$).

Demographic and clinical background for SLP patients (admissions sample)

Table 2 shows the demographic and clinical background information for the 369 SLP patients who had been admitted during the year. Immigrant ($N = 119$) and native-born ($N = 250$) SLP patients differed only on one aspect: immigrant patients were more likely than native-born to be currently co-habiting or married than to be living alone ($\chi^2 = 14.7$, $P < 0.001$). Immigrant patients tended to be slightly older than native-born at first contact for a psychotic symptom ($t = 1.98$, $P < 0.05$). The proportion of cases with lowest socioeconomic status tended to be greater in immigrants than native-borns ($P = 0.10$). The two groups did not differ on paths to admission, number of admissions, compulsory admissions, or treatment days during the study year, but immigrants tended more often to be admitted to a maximum security ward ($P = 0.12$). With reservations for cases with missing data, the proportion of cases with a family history of psychosis, history of substance abuse, and history of somatic trauma were similar in both immigrant and native-born SLP groups.

Migration background for the SLP patients (admissions sample)

The mean duration of stay in Sweden for the 119 SLP immigrant patients was 21.2 years (s.d. 13). All but 1 of these patients had been in Sweden

Table 1. Relative risk (RR) for admission for DSM-IV psychiatric disorder among immigrants in Malmö, Sweden during a 1-year period, based on population rates†

Diagnosis	Immigrant N	Native-born N	Total N	RR	95% CI
Any diagnosis	265	897	1162	0.99	0.87–1.14
Compulsory admission	82	232	314	1.07	0.83–1.38
SLP‡	119	250	369	1.42**	1.14–1.77
Schizophrenia (narrow)	72	177	249	1.17	0.88–1.54
Affective disorders	63	300	363	0.77	0.59–1.02
Bipolar disorder	19	38	57	1.51	0.86–2.63
Major depressive disorder	16	90	106	0.75	0.44–1.28
Personality disorders	7	40	47	0.46	0.21–1.03
Substance abuse disorders	14	68	82	0.58	0.33–1.03
Organic disorders	12	102	114	0.69	0.38–1.26
Other non-psychotic disorders	50	137	187	1.14	0.82–1.59

† Baseline represented by native-born.

‡ Schizophrenia or other non-affective psychoses.

** $P < 0.005$.

Table 2. Demographic and clinical background of immigrant and native-born patients admitted for schizophrenia-like psychoses and schizophrenia (SLP)

Characteristic	Immigrant patients (N = 119)	Native-born patients (N = 250)
Current age, mean	44.7 (s.d. 14.7)	46.9 (s.d. 16.3)
Male/female ratio	57/62	126/124
Socio-economic group, % (N)		
Highest	8.5 (10)	13.3 (33)
Middle	30.8 (36)	37.7 (94)
Lowest	60.7 (71)	49.0 (122)
Current civil status, % (N)		
Married or co-habiting	25.2 (30)	10.0 (25)
Divorced, single	74.8 (89)	90.0 (225)
Age at first contact for psychotic symptom, mean	32.4 (s.d. 14.5)	29.3 (s.d. 13.4)
Family history of psychosis, % (N)		
Positive	26.3 (20)	29.4 (57)
Negative	73.7 (56)	70.6 (137)
History of substance abuse, % (N)		
Positive	32.8 (38)	41.4 (103)
Negative	67.2 (78)	58.6 (146)
History of somatic trauma, % (N)		
Positive	13.6 (16)	18.1 (45)
Negative	86.4 (102)	81.9 (204)
Path to admission for current episode, % (N)		
Patient	17.0 (20)	21.9 (54)
Family	22.0 (26)	17.0 (42)
Police	20.3 (24)	15.8 (39)
Social welfare	2.5 (3)	1.6 (4)
Health care	38.2 (45)	43.7 (108)
Admissions during year, mean	1.7 (s.d. 1.3)	2.0 (s.d. 1.8)
Involuntary admissions, mean	0.7 (s.d. 0.8)	0.7 (s.d. 0.8)
Days in hospital, mean	71.3 (s.d. 101.1)	61.5 (s.d. 62.5)
Type of treatment ward, % (N)		
Psychiatric emergency ward	6.7 (8)	6.0 (15)
Regular treatment ward	93.3 (111)	94.0 (234)
Security of treatment ward, % (N)		
Maximum security	39.5 (47)	31.3 (78)
Normal security	60.5 (72)	68.7 (171)

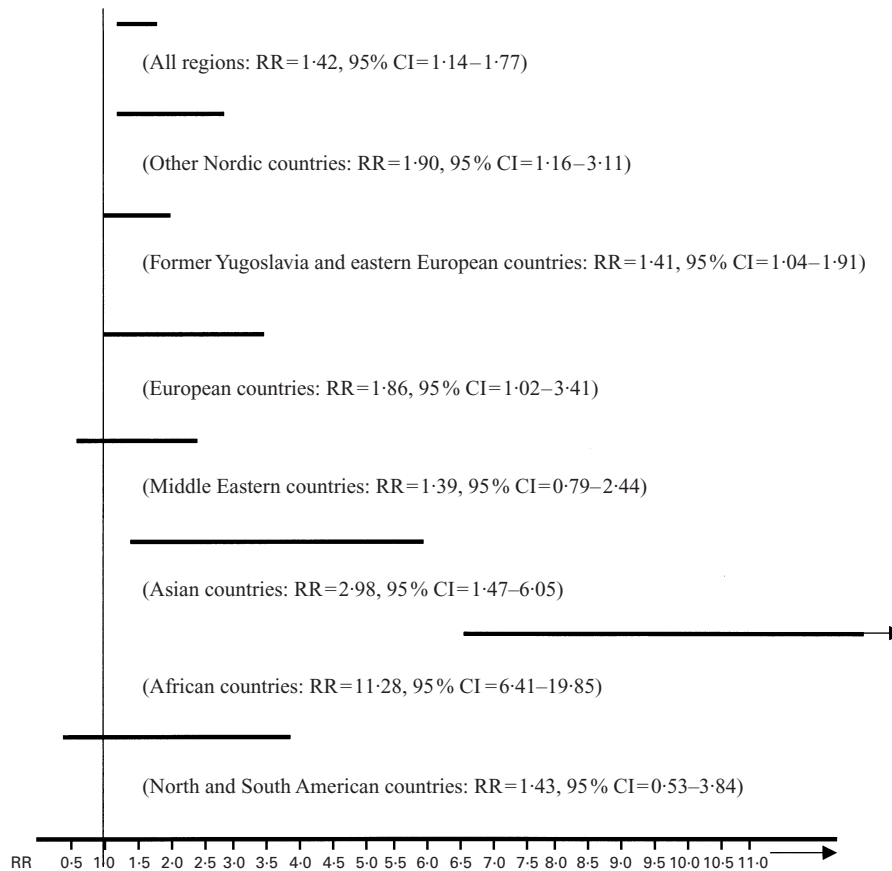


FIG. 1. Immigrants: relative risk (95% CI) for admission for psychosis by geographic region (confidence intervals are shown for RR of psychosis separately by geographic region).

for at least one year. The mean duration of stay before first contact with psychiatric services for psychotic symptom was 9.0 years (s.d. 10.8). Approximately half (54.6%) of these patients had their first contact 5 years or more after arrival in Sweden. The patients originated from 32 different countries, with the largest group from former Yugoslavia and eastern Europe ($N = 52$). The remainder came from Nordic countries ($N = 17$), Africa ($N = 13$), the Middle East ($N = 13$), Europe ($N = 11$), Asia ($N = 8$), North and South America ($N = 4$), and one individual lacked statehood. Age- and sex-adjusted relative risks (Poisson regression) for SLP were also calculated for immigrants by geographical region, based on detailed information for the background immigrant population in Malmö for that year. While the confidence intervals for the relative risks are expectedly very wide (Fig.

1) and the results thus uncertain, unusually high rates for SLP were obtained for immigrants from Africa (RR = 11.28; 95% CI 6.41–19.85). The lowest estimate of relative risk contained within the 95% CI for African immigrants is higher than the highest risk in the Asian immigrants, the group with the second highest RR estimate (RR = 2.98; 95% CI 1.47–6.05).

Total immigrant patient sample (SLP v. non-SLP psychiatric disorders)

During the study year 146 immigrants were admitted for non-SLP psychiatric disorders. The non-SLP immigrant patient group was similar in current age (mean 48.5, s.d. 18.6) and male/female ratio (68/78) to the SLP group, but the proportion of patients with lowest socio-economic status tended to be smaller (48.6%, $P = 0.13$) in the non-SLP immigrant group.

Table 3. Migration and other background characteristics of immigrant patients admitted for SLP and non-SLP psychiatric disorders

Characteristic	SLP patients (N = 119)	Non-SLP psychiatric disorder patients (N = 146)
Age at arrival in Sweden, mean	23.5 (s.d. 12.8)	29.8 (s.d. 15.0)
Years in Sweden, mean	21.2 (s.d. 13.0)	18.3 (s.d. 15.0)
Interval (years) between arrival in Sweden and first contact with psychiatry, mean	9.0 (s.d. 10.8)	12.4 (s.d. 11.8)
Reason for migration, % (N)		
Family	51.3 (60)	35.9 (51)
Work or studies	17.9 (21)	18.3 (26)
Asylum	30.8 (36)	45.8 (65)
Extreme duress prior to/during migration, % (N)		
War, famine, imprisonment, etc.	28.6 (32)	47.5 (66)
No duress	71.4 (80)	52.5 (73)
Contact with psychiatry before arrival, % (N)		
Some contact	23.5 (27)	10.6 (15)
No contact	76.5 (88)	89.4 (126)
Swedish language skills, % (N)		
Fluent	25.6 (30)	30.3 (44)
Adequate	39.3 (46)	39.4 (57)
Poor or none	35.1 (41)	30.3 (44)
Use of interpreter services during admission, % (N)		
No	78.0 (92)	69.2 (101)
Yes	22.0 (26)	30.8 (45)
History of substance abuse, % (N)		
Positive	32.8 (38)	26.7 (39)
Negative	67.2 (78)	73.3 (107)
History of somatic trauma, % (N)		
Positive	13.6 (16)	30.8 (45)
Negative	86.4 (102)	69.2 (101)

Table 3 shows the migration and other background characteristics for these two immigrant patient groups. SLP patients were significantly younger at arrival in Sweden ($t = 3.63$, $P < 0.001$). While SLP patients' duration of stay in Sweden tended to be longer ($P = 0.10$), the interval between their arrival in Sweden and their first contact with psychiatry tended to be shorter ($P < 0.02$). SLP patients tended more often to have emigrated for family reasons *v.* asylum or work/study than non-SLP patients ($P < 0.03$). Contrary to our hypothesis, exposure to adversity or extreme duress during or prior to migration was significantly less frequent in the SLP patients, ($\chi^2 = 9.3$, $P = 0.002$), as was history of somatic trauma ($\chi^2 = 10.96$, $P = 0.001$). The two groups did not differ with regard to history of substance abuse ($P = 0.29$) or adequacy of Swedish language skills ($P = 0.62$), but use of interpreter services tended to be less frequent among SLP patients ($P = 0.11$). SLP patients had significantly more frequently some

contact with psychiatric services prior to arrival in Sweden than non-SLP patients ($\chi^2 = 7.6$, $P = 0.006$).

DISCUSSION

Immigrants residing in Malmö had significantly increased risk for admission to a psychiatric treatment facility for schizophrenia-like psychosis (SLP), with a similar tendency regarding risk for first-onset SLP. As expected, the total number of first-onset cases was limited. Thus, the primary data source in the present study is an admissions sample, and the results must be weighed against the methodological weaknesses associated with the use of hospitalized cases, which include the possibility of selective treatment seeking patterns, referral bias, and selective admission thresholds. The immigrant population in Malmö is ethnically diverse, and the extent to which any of the minority groups represented differ from the native-born popu-

lation in treatment-seeking is unknown. Current restrictive immigration policies may tend to make immigrants wary of contact with authorities, and psychiatric services with their risk of compulsory treatment may be viewed as threatening by immigrants coming from countries with political unrest. Private treatment for psychosis is very rare in Malmö, and no private psychiatric hospitals exist. Also, the exclusion from the sample of asylum-seekers not yet granted residency permission eliminated a group who might especially seek psychiatric treatment due to their uncertain situation. These factors suggest that the current results may tend more towards an underestimate than an over-estimate of the true number of immigrants with psychosis in the community at large.

While selective processes regarding referral or admission could have influenced the results, referral paths to admission were similar in immigrants and native-born SLP patients. In contrast to findings in the UK indicating increased compulsory admission among patients with African-Caribbean ethnicity (McKenzie *et al.* 1993; Davies *et al.* 1996), immigrants were not at increased risk for compulsory admission or for admission in general. Thus, coercive treatment can not explain the current findings. A *post-hoc*, case-control test (logistic regression) of whether the immigrants were more likely than the native-born to be admitted for a psychotic disorder (SLP) *v.* all other disorders was performed within the total hospital sample ($N = 1162$). If the case-control analysis yielded a much larger SLP risk estimate for immigrants than was obtained with the population method (Poisson), this could indicate a bias towards preferentially admitting immigrants under SLP rather than non-SLP diagnoses, which does not appear to be the case. The odds ratio for SLP obtained by the case-control method (OR = 1.8, 95% CI 1.33–2.39, age- and sex-adjusted) was approximately similar to the relative risk estimate for SLP in immigrants based on the background population (RR = 1.4, 95% CI 1.14–1.77). Also, the proportion of SLP patients who received in-patient treatment solely at the psychiatric emergency unit (*v.* transferral to a regular psychiatric treatment ward) was equivalent in the immigrants (6.7%) and native-born (6.0%) groups. Such patients are primarily self-referrals, and the similarity in whether further

treatment was required suggests that immigrant SLP patients are no more severely ill than native-born patients when they seek emergency treatment.

A potential limitation is that diagnoses were based on case notes rather than on research interview. However, the use of an aggregate category of psychosis (SLP) in data analysis may represent an advantage, as less exact clinical differentiation is required. A number of cases (22.4% native-born, 36.1% immigrant) had missing data with regard to family history of psychosis, and the reliability of this information is open to question, although false negatives would be most likely for both groups. False negatives with regard to substance abuse could have more serious implications, although in the total sample immigrants showed, if anything, a reduced risk (*v.* native-born) for psychiatric admission for substance abuse disorders. While it is difficult to assess the extent to which the case record data has been marred by language difficulties, much of the information contained is fairly straightforward, in that the sample primarily consisted of chronic cases with well-established illnesses. Finally, the large proportion of foreign-born psychiatrists employed in Malmö (ca. 50%) could potentially diminish any existing tendencies towards 'Swedish culture'-bound diagnostic praxes.

The heterogeneity in the immigrant group with regard to ethnicity gives rise to the question of what generalized aspect of migration, if any, could play a role in the development of SLP. We explored the notion that adverse experiences related to migration might aggravate a pre-existing disposition for psychosis, and that such experiences would be found preferentially among immigrants with SLP *v.* immigrants admitted for non-SLP disorders. The variables examined are at best crude indicators of stress exposure, *i.e.* extreme duress prior to/during migration and the more subtle stress represented by acculturation difficulty, operationalized here as level of Swedish language skills. Such an approach is admittedly speculative, as stress is a reactive experience with great individual variation (Creed, 1987). With reservations for possible inaccuracies in the information provided by the patients, the results indicate that exposure to extreme duress was significantly less in the SLP immigrant group compared with

immigrants with other psychiatric disorders, as was history of somatic trauma, including current chronic illness. The two groups had similar levels of Swedish language skills, and to the extent that language reflects acculturation, no major differences in this regard. These findings, taken together with the observation that a fair number of SLP patients in the admissions sample had already had some contact with psychiatric services prior to arrival in Sweden, suggest that factors related to migration and its aftermath may not be as relevant for the development of psychosis in these immigrants as other risk factors, perhaps occurring earlier (e.g. genetic predisposition, early somatic trauma). While it can not be excluded that some individuals may experience migration as stressful even in the absence of especially adverse circumstances, it should be kept in mind that these are not newly arrived immigrants.

As such, our findings are similar to Ödegård's (1932), in that negative selection factors would appear to be implicated. The current results are undoubtedly also influenced by Swedish immigration policy, which since 1992 has become increasingly restrictive. While Sweden has the highest number of asylum seekers in Europe, the actual number of persons granted refugee status is small, and immigrants who are relatives comprise the largest group of resident foreign-born (*Statistical Yearbook of Sweden*, 1999). Finally, the results obtained mirror the mixed-migration pattern characteristic of Sweden, especially during recent years. In this regard our setting differs both from the UK and The Netherlands where former colonies contribute the greatest influx of immigrants with presumably other selection factors operating.

It might thus appear that our study sheds little light on immigrant and minority group findings in The Netherlands and the UK. Nevertheless, the strikingly high SLP rates observed among African immigrants in the current sample may provide some common ground for speculation. Although the actual number of patients is small, the majority are from Somalia and the remainder from neighbouring countries in East Africa. While little is known about the incidence of psychosis in these specific regions (Torrey, 1980), this immigrant group has several distinguishing characteristics. The African community in Malmö is largely comprised of individuals from

Somalia among whom unemployment is virtually 100%. The use of the amphetamine-like stimulant khat (*Catha edulis*) is widespread in East Africa, where it is also used by women during pregnancy (Abdul *et al.* 1987). Khat has been shown to have embryotoxic and teratogenic properties (Al-Meshal *et al.* 1991; Eriksson *et al.* 1991; Islam *et al.* 1994). Thus, early life exposure to khat could be a risk factor operating in this group. Other putative risk factors that are seemingly concentrated in this group (dark-skinned migrants moving to cold climates, exposure to infectious agents, very low levels of acculturation compared to other groups, e.g. thus more readily targeted for discrimination) may particularly warrant further study in that they are generalizable to other ethnic groups.

While the current results leave the question of the relationship between migration and psychosis rather open, a continued focus on aetiological aspects common to both first- and second-generation immigrants would appear strategic in order to come to grips with the 'ethnicity-psychosis' conundrum.

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REFERENCES

- Abdul Ghani, N., Eriksson, M., Kristiansson, B. & Qirbi, A. (1987). The influence of khat-chewing on birth-weight in full-term infants. *Social Science Medicine* **24**, 625–627.
- Al-Meshal, I. A., Qureshi, S., Ageel, A. M. & Tariq, M. (1991). The toxicity of *Catha edulis* (khat) in mice. *Journal of Substance Abuse* **3**, 107–115.
- Cantor-Graae, E., Nordström, L. G. & McNeil, T. F. (2001). Substance abuse in schizophrenia: a review of the literature and a study of correlates in Sweden. *Schizophrenia Research* (in the press).
- Chung, R. K., Langeluddecke, P. & Tennant, C. (1986). Threatening life events in the onset of schizophrenia, schizophreniform psychosis and hypomania. *British Journal of Psychiatry* **148**, 680–685.
- Creed, F. (1987). Immigrant stress. *Stress Medicine* **3**, 185–192.
- Davies, S., Thornicroft, G., Leese, M., Higgingsbotham, A. & Phelan, M. (1996). Ethnic differences in risk of compulsory admission among representative cases of psychosis in London. *British Medical Journal* **312**, 533–537.
- Eriksson, M., Ghani, N. A. & Kristiansson, B. (1991). Khat-chewing during pregnancy – effect upon the offspring and some characteristics of the chewers. *East African Medical Journal* **68**, 106–111.
- Hare, E. H. (1987). Epidemiology of schizophrenia and affective psychoses. *British Medical Bulletin* **43**, 514–530.

- Harrison, G. (1990). Searching for the causes of schizophrenia: the role of migrant studies. *Schizophrenia Bulletin* **16**, 663–671.
- Harrison, G., Owens, D., Holton, A., Neilson, D. & Boot, D. (1988). A prospective study of severe mental disorder in Afro-Caribbean patients. *Psychological Medicine* **18**, 643–657.
- Hutchinson, G., Takei, N., Fahy, T. A., Bhugra, D., Gilvarry, C., Moran, P., Mallett, R., Sham, P., Leff, J. & Murray, R. M. (1996). Morbid risk of schizophrenia in first-degree relatives of white and African-Caribbean patients with psychosis. *British Journal of Psychiatry* **169**, 776–780.
- Islam, M. W., al-Shabanah, O. A., al-Harbi, M. M. & al-Gharably, N. M. (1994). Evaluation of teratogenic potential of khat (*Catha edulis* Forsk.) in rats. *Drug and Chemical Toxicology* **17**, 51–68.
- Jablensky, A., Sartorius, N., Ernberg, G., Anker, M., Korten, A., Cooper, J. E., Day, R. & Bertelsen, A. (1992). *Schizophrenia: Manifestations, Incidence and Course in Different Cultures. A World Health Organization Ten-Country Study*. Psychological Medicine Monograph/Supplement 20. Cambridge University Press: Cambridge.
- King, M., Coker, E., Leavey, G., Hoare, A. & Johnson-Sabine, E. (1994). Incidence of psychotic illness in London: comparison of ethnic groups. *British Medical Journal* **309**, 1115–1119.
- Leff, J. (1988). *Psychiatry Around the Globe: A Transcultural View, 2nd edn*. Gaskell: London.
- McGrath, J. (1999). Hypothesis: is low prenatal vitamin D a risk-modifying factor for schizophrenia? *Schizophrenia Research* **40**, 173–177.
- McKenzie, K., van Os, J., Fahy, T., Jones, P., Harvey, I., Toone, B. & Murray, R. (1995). Psychosis with good prognosis in Afro-Caribbean people now living in the United Kingdom. *British Medical Journal* **311**, 1325–1328.
- Mortensen, P. B., Cantor-Graae, E. & McNeil, T. F. (1997). Increased rates of schizophrenia among immigrants: some methodological concerns raised by Danish findings. *Psychological Medicine* **27**, 813–820.
- Ödegård, O. (1932). Emigration and insanity: a study of mental disease among Norwegian-born population in Minnesota. *Acta Psychiatrica et Neurologica Scandinavica* **7** (suppl. 4), 1–206.
- Sartorius, N., Jablensky, A., Korten, A., Ernberg, G., Anker, M., Cooper, J. E. & Day, R. (1986). Early manifestations and first-contact incidence of schizophrenia in different cultures. *Psychological Medicine* **16**, 909–928.
- SAS (1990). *SAS/STAT**. SAS Institute Inc.: Cary, NC.
- Sashidharan, S. P. (1993). Afro-Caribbeans and schizophrenia: the ethnic vulnerability hypothesis re-examined. *International Review of Psychiatry* **5**, 129–144.
- Selten, J. P., Slaets, J. P. L. & Kahn, R. S. (1997). Schizophrenia in Surinamese and Dutch Antillean immigrants to the Netherlands: evidence of an increased incidence. *Psychological Medicine* **27**, 807–811.
- Selten, J. P. & Sijben, N. (1994). First admission rates for schizophrenia in immigrants to the Netherlands. The Dutch National Register. *Social Psychiatry and Psychiatric Epidemiology* **29**, 71–77.
- Sharpley, M. S. & Peters, E. R. (1999). Ethnicity, class and schizotypy. *Social Psychiatry and Psychiatric Epidemiology* **34**, 507–512.
- SPSS (1997). *SPSS 8.0 for Windows*. SPSS Inc.: Chicago.
- Statistical Yearbook of Sweden* (1999). Statistics Sweden: Örebro.
- Sugarman, P. A. & Craufurd, D. (1994). Schizophrenia in the Afro-Caribbean Community. *British Journal of Psychiatry* **164**, 474–480.
- Torrey, E. F. (1980). *Schizophrenia and Civilization*. Aronson: New York.
- Van Os, J., Castle, D. J., Takei, N., Der, G. & Murray, R. M. (1996). Psychotic illness in ethnic minorities: clarification from the 1991 census. *Psychological Medicine* **26**, 203–208.
- Wessely, S., Castle, D., Der, G. & Murray, R. M. (1991). Schizophrenia and Afro-Caribbeans. A case-control study. *British Journal of Psychiatry* **159**, 795–801.