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Incidence and prevalence of mental disorders among immigrants and native Finns: a register-based study

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Abstract

Purpose Migrants appear to have a higher risk of mental disorders, but findings vary across country settings and migrant groups. We aimed to assess incidence and prevalence of mental disorders among immigrants and Finnish-born controls in a register-based cohort study.

Methods A register-based cohort study of 184.806 immigrants and 185.184 Finnish-born controls (1.412.117 person-years) was conducted. Information on mental disorders according to ICD-10 was retrieved from the Hospital Discharge Register, which covers all public health care use.

Results The incidence of any mental disorder was lower among male (adjusted HR 0.82, 95% CI 0.77–0.87) and female (aHR 0.76, 95% CI 0.72–0.81) immigrants, being lowest among Asian and highest among North African and Middle Eastern immigrants. The incidence of bipolar, depressive and alcohol use disorders was lower among immigrants. Incidence of psychotic disorders was lower among female and not higher among male immigrants, compared with native Finns. Incidence of PTSD was higher among male immigrants (aHR 4.88, 95% CI 3.38–7.05).

Conclusions The risk of mental disorders varies significantly across migrant groups and disorders and is generally lower among immigrants than native Finns.

Keywords Migrants · Mood disorders · Post-traumatic stress disorder · Psychotic disorders · Register study

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Introduction

Migrants appear to have an increased risk of some mental disorders [1, 2]. Several factors may negatively influence migrants' mental health: neurodevelopmental problems caused by, e.g., infections or vitamin deficiencies; psychosocial stressors such as traumatic experiences prior to and during migration, and also discrimination, social adversity and minority stress in the recipient country; and risky health behaviours, particularly substance use [3]. However, selective migration and sometimes more favourable health behaviours interplay with the above-mentioned risk factors, and many indicators, such as mortality, show better health among migrants than native populations [4, 5].

Immigrant populations and their countries of origin and residence are also very heterogeneous, and regarding risk of mental illness, it can be erroneous to consider migrants as a uniform group [6]. Compared with labour and other types of migrants, refugees have a particularly increased

risk of some mental disorders [7–10]. Therefore, the profile of the immigrant population, as well as the native population used as comparison may define the observed risk differences.

Many studies on migrants' mental health have been carried out in Sweden and Denmark [11]. Finland, however, shows worse mental health than its neighbouring Nordic countries in many indicators, such as higher suicide rate and higher level of alcohol use and alcohol-related mortality [12, 13], and has a somewhat stricter humanitarian migration policy than some other Nordic countries [14–16]. Therefore, the findings and risk profile found in these studies may not be applicable in the Finnish context. These characteristics and the comprehensive Finnish register-based health information system provide a good setting for examining hypotheses regarding the risk of mental disorders among migrants.

Based on two existing studies on psychological symptoms, the Finnish immigrant population appears to have better mental health than native Finns, with some variation across immigrant groups [17]. Register-based studies have found a higher risk of ADHD [18] and autism [19], and a lower risk of Asperger's syndrome [20] among children of immigrant parents living in Finland. However, these studies have not assessed psychotic symptoms, diagnoses of psychotic and mood disorders or post-traumatic stress disorder (PTSD), which have all shown an elevated risk among migrants [1, 2, 21].

This study aims at assessing incidence and prevalence of mental disorders among immigrants and Finnish-born controls in a register-based cohort study with a 4-year follow-up. This is the first large-scale study on psychiatric disorders among migrants in Finland. Based on earlier literature, we expect to find increased risk of some mental disorders, such as psychoses, mood disorders and PTSD.

Methods

This cohort study utilises Finnish registers to study prevalence and incidence of mental disorders treated in specialised psychiatric services among immigrants and Finnish-born controls. The study was approved by the Ethics Committee of the National Institute for Health and Welfare (THL) in Finland (589/2013). THL, The Central Population Register and Statistics Finland gave their permissions to use confidential register data in this study.

Sample

Immigrants were identified from the Finnish Central Population Register (FCPR), a national register of Finnish citizens and permanent residents in Finland. The register does not include temporary residents, such as asylum seekers or undocumented migrants. We identified persons who were born abroad, whose mother tongue is not Finnish, and who were at least 15 years old, alive and resident in Finland on 31st December 2010. For each immigrant, a Finnish-born control was identified from the FCPR and matched by background characteristics [22]. The controls were matched by age, so that they were born the same year and month as the migrant (if needed, this timeframe was extended by ± 1 month); by place of residence (municipality) on 31st December 2010 and by gender. Additionally, the controls' mother tongue had to be one of the official languages spoken in Finland (Finnish or Swedish), and they must not be adopted. In case several persons filled all criteria, the control was chosen randomly. The number of both immigrants and their Finnish-born controls was 185.605 leading to a total sample size of 371.210.

However, according to the FCPR, 799 immigrants (0.4%) and 421 controls (0.2%) in the sample had moved to Finland in 2011–2014. It was assumed that they had lived in Finland on 31st December 2010, emigrated without informing their leaving date, and then returned during the follow-up period. Because their actual residence could not be verified, they were omitted from the analyses.

Regional categorization

We categorised countries of birth into nine regions: (1) Finland, (2) Other Nordic countries, (3) Russia and former Soviet Union, (4) Other Western countries (members of the European Union (EU) and/or European Economic Area (EEA), Switzerland, USA, Canada, Australia and New Zealand), (5) Eastern Europe (former or current Eastern European countries that are not members of the EU), (6) North Africa and Middle East, (7) Sub-Saharan Africa, and (8) Asia. The number of immigrants from other countries (mostly Latin American countries and Pacific Islands) was small, so no separate category was formed for them, but they were included in the total number of immigrants. For 1134 foreign-born persons, information on country of birth was missing, but 1031 of them could be classified based on their mother tongue. Those whose mother tongue was unknown or geographically very widely spoken (English, French, Spanish and Portuguese) ($n = 103$) were excluded from the regional analyses.

Information on mortality

Information on time and causes of death during the follow-up (January 1st 2011 to December 31st 2014) was obtained from the national Causes of Death Register maintained by Statistics Finland. The Finnish system of death reporting is considered very reliable [23].

Outcome variables: mental disorders

Information on mental disorders was obtained from the Hospital Discharge Register, which covers all hospital inpatient care since 1967 and outpatient care in specialised services at the public sector in Finland since 1998, with the exception of a few cities that provide municipal psychiatric outpatient services. All psychiatric diagnoses (ICD-10 codes F00–F99) were included and analysed according to the following categorization: alcohol use disorders F10; other substance use disorders F11–F16 and F18–F19; non-affective psychotic disorders F20–F29; bipolar disorder F30–F31; major depressive disorder F32–F33; other mood disorders F34–F39; anxiety disorders F40–F42; post-traumatic stress disorder F43.1; dissociative and somatoform disorders F44–F45; eating disorders F50 and personality disorders F60.

In addition, information on diagnoses in primary care was obtained from the Care Register on outpatient visits in primary health care (AvoHILMO), where information was available from 2011 onwards. This register contains either ICD-10 or ICPC-2-codes diagnoses set by primary care physicians. Since primary care physicians have limited time and few psychiatric diagnostic tools available, these diagnoses were considered less reliable than those used in specialised health care by psychiatrists, and were not combined to those given in specialised care. They are reported in the category "Any psychiatric contact in primary care (F00–F99)", including both ICD-10 codes F00–F99 and ICPC2-codes P01–P29 and P70–P99.

Covariates

Sociodemographic factors that were considered potential confounders or mediators and therefore included in the adjusted analyses were age, socioeconomic status (SES) and marital status. Information about age and marital status in the beginning of the study was provided by the FCPR and information about SES was obtained from Statistics Finland. Age was used as a five-categorical variable. Marital status was categorised into three groups: unmarried, married or in a registered partnership, and other (including those who were widowed, separated or divorced). The SES variable provided by Statistics Finland is based on occupation, main type of activity, job status, nature of work and stage in life. In this study, a five-categorical variable was used: entrepreneurs and farmers, upper white collar workers (such as leaders and experts), lower white collar workers (such as office workers), blue collar workers (manual work) and others (people not in employment such as students, homemakers and unemployed people) [24]. Information on education was unavailable for most immigrants, and therefore could not be used.

Statistical analysis

The Cox proportional hazards model was used to analyse risk differences between immigrants and Finnish-born controls in incidence of new-onset mental disorders in each diagnosis group. Participants were followed up from January 1st 2011 until emigration, death, first incidence of the psychiatric diagnosis in question, or 31st December 2014.

To be able to analyse incidence of new-onset disorders, a 4-year washout period was used: for each disorder category, persons who had received a diagnosis from this category during 2007–2010 were excluded from the incidence analysis for that particular category. The washout period was specific to each disorder category. Persons with multiple admissions for different diagnoses were included in the analyses for all the corresponding diagnostic categories.

Sensitivity analyses were carried out excluding those who migrated to Finland during the follow-back time 2007–2010, to account for the fact that the washout period in their case was incomplete.

Also, prevalence of disorders was analysed based on F00–F99 diagnoses received in years 2007–2010 among immigrants and controls. In these analyses, immigrants and native Finns who moved to Finland between 2007 and 2010 were excluded.

Unadjusted and analyses adjusted for available covariates were carried out, with Finnish-born controls as the reference group. Previous literature [25] and preliminary analyses pointed to significant variations in risk differences by sex, and thus incidence and prevalence analyses were carried out separately for men and women.

The proportional hazards assumption was tested on the basis of Schoenfeld residuals [26], and based on this, the covariates (age, marital status and socioeconomic status) were added to the models through stratification.

The results are presented as hazard ratios (HR) and prevalences with their 95% confidence intervals. Stata 14.2 was used for the analyses.

Results

Altogether 184.806 immigrants and 185.184 Finnish-born controls were followed up from 1.1.2011 to 31.12.2014, leading to a total of 1.412.117 person-years (700.243 person-years for immigrants and 718.874 for controls). Finnish-born controls are the reference group in all analyses. Descriptive statistics of the sample are presented in Supplementary Table 1.

Incidence of mental disorders

The incidence of any mental disorder was lower among immigrants in men (adjusted HR 0.82, 95% CI 0.77–0.87

in specialised care and aHR 0.90 (0.86–0.93) in primary care) and women (aHR 0.76, 95% CI 0.72–0.81 in specialised care and aHR 0.79, 95% CI 0.76–0.81 in primary care) (Tables 1, 2; Fig. 1a, b). The lowest incidence was observed among Asian immigrants (aHR 0.49, 95% CI 0.42–0.58 in men and aHR 0.47, 95% CI 0.41–0.53 in women), and the highest in immigrants from North Africa and Middle East (aHR 1.17, 95% CI 1.06–1.28 in men and aHR 1.30, 95% CI 1.17–1.45 in women).

The incidence of psychotic disorders among migrant men was not different than among Finnish men (aHR 0.92, 95% CI 0.79–1.08) and lower among migrant women (aHR 0.82, 95% CI 0.69–0.97). The incidence of bipolar disorders was considerably lower among immigrants (aHR 0.49, 95% CI 0.38–0.63 in men and aHR 0.29, 95% CI 0.24–0.37 in women). Depressive disorders were also less common among immigrants (aHR 0.82, 95% CI 0.75–0.90 in men and aHR 0.77, 95% CI 0.71–0.83 in women), except among immigrants from North Africa and Middle East, who had higher incidence than Finns (Fig. 1c, d).

PTSD was the only disorder where immigrant men had a higher incidence (aHR 4.88, 95% CI 3.38–7.05) and the risk of immigrant women did not differ from native Finns (aHR 1.03, 95% CI 0.81–1.32) (Fig. 1e, f). The incidence was particularly high among immigrants from Eastern Europe, North Africa and Middle East, and in the case of men, Sub-Saharan Africa and Asia. The largest differences in terms of effect size were observed for PTSD.

The incidence of alcohol use disorders (aHR 0.42, 95% CI 0.37–0.48 in men and aHR 0.40, 95% CI 0.34–0.48 in women) and other substance use disorders (aHR 0.73, 95% CI 0.61–0.88 in men and aHR 0.44, 95% CI 0.34–0.58 in women) was lower among immigrants. The difference to Finns was statistically significant in all immigrant groups except for Nordic immigrants.

There was no statistically significant difference in the incidence of dissociative and somatoform disorders and eating disorders among men, when adjusted for covariates, whereas in women the incidence of these disorders was also lower among immigrants (aHR 0.71, 95% CI 0.57–0.90% and 0.55, 95% CI 0.41–0.75%, respectively).

The results of the sensitivity analysis, excluding persons who had migrated into Finland between 2007 and 2010, did not have important differences from those reported here. Among men of North African and Middle Eastern origin and women from Nordic countries, the risk of any mental disorder did not significantly differ from the Finnish-born (HR 1.08, 95% CI 0.97–1.20% and 1.12, 95% CI 0.94–1.32%, respectively), as opposed to the elevated risks reported as main results (Supplementary Tables 2-3).

Prevalence of mental disorders

The differences between immigrants and Finnish-born controls in the prevalence of different groups of mental disorders were of similar magnitude as in the incidence (Tables 3, 4). The prevalence of any mental disorder in 2007–2010 among immigrant men was 4.2% (95% CI 4.1–4.5) and among Finnish men 6.4% (95% CI 6.2–6.6). In women, the corresponding figures were 5.5% (95% CI 5.4–5.7) among immigrant women and 7.8% (95% CI 7.6–8.0) among Finnish women.

Nordic (6.4%, 95% CI 5.7–7.3) and Middle Eastern and North African men (6.5%, 95% CI 6.0–7.0) had a similar overall prevalence, and Nordic (9.5%, 95% CI 8.5–10.5) and Middle Eastern and North African women (9.5%, 95% CI 8.9–10.3) had a higher prevalence than the corresponding Finnish-born controls, whereas the other regions had lower prevalence rates of any mental disorder.

The prevalence rates reported are unadjusted and do not account for different age structures between the immigrant and control groups.

Discussion

This large register-based cohort study of incidence and prevalence of mental disorders among immigrants and the native population in Finland showed a generally lower risk of mental disorders among the immigrant population in Finland, and large risk differences by immigrant and disorder group.

The risk of any new-onset mental disorder was lower both among immigrant men (aHR 0.74–0.86) and women (aHR 0.76–0.78) compared with native Finns. This is in contrast to register studies from Sweden [27, 28] and the Netherlands [29], and systematic reviews [1, 2, 30], which have indicated higher incidence and prevalence rates of mental disorders among immigrants. However, in population surveys in the US, first-generation immigrants also had a lower rate of mood, anxiety and personality disorders, compared with native-born Americans [31, 32]. In Spain and Australia, no difference in psychiatric morbidity was found between local population and immigrants [33, 34], and in Canada, immigrants experienced less psychological distress [35]. Also in a Danish register-based study, first- and second-generation immigrants had an increased risk of psychotic disorders, but decreased risk of affective, personality and substance use disorders. The risk of any psychiatric contact was lower for second-generation immigrants and not different from native Danes for first-generation immigrants [11].

Table 1 Hazard ratios for new-onset ICD-10 psychiatric disorders in men according to immigration background and country of origin, 2011–2014

	Native Finns (n = 94,488)	Immigrants (n = 94,188), unadjusted	Immigrants (n = 94,188), adjusted[a]	Nordic countries (n = 4540), adjusted[a]	Russia and Soviet Union (n = 17,643) adjusted[a]	Western countries (n = 28,156) adjusted[a]	Eastern Europe (n = 4640) adjusted[a]	North Africa and Middle East (n = 15,276) adjusted[a]	Sub-Saharan Africa (n = 9557) adjusted[a]	Asia (n = 12,408) adjusted[a]
Alcohol use disorders (F10)										
No. of events	2062	699		62	212	253	13	76	51	28
HR (95% CI)	1	**0.41 (0.37–0.45)**	**0.42 (0.37–0.48)**	0.71 (0.50–1.01)	**0.65 (0.54–0.79)**	**0.60 (0.50–0.72)**	**0.17 (0.09–0.33)**	**0.23 (0.17–0.31)**	**0.20 (0.13–0.31)**	**0.14 (0.08–0.24)**
Other substance use disorders (F11–F19)										
No. of events	806	319		14	86	83	11	66	43	12
HR (95% CI)	1	**0.46 (0.40–0.54)**	**0.73 (0.61–0.88)**	0.56 (0.27–1.18)	0.94 (0.70–1.27)	0.82 (0.60–1.12)	0.55 (0.27–1.10)	0.75 (0.54–1.05)	0.77 (0.52–1.16)	**0.26 (0.12–0.54)**
Psychoses (F20–F29)										
No. of events	1341	764		34	156	136	41	182	128	74
HR (95% CI)	1	**0.69 (0.60–0.78)**	0.92 (0.79–1.08)	**0.48 (0.24–0.96)**	0.96 (0.74–1.26)	0.86 (0.66–1.13)	1.16 (0.74–1.81)	0.93 (0.70–1.22)	1.25 (0.92–1.71)	0.85 (0.58–1.24)
Bipolar disorder (F30–F31)										
No. of events	573	227		37	32	79	10	36	20	5
HR (95% CI)	1	**0.48 (0.40–0.59)**	**0.49 (0.38–0.63)**	1.53 (0.91–2.58)	**0.47 (0.30–0.74)**	0.70 (0.49–1.00)	0.59 (0.30–1.21)	**0.27 (0.15–0.47)**	**0.36 (0.19–0.69)**	**0.04 (0.01–0.28)**
Major depressive disorder (F32–F33)										
No. of events	2371	1710		96	189	409	111	619	130	120
HR (95% CI)	1	**0.79 (0.74–0.85)**	**0.82 (0.75–0.90)**	0.94 (0.71–1.24)	**0.50 (0.41–0.60)**	**0.82 (0.71–0.95)**	0.98 (0.76–1.26)	**1.53 (1.34–1.74)**	**0.55 (0.44–0.71)**	**0.46 (0.36–0.60)**
Other mood disorders (F34–F39)										
No. of events	352	173		15	33	59	11	37	8	9
HR (95% CI)	1	**0.52 (0.42–0.63)**	**0.56 (0.44–0.71)**	0.88 (0.43–1.78)	**0.64 (0.43–0.95)**	0.84 (0.60–1.20)	0.72 (0.37–1.43)	**0.47 (0.30–0.75)**	**0.08 (0.02–0.31)**	**0.30 (0.14–0.65)**
Anxiety disorders (F40–F42)										
No. of events	1565	810		63	121	200	64	249	49	50
HR (95% CI)	1	**0.57 (0.52–0.63)**	**0.69 (0.62–0.78)**	0.96 (0.68–1.35)	**0.57 (0.45–0.71)**	**0.79 (0.65–0.95)**	0.98 (0.71–1.34)	0.97 (0.81–1.17)	**0.34 (0.24–0.50)**	**0.40 (0.28–0.57)**

Table 1 continued

	Native Finns (n = 94,488)	Immigrants (n = 94,188), unadjusted	Immigrants (n = 94,188), adjusted[a]	Nordic countries (n = 4540), adjusted[a]	Russia and Soviet Union (n = 17,643) adjusted[a]	Western countries (n = 28,156) adjusted[a]	Eastern Europe (n = 4640) adjusted[a]	North Africa and Middle East (n = 15,276) adjusted[a]	Sub-Saharan Africa (n = 9557) adjusted[a]	Asia (n = 12,408) adjusted[a]
Post-traumatic stress disorder (F43.1)										
No. of events	54	336		6	8	23	50	194	35	18
HR (95% CI)	1	**5.37 (3.97–7.27)**	**4.88 (3.38–7.05)**	1.38 (0.33–5.72)	0.85 (0.36–2.03)	1.85 (1.00–3.44)	**12.1 (7.10–20.51)**	**15.74 (10.50–23.57)**	**5.01 (2.85–8.78)**	**2.62 (1.29–5.32)**
Dissociative and somatoform disorders (F44–F45)										
No. of events	146	146		6	14	30	18	49	17	10
HR (95% CI)	1	1.07 (0.83–1.38)	1.07 (0.79–1.44)	0.95 (0.35–2.58)	**0.50 (0.24–0.98)**	1.22 (0.78–1.89)	1.86 (0.95–3.63)	**1.68 (1.07–2.63)**	1.23 (0.66–2.29)	0.39 (0.14–1.08)
Eating disorders (F50)										
No. of events	26	11		0	2	7	0	0	0	1
HR (95% CI)	1	0.47 (0.20–1.09)	0.70 (0.26–1.86)	–	0.52 (0.07–43.99)	1.82 (0.60–5.60)	–	–	–	1.09 (0.14–8.46)
Personality disorders (F60)										
No. of events	466	179		16	36	51	9	41	11	12
HR (95% CI)	1	**0.44 (0.36–0.54)**	**0.46 (0.34–0.58)**	0.58 (0.24–1.41)	**0.40 (0.24–0.66)**	**0.54 (0.36–0.83)**	0.51 (0.22–1.15)	**0.47 (0.30–0.75)**	**0.30 (0.15–0.62)**	**0.31 (0.15–0.67)**
Any mental disorder (F00–F99)										
No. of events	6873	4282		294	733	1055	260	1177	392	290
HR (95% CI)	1	**0.74 (0.70–0.77)**	**0.82 (0.77–0.87)**	0.96 (0.80–1.14)	**0.73 (0.65–0.81)**	**0.82 (0.75–0.91)**	1.01 (0.86–1.20)	**1.17 (1.06–1.28)**	**0.59 (0.51–0.69)**	**0.49 (0.42–0.58)**
Any mental disorder (F00–F99) (Primary care)										
No. of events	9843	8473		296	1334	1915	475	2504	1106	665
HR (95% CI)	1	**0.86 (0.83–0.88)**	**0.90 (0.86–0.93)**	**0.67 (0.59–0.76)**	**0.75 (0.71–0.81)**	**0.82 (0.78–0.87)**	1.00 (0.90–1.10)	**1.34 (1.26–1.41)**	1.00 (0.92–1.07)	**0.63 (0.57–0.69)**

Statistically significant results are bolded

[a] Adjusted for age, socioeconomic status (SES) and marital status

Table 2 Hazard ratios for new-onset ICD-10 psychiatric disorders in women according to immigration background and country of origin, 2011–2014

	Native Finns (n = 90,696)	Immigrants (n = 90,618), unadjusted	Immigrants (n = 90,618), adjusted[a]	Nordic countries (n = 3853), adjusted[a]	Russia and Soviet Union (n = 29,693) adjusted[a]	Western countries (n = 21,548) adjusted[a]	Eastern Europe (n = 3983) adjusted[a]	North Africa and Middle East (n = 7608) adjusted[a]	Sub-Saharan Africa (n = 6417) adjusted[a]	Asia (n = 15,668) adjusted[a]
Alcohol use disorders (F10)										
No. of events	903	349		32	180	89	4	11	15	13
HR (95% CI)	1	**0.45 (0.39–0.51)**	**0.40 (0.34–0.48)**	1.00 (0.65–1.58)	**0.54 (0.43–0.67)**	**0.46 (0.34–0.62)**	**0.12 (0.04–0.38)**	**0.18 (0.10–0.35)**	**0.21 (0.11–0.41)**	**0.12 (0.07–0.22)**
Other substance use disorders (F11–F19)										
No. of events	369	154		15	68	33	7	9	9	11
HR (95% CI)	1	**0.46 (0.37–0.58)**	**0.44 (0.34–0.58)**	1.23 (0.63–2.41)	**0.43 (0.28–0.64)**	**0.51 (0.32–0.83)**	0.70 (0.32–1.50)	**0.29 (0.13–0.63)**	**0.33 (0.14–0.74)**	**0.27 (0.13–0.53)**
Psychoses (F20–F29)										
No. of events	1047	730		38	273	133	29	49	81	112
HR (95% CI)	1	0.92 (0.80–1.05)	**0.82 (0.69–0.97)**	1.03 (0.61–1.72)	0.85 (0.68–1.07)	**0.71 (0.53–0.97)**	0.69 (0.39–1.24)	**0.59 (0.38–0.92)**	1.04 (0.69–1.55)	0.94 (0.69–1.27)
Bipolar disorder (F30–F31)										
No. of events	801	283		33	95	86	9	14	11	22
HR (95% CI)	1	**0.38 (0.32–0.46)**	**0.29 (0.24–0.37)**	1.07 (0.62–1.82)	**0.26 (0.18–0.37)**	**0.42 (0.29–0.61)**	**0.24 (0.10–0.58)**	**0.15 (0.07–0.32)**	**0.14 (0.06–0.35)**	**0.14 (0.08–0.27)**
Major depressive disorder (F32–F33)										
No. of events	3801	2744		180	754	612	151	563	139	265
HR (95% CI)	1	**0.82 (0.77–0.87)**	**0.77 (0.71–0.83)**	1.05 (0.84–1.32)	**0.62 (0.56–0.70)**	**0.86 (0.76–0.97)**	0.86 (0.68–1.08)	**1.68 (1.47–1.91)**	**0.50 (0.40–0.64)**	**0.45 (0.38–0.53)**
Other mood disorders (F34–F39)										
No. of events	555	298		18	93	71	19	60	9	21
HR (95% CI)	1	**0.57 (0.49–0.66)**	**0.55 (0.46–0.67)**	0.98 (0.57–1.67)	**0.50 (0.38–0.67)**	**0.62 (0.46–0.85)**	0.76 (0.44–1.30)	1.07 (0.76–1.50)	**0.17 (0.07–0.41)**	**0.23 (0.14–0.39)**
Anxiety disorders (F40–F42)										
No. of events	2262	1274		102	357	316	78	214	65	103
HR (95% CI)	1	**0.62 (0.57–0.67)**	**0.64 (0.58–0.70)**	1.02 (0.77–1.35)	**0.55 (0.48–0.64)**	**0.73 (0.63–0.86)**	**0.69 (0.51–0.94)**	1.13 (0.95–1.35)	**0.36 (0.26–0.50)**	**0.34 (0.27–0.43)**

Table 2 continued

	Native Finns (n = 90,696)	Immigrants (n = 90,618), unadjusted	Immigrants (n = 90,618), adjusted[a]	Nordic countries (n = 3853), adjusted[a]	Russia and Soviet Union (n = 29,693) adjusted[a]	Western countries (n = 21,548) adjusted[a]	Eastern Europe (n = 3983) adjusted[a]	North Africa and Middle East (n = 7608) adjusted[a]	Sub-Saharan Africa (n = 6417) adjusted[a]	Asia (n = 15,668) adjusted[a]
Post-traumatic stress disorder (F43.1)										
No. of events	213	295		12	47	35	47	97	23	26
HR (95% CI)	1	**1.38 (1.13–1.68)**	1.03 (0.81–1.32)	1.11 (0.49–2.51)	**0.53 (0.35–0.81)**	0.66 (0.41–1.07)	**3.11 (1.96–4.93)**	**3.53 (2.50–4.99)**	0.95 (0.51–1.79)	0.66 (0.40–1.11)
Dissociative and somatoform disorders (F44–F45)										
No. of events	295	252		14	71	55	22	46	13	24
HR (95% CI)	1	0.94 (0.78–1.12)	**0.71 (0.57–0.90)**	0.84 (0.39–1.77)	**0.56 (0.40–0.80)**	0.89 (0.63–1.28)	1.35 (0.79–2.31)	1.18 (0.77–1.82)	0.51 (0.25–1.06)	**0.35 (0.20–0.62)**
Eating disorders (F50)										
No. of events	351	122		11	33	33	4	19	7	9
HR (95% CI)	1	**0.47 (0.36–0.61)**	**0.55 (0.41–0.75)**	1.48 (0.73–3.01)	**0.57 (0.36–0.92)**	0.67 (0.41–1.10)	0.33 (0.08–1.32)	0.63 (0.32–1.26)	**0.17 (0.04–0.68)**	**0.24 (0.10–0.59)**
Personality disorders (F60)										
No. of events	876	277		25	92	93	9	29	10	13
HR (95% CI)	1	**0.38 (0.33–0.45)**	**0.40 (0.33–0.49)**	0.88 (0.50–1.52)	**0.39 (0.29–0.53)**	**0.71 (0.53–0.94)**	**0.25 (0.10–0.61)**	**0.31 (0.18–0.53)**	**0.14 (0.06–0.34)**	**0.09 (0.04–0.19)**
Any mental disorder (F00–F99)										
No. of events	7648	5190		375	1594	1131	282	826	320	508
HR (95% CI)	1	**0.80 (0.76–0.83)**	**0.76 (0.72–0.81)**	**1.19 (1.02–1.39)**	**0.68 (0.63–0.74)**	**0.80 (0.73–0.88)**	0.86 (0.72–1.02)	**1.30 (1.17–1.45)**	**0.59 (0.50–0.70)**	**0.47 (0.41–0.53)**
Any mental disorder (F00–F99) (primary care)										
No. of events	13,420	11,531		434	3676	2528	684	1772	906	1230
HR (95% CI)	1	**0.85 (0.83–0.87)**	**0.79 (0.76–0.81)**	**0.79 (0.71–0.87)**	**0.73 (0.70–0.76)**	**0.84 (0.80–0.88)**	1.02 (0.93–1.11)	**1.32 (1.25–1.40)**	**0.73 (0.67–0.80)**	**0.49 (0.46–0.53)**

Statistically significant results are bolded

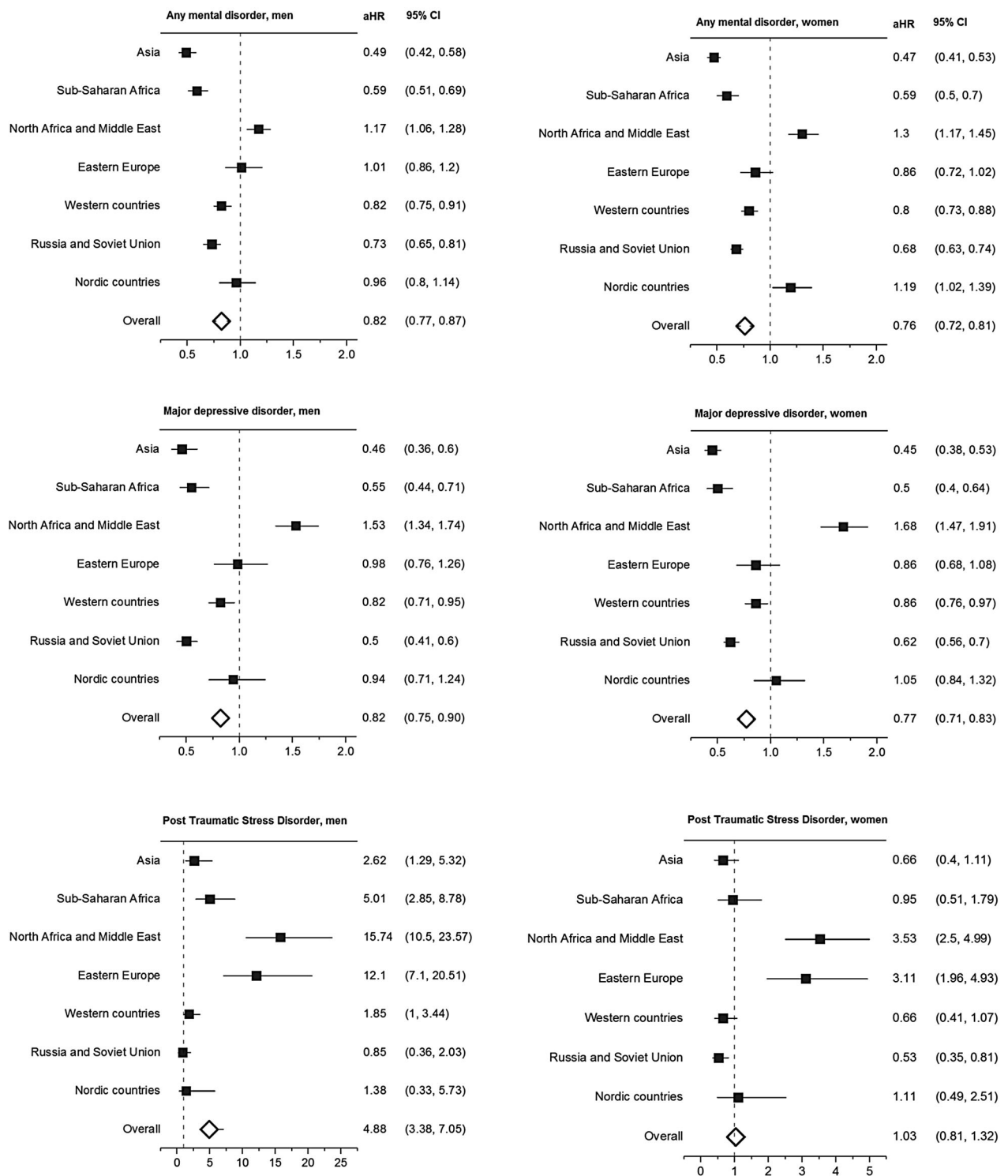[a] Adjusted for age, socioeconomic status (SES) and marital status

Fig. 1 Adjusted hazard ratios (aHR) for all mental disorders, major depressive disorder (MDD) and post-traumatic stress disorder (PTSD) according to region of origin in men and women* (*all hazard ratios adjusted for age, marital status and socioeconomic status)

Psychotic and bipolar disorders

Among the most consistent findings in previous studies has been an elevated risk of psychotic disorders in first- and second-generation migrants, particularly African immigrants [1]. We failed to find an increased risk of psychotic or bipolar disorder in any of the migrant groups, and overall the risk of both psychotic and bipolar disorders was

Table 3 4-year prevalence of ICD-10 psychiatric disorders in men according to immigration background and country of origin, 2007–2010

	Native Finns (n = 93,714)	Immigrants (n = 64,889)	Nordic countries (n = 3855)	Russia and Soviet Union (n = 13,614)	Western countries (n = 18,220)	Eastern Europe (n = 3574)	North Africa and Middle East (n = 10,802)	Sub-Saharan Africa (n = 5949)	Asia (n = 7597)
Alcohol use disorders (F10)									
No. of events	1747	381	43	148	95	9	36	25	22
Prevalence (95% CI)	1.9 (1.8–2.0)	0.6 (0.5–0.6)	1.1 (0.8–1.5)	1.1 (0.9–1.3)	0.5 (0.4–0.6)	0.3 (0.2–0.5)	0.4 (0.3–0.6)	0.4 (0.3–0.6)	0.3 (0.2–0.4)
Other substance use disorders (F11–F19)									
No. of events	725	194	16	49	50	3	39	19	14
Prevalence (95% CI)	0.8 (0.7–0.8)	0.3 (0.26–0.34)	0.4 (0.3–0.7)	0.4 (0.3–0.5)	0.3 (0.2–0.4)	0.1 (0.0–0.3)	0.4 (0.3–0.5)	0.3 (0.2–0.5)	0.2 (0.1–0.3)
Psychoses (F20–F29)									
No. of events	1156	565	28	124	93	33	133	83	59
Prevalence (95% CI)	1.2 (1.2–1.3)	0.9 (0.8–0.9)	0.7 (0.5–1.1)	0.9 (0.8–1.1)	0.5 (0.4–0.6)	0.9 (0.7–1.3)	1.2 (1.0–1.5)	1.4 (1.1–1.7)	0.8 (0.6–1.0)
Bipolar disorder (F30–F31)									
No. of events	476	148	24	21	52	5	28	12	3
Prevalence (95% CI)	0.5 (0.5–0.6)	0.2 (0.2–0.3)	0.6 (0.4–0.9)	0.2 (0.1–0.2)	0.3 (0.2–0.4)	0.1 (0.1–0.3)	0.3 (0.2–0.4)	0.2 (0.1–0.4)	0.04 (0.0–0.1)
Major depressive disorder (F32–F33)									
No. of events	2127	1101	100	137	251	81	351	59	105
Prevalence (95% CI)	2.3 (2.2–2.4)	1.7 (1.6–1.8)	2.6 (2.1–3.1)	1.0 (0.9–1.2)	1.4 (1.2–2.8)	2.3 (1.8–2.8)	3.2 (2.9–3.6)	1.0 (0.8–1.2)	1.4 (1.1–1.7)
Other mood disorders (F34–F39)									
No. of events	300	109	13	14	28	8	34	4	6
Prevalence (95% CI)	0.3 (0.3–0.4)	0.2 (0.1–0.2)	0.3 (0.2–0.6)	0.1 (0.1–0.2)	0.2 (0.1–0.2)	0.2 (0.1–0.5)	0.3 (0.2–0.4)	0.1 (0.0–1.2)	0.1 (0.0–0.2)
Anxiety disorders (F40–F42)									
No. of events	1182	459	60	70	110	46	124	12	30
Prevalence (95% CI)	1.3 (1.2–1.3)	0.7 (0.6–0.8)	1.6 (1.2–2.0)	0.5 (0.4–0.6)	0.6 (0.5–0.7)	1.3 (1.0–1.7)	1.1 (1.0–1.4)	0.2 (0.1–0.4)	0.2 (0.1–0.4)
Post-traumatic stress disorder (F43.1)									
No. of events	48	152	1	9	13	39	70	9	10

Table 3 continued

	Native Finns (n = 93,714)	Immigrants (n = 64,889)	Nordic countries (n = 3855)	Russia and Soviet Union (n = 13,614)	Western countries (n = 18,220)	Eastern Europe (n = 3574)	North Africa and Middle East (n = 10,802)	Sub-Saharan Africa (n = 5949)	Asia (n = 7597)
Prevalence (95% CI)	0.1 (0.0–0.1)	0.2 (0.2–0.3)	0.0 (0.0–0.2)	0.1 (0.0–0.1)	0.1 (0.0–0.1)	1.1 (0.8–1.5)	0.6 (0.5–0.8)	0.2 (0.1–0.3)	0.1 (0.1–0.2)
Dissociative and somatoform disorders (F44–F45)									
No. of events	116	97	5	14	21	10	31	6	9
Prevalence (95% CI)	0.1 (0.1–0.1)	0.1 (0.1–0.2)	0.1 (01–0.3)	0.1 (0.1–0.2)	0.1 (0.1–0.2)	0.3 (0.2–0.4)	0.3 (0.2–0.4)	0.1 (0.0–0.2)	0.1 (0.1–0.2)
Eating disorders (F50)									
No. of events	35	10	1	0	5	0	2	0	1
Prevalence (95% CI)	0.0 (0.0–0.1)	0.0 (0.0–0.0)	0.0 (0.0–0.2)	–	0.0 (0.0–0.1)	–	0.0 (0.0–0.1)	–	0.1 (0.0–0.6)
Personality disorders (F60)									
No. of events	464	127	13	23	40	6	33	2	8
Prevalence (95% CI)	0.5 (0.5–0.5)	0.2 (0.2–0.2)	0.3 (0.2–0.6)	0.2 (0.1–0.3)	0.2 (0.2–0.3)	0.2 (0.1–0.4)	0.3 (0.2–0.4)	0.0 (0.0–0.1)	0.1 (0.1–0.2)
Any mental disorder (F00–F99)									
No. of events	5999	2788	248	535	638	182	699	204	235
Prevalence (95% CI)	6.4 (6.2–6.6)	4.2 (4.1–4.5)	6.4 (5.7–7.3)	3.9 (3.6–4.3)	3.5 (3.2–3.8)	5.1 (4.4–5.9)	6.5 (6.0–7.0)	3.4 (3.0–3.9)	3.1 (2.6–4.7)

All prevalences are expressed as percentages. Persons who moved to Finland after 2007 have been excluded from the analyses

Table 4 4-year prevalence of ICD-10 psychiatric disorders in women according to immigration background and country of origin, 2007–2010[a]

	Native Finns (n = 89,919)	Immigrants (n = 65,571), unadjusted	Nordic countries (n = 3439),	Russia and Soviet Union (n = 23,959)	Western countries (n = 14,026)	Eastern Europe (n = 3188)	North Africa and Middle East (n = 5725)	Sub-Saharan Africa (n = 4110)	Asia (n = 9851)
Alcohol use disorders (F10)									
No. of events	836	237	25	124	56	2	5	12	10
Prevalence (95% CI)	0.9 (0.9–1.0)	0.4 (0.3–0.4)	0.7 (0.5–1.1)	0.5 (0.4–0.6)	0.4 (0.3–0.5)	0.1 (0.0–0.3)	0.1 (0.0–0.2)	0.3 (0.2–0.5)	0.1 (0.1–0.2)
Other substance use disorders (F11–F19)									
No. of events	323	99	7	55	23	1	5	4	3
Prevalence (95% CI)	0.4 (0.3–0.4)	0.2 (0.1–0.2)	0.2 (0.1–0.4)	0.2 (0.2–0.3)	0.2 (0.1–0.2)	0.0 (0.0–0.2)	0.1 (0.0–0.2)	0.1 (0.0–0.3)	0.0 (0.0–0.1)
Psychoses (F20–F29)									
No. of events	989	561	32	215	93	23	48	59	75
Prevalence (95% CI)	1.1 (1.0–1.2)	0.9 (0.8–0.9)	0.9 (0.7–1.3)	0.9 (0.8–1.0)	0.7 (0.5–0.8)	0.7 (0.5–1.1)	0.8 (0.8–1.1)	1.4 (1.1–1.8)	0.8 (0.6–1.0)
Bipolar disorder (F30–F31)									
No. of events	681	217	23	83	66	5	12	9	15
Prevalence (95% CI)	0.8 (0.7–0.8)	0.3 (0.3–0.4)	0.7 (0.4–1.0)	0.3 (0.3–0.4)	0.5 (0.4–0.6)	0.2 (0.1–0.4)	0.2 0.1–0.4)	0.2 (0.1–0.4)	0.2 (0.1–0.3)
Major depressive disorder (F32–F33)									
No. of events	3573	1979	178	602	418	126	348	82	178
Prevalence (95% CI)	4.0 (3.8–4.1)	3.0 (2.9–3.2)	5.2 (4.5–6.0)	2.5 (2.3–2.7)	3.0 (2.7–3.3)	4.0 (3.3–4.7)	6.1 (5.5–6.7)	2.0 (1.6–2.5)	1.8 (1.6–2.1)
Other mood disorders (F34–F39)									
No. of events	459	175	14	60	41	13	20	6	15
Prevalence (95% CI)	0.5 (0.5–0.6)	0.3 (0.2–0.3)	0.4 (0.2–0.7)	0.3 (0.2–0.3)	0.3 (0.2–0.4)	0.4 (0.2–0.7)	0.3 (0.2–0.5)	0.1 (0.1–0.3)	0.2 (0.1–0.3)
Anxiety disorders (F40–F42)									
No. of events	1831	833	93	264	198	60	119	27	50
Prevalence (95% CI)	2.0 (1.9–2.1)	1.3 (1.2–1.4)	2.7 (2.2–3.3)	1.1 (1.0–1.2)	1.4 (1.2–1.6)	1.9 (1.5–2.4)	2.1 (1.7–2.5)	0.7 (0.5–1.0)	0.5 (0.4–0.7)
Post-traumatic stress disorder (F43.1)									
No. of events	160	150	6	25	19	32	42	16	9

Table 4 continued

	Native Finns (n = 89,919)	Immigrants (n = 65,571), unadjusted	Nordic countries (n = 3439),	Russia and Soviet Union (n = 23,959)	Western countries (n = 14,026)	Eastern Europe (n = 3188)	North Africa and Middle East (n = 5725)	Sub-Saharan Africa (n = 4110)	Asia (n = 9851)
Prevalence (95% CI)	0.2 (0.2–0.2)	0.2 (0.2–0.3)	0.2 (0.1–0.4)	0.1 (0.1–0.2)	0.1 (0.1–0.2)	1.0 (0.7–1.4)	0.7 (0.5–1.0)	0.4 (0.2–0.6)	0.1 (0.0–0.2)
Dissociative and somatoform disorders (F44–F45)									
No. of events	238	168	10	56	27	19	37	5	12
Prevalence (95% CI)	0.3 (0.2–0.3)	0.3 (0.2–0.3)	0.3 (0.2–0.5)	0.2 (0.2–0.3)	0.2 (0.1–0.3)	0.6 (0.4–0.9)	0.6 (0.5–0.9)	0.1 (0.1–0.3)	0.1 (0.1–0.2)
Eating disorders (F50)									
No. of events	427	113	7	28	36	7	19	7	8
Prevalence (95% CI)	0.5 (0.4–0.5)	0.2 (0.1–0.2)	0.2 (0.1–0.4)	0.1 (0.0–0.2)	0.3 (0.2–0.4)	0.2 (0.1–0.5)	0.3 (0.2–0.5)	0.2 (0.1–0.4)	0.1 (0.0–0.2)
Personality disorders (F60)									
No. of events	729	169	17	64	47	6	19	3	12
Prevalence (95% CI)	0.8 (0.8–0.9)	0.3 (0.2–0.3)	0.5 (0.3–0.8)	0.3 (0.2–0.3)	0.3 (0.3–0.4)	0.2 (0.1–0.4)	0.3 (0.2–0.5)	0.1 (0.0–0.2)	0.1 (0.1–0.2)
Any mental disorder (F00–F99)									
No. of events	6997	3636	326	1175	778	218	545	194	325
Prevalence (95% CI)	7.8 (7.6–8.0)	5.5 (5.4–5.7)	9.5 (8.5–10.5)	4.9 (4.6–5.2)	5.5 (5.2–5.9)	6.8 (6.0–7.8)	9.5 (8.9–10.3)	4.7 (4.1–5.4)	3.2 (3.0–3.7)

[a] All prevalences are expressed as percentages. Persons who moved to Finland after 2007 have been excluded from the analyses

decreased in migrants compared to the Finnish controls. This unprecedented finding may be due to the high prevalence of psychotic disorders in Finland [36]. For example, the lifetime prevalence of schizophrenia in Finland was 1.0% in a general population survey [36], while the median lifetime prevalence in the world is 0.4% [37]. Moreover, the rate of psychosis among Finnish migrants in Sweden was among the highest in all migrant groups [28]. Although previous studies suggest that the relative incidence of psychotic disorders among immigrants increases as they form a decreasing proportion of the population [1], in Finland, where migrants constitute a small minority, their risk of psychosis does still not exceed that of the native Finns.

Depressive disorders

Immigrants had a lower incidence of major depressive disorder and other mood disorders compared with Finnish-born population. Persons of North African and Middle Eastern origin, however, had a higher risk, and Nordic and Eastern European immigrants had the same risk as Finns did, while immigrants of Russian, Sub-Saharan African and Asian origin had remarkably lower incidence of major depression.

A recent systematic review found a slightly increased risk of depressive disorders among both first- and second-generation migrants [2]. Proposed mechanisms include post-migratory stress, discrimination and isolation. Strong social networks could potentially mitigate this risk, an example being the 'Latino paradox' in the US [2]. Finland has relatively small immigrant communities, and it does not appear likely that strong social networks would explain the lower risk of depression in all migrant groups. However, the 12-month prevalence of major depressive disorder in Finland is 7.4%, slightly higher than the global average [38]. Studies from Denmark and the US have also found lower prevalence of depressive disorders and migrants [11, 31]. Globally, the North African and Middle Eastern region has a higher than average prevalence, whereas East Asian region has a lower prevalence [39]. The observed differences in incidence of depression by geographic groups appear to follow these patterns of countries of origin.

PTSD

In this study, post-traumatic stress disorder was the only disorder where immigrants had a higher risk than native Finns (aHR 5.4 for men and 1.4 for women). In particular, the risk of PTSD was increased among immigrants from Northern Africa and the Middle East, Sub-Saharan Africa and Eastern Europe. There were large differences by sex,

with men having larger hazard ratios across the geographic groups. Women from Asia and Sub-Saharan Africa did not have an increased risk of PTSD, whereas men from these regions did. In terms of public health relevance, the largest risk differences between migrants and Finns were observed for PTSD, highlighting the need to develop psychosocial services to respond to the needs of immigrants from unstable societies [40].

Compared with other geographic areas, in Finland immigrants from these regions are more frequently refugees than labour migrants [17], and more likely to have been exposed to traumatic events. Globally, the risk of PTSD among refugees is up to tenfold compared with the general population [8], and particularly high among refugees from former Yugoslavia [10]. The gender difference observed in our study is likely related to different exposure to traumatic events: In another Finnish study, 82% of Kurdish men and 72% of Kurdish women living in Finland reported to have experienced a traumatic event, most often war-related [41]. Among Somali immigrants, however, the situation was reversed, with 44% of men and 68% of women reporting traumatic events. In the case of more severe traumatic experiences, the gender difference was wider: 9–33% of men vs. 3–6% of women reported to have experienced torture and 5–41% of men vs. 1–13% of women experienced imprisonment or kidnapping.

Alcohol use disorders

Immigrants as a group and all geographic area groups separately had a lower risk for alcohol use disorders (HR 0.1–0.7), with the exception of persons from Nordic countries. Incidence of other substance use disorders was also lower among both men and women (HR 0.4–0.7). Finland has a high level of alcohol consumption and alcohol use disorders, [42] whereas immigrants in Finland report much lower rates of alcohol consumption than the native population [17], and in a previous Finnish study, lower alcohol-related mortality explained a large share of the lower mortality among immigrants [5]. Similar findings of lower alcohol use disorder prevalence have been reported from the Netherlands and the US [43, 44].

Other mental disorders

The incidence of dissociative and somatoform disorders, which can also be trauma-related [45], did not differ between immigrant and Finnish men, whereas immigrant women had a lower risk. Incidence of anxiety, eating and personality disorders was lower among immigrants. Eating disorders among men were too rare to make meaningful conclusions. In the case of personality disorders, language and cultural barriers as well as lack of information about

earlier medical history could influence the low rate of diagnosing these disorders.

Geographic differences

Looking at the geographic categories of immigrants, persons from Nordic countries appear to have a very similar risk as Finns for most disorders, and among women in total a slightly elevated total risk (HR 1.19), whereas among men their risk of psychotic disorders is significantly lower than Finns. This is in line with earlier findings of high psychosis rates among Finnish migrants in Sweden [46]. The largest differences compared with the native population are observed among people of Asian, African and Middle Eastern origin. In these categories, persons from North Africa and Middle East have a higher incidence of all mental disorders than Finns among both men and women, but with large inter-category variations, such that the risk of PTSD, dissociative and somatoform disorders and major depression is increased, whereas the risk of other mental disorders is decreased. People of Asian and Sub-Saharan origin have lower incidence rates overall, with the exception of PTSD in men.

As mentioned above, immigrants from Africa and the Middle East more often have a refugee background than other immigrant groups in Finland: approximately one-third in this group are refugees [17]. However, across groups, family-related reasons, which include refugee family reunification, are the most important reason for migration to Finland (42–67% of migrants in each group). Unfortunately, refugee status is not recorded in the Finnish Central Population Register, so it was not possible to carry out further analyses regarding the impact of refugee status.

Comparison to earlier migrant studies in Finland

Only two recent studies provide information on the mental health of the adult Finnish immigrant population [17, 41]. The Migrant Health and Wellbeing Study interviewed 1846 immigrants of Russian, Somali and Kurdish origin. Using the Hopkins Symptom Checklist (HSCL-25), Russian and Kurdish immigrants reported a high level of psychological symptoms (18 and 36%, respectively, reported severe depressive and anxiety symptoms during the last week), whereas Somali immigrants' symptom level (8.7%) did not differ from the Finnish general population (8.6%) [41]. Socioeconomic disadvantage, more recent migration and lower language proficiency were associated with more psychological symptoms [25].

In the Survey on Work and Well-being among People of Foreign Origin, including immigrants of varying nationalities, self-reported mental disorder was not more common among immigrants than among the Finnish population, and

psychological distress as measured by the Mental Health Index (MHI-5) was less common. Many indicators of wellbeing, such as trust in strangers and the health care system, happiness in the past month or receiving support from neighbours were better compared to the Finnish population across immigrant groups. However, immigrants from North Africa and the Middle East reported significantly higher levels of psychological distress and self-reported psychiatric disorder than Finns [17].

Our results are in line with these studies: immigrants as a group appear to have better mental health than Finns, but some groups, particularly those originating from Africa and Middle East, show worse mental health indicators.

Why do immigrants have better mental health than Finns?

Some possible explanations to our findings emerge from the literature. Many studies have found refugees to be at a higher risk of mental disorders than other types of migrants [7–9]. Finland has a relatively restrictive humanitarian migration policy compared with Scandinavian countries [47, 48], and most migrants are either labour migrants or migrated due to personal, family-related reasons, and therefore subject to selective migration. This may explain the notable differences to the findings of neighbouring Sweden, which has been known for its liberal and humanitarian migration policies [7, 48]. On the other hand, Finnish integration policy is characterised as 'multicultural' or tolerant, and therefore beneficial to migrant health [49].

However, also methodological considerations related to the use of registers may influence our findings. This study is based on register data from all public health services, which in Finland constitute a large majority of all health care use. Nevertheless, this approach does not consider two groups: those using only private services, and those who do not seek health services. Regarding the use of private services, it is less likely that immigrants would use them more than the Finnish-born, since majority of these services are occupational health services, and unemployment rates among immigrants are higher than native Finns. Therefore, our findings of mostly lower incidence and prevalence are probably not influenced by differences in the use of private and public health services.

The second group, those who do not use mental health services at all, is more problematic. Access and pattern of use of mental health services could differ between migrants and local populations [21, 50]. Since Finland has a universal health care system, all legal migrants have in principle access to the same services as the native population. However, utilisation of services at different levels of health care might still differ. In one Finnish study, the use of

specialised mental health services did not differ between immigrants and the general population, with the exception of Kurdish women, who used these services more frequently [51]. However, we cannot exclude the influence of different patterns of health service use on our results. Nevertheless, the observed differences in the incidence of any mental disorder between specialised and primary mental health care were small.

Another suggested explanation for the higher incidence of psychosis among migrants found in previous studies is misdiagnosis. Even though there is some evidence that there might be diagnostic challenges in particular in schizophrenia [52], this is unlikely to explain the frequently observed increased risk of psychosis to a meaningful extent [3]. No culturally specific diagnostic procedures are used in Finland, and there is very little training on cultural competence in health care. It is possible that some psychiatric problems are misdiagnosed, if large cultural differences exist between patients and the Finnish health care professionals. Also, under diagnosis related to communication problems is possible and is another potential contributor to the observed lower rates of mental disorders.

Limitations

In addition to the methodological challenges related to register studies mentioned above, particularly the fact that it was not possible to assess those who have not accessed health services, one additional limitation is the follow-up time and the washout period. Some studies have been able to follow persons from early adolescence, but since the migrant population in Finland is recent, this approach would have resulted in a small sample size. Finally, the FCPR includes only residents in Finland, and therefore asylum seekers and undocumented migrants were not included, even though they might be a particularly vulnerable migrant group.

Conclusion

We found a lower risk of mental disorders among the immigrant population in Finland, with notable differences by immigrant and disorder group. The region of origin significantly influenced the risk of specific mental disorders. Particularly, the risk of PTSD varied according to region of origin of the migrants. The Finnish migrant profile and relatively high psychiatric morbidity of Finns contribute to these findings, which are radically different from many earlier migrant studies. It is vital to understand the heterogeneity of migrant populations, and also of the native comparison populations. Instead of trying to decipher the overall risk of all mental disorders across all migrant groups, it can be much more valuable to study specific risks in specific groups.

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