Country of birth, time period of resettlement and subsequent treated common mental disorders in young refugees in Sweden

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Background: Little is known regarding treatment for common mental disorders (CMDs) in young refugees. We
aimed to identify (i) if the risk of treatment for CMDs in young refugees varies by their country of birth, compared
with the Swedish-born population and (ii) if time period of resettlement influences these possible associations.
Methods: All Swedish-born individuals and people who were granted refugee status, aged 16–25 years, living in
Sweden on 31 December 1999, 2004 or 2009 (around 1 million people with 3–4% refugees in each cohort), were
followed for 4 years for treated CMDs by linking register data. To facilitate stratified analyses by refugees' country
of birth, the 2009 cohort was followed for 7 years with regard to specialized healthcare and antidepressant
prescription due to CMDs. Hazard ratios with 95% confidence intervals were computed in crude and adjusted
models. **Results:** Refugees in the 2009 cohort with 7-year follow-up had a 25% lower risk for treated CMDs,
compared with the Swedish-born. Stratified analysis by country of birth showed a similarly lower risk regarding
treated CMDs among refugees from all countries but Iran [hazard ratios (95% confidence intervals): 1.15 (1.05–
1.26)] than their Swedish-born peers. No substantial effect of time period of resettlement was observed in the risk
for treated CMDs in refugees. **Conclusions:** Treatment for CMDs is lower in young refugees than in the majority
population in Sweden, is stable across time, but varies with country of birth. Strategies to improve access to
mental healthcare for young refugees are warranted.

Introduction

There has been a progressive rise in the number of people seeking refuge due to human rights violations, persecutions and conflicts in several European countries.[1] Such inflow of refugees has impacted the population demography all over Europe, especially in Sweden.[2] Within the European union, the highest number of refugee status per capita was granted by Sweden in 2016.[3] During 2018, nearly four in every fifth (79%) first-time asylum seeker in the EU-28 were <35 years old. Among those, about one-third (31%) were aged <18 years,[4] of which ~10% were unaccompanied.[4] Only in 2015, 35 369 unaccompanied minors came to Sweden.[5]

Many refugees have experienced traumatic events in their origin country and during flight. This might lead to the development of common mental disorders (CMDs) including depression, anxiety and post-traumatic stress disorder.[6–8] A high prevalence of CMDs in refugees has been reported.[6–8] Existing scientific knowledge also suggests that the risk for CMDs in subgroups of refugees, e.g.

women, elderly and minors is higher than in economic migrants,[9–12] particularly in unaccompanied refugee minors[13] or separated refugee adolescents.[14] Therefore, young refugees are of specific interest when it comes to CMDs.

Despite the higher risk of developing CMDs in refugees, the literature suggests that there are several obstacles for refugees with CMDs to access healthcare services and get proper treatment.[15] These obstacles include restrictions regarding access to healthcare, language barriers, the stigma attached to mental disorders and the lack of skill in transcultural psychiatry of the treating physician.[15] Research on treatment of CMDs in young refugees is therefore of eminent importance, but still sparse.

Refugees form a heterogenous group and differ among other determinants regarding their country of birth. Treatment for CMDs may also vary according to the birth country of the refugee.[16] Moreover, mental health problems and treatment-seeking behaviour among refugees are affected by the acculturation process in the host country, which may depend on the country of birth and the

ethnicity of the refugees.[17,18] Problems in acculturation and social integration, such as labour market marginalization, may in turn also result in the development of CMDs.[19] Furthermore, pre-migration traumatic events in the country of birth, such as sudden and violent emergencies or war, separation from one or both parents and abrupt financial deprivation affect the psychosocial well-being of refugee children, making them more vulnerable to subsequent CMDs.[20] Finally, the lack of access to healthcare among refugees in their country of birth prior to migration to the host country also contributes to the risk for subsequent CMDs.[21] For these reasons, analyzing any differences in the risk of treatment for CMDs in young refugees resettled in Sweden according to their country of birth is important.

Still, treatment for CMDs among young refugees may not only depend on pre-migration factors such as the country of birth, but on post-migration factors, such as the social insurance system, migration policies and the healthcare system in their destination country.[22,23] These post-migration factors in the host country are subjected to temporal changes. Hence, entry and residence during different time periods in the host country may influence the risk for treated CMDs in the refugees. In Sweden, specialized healthcare consumption increased strongly in adolescents and young adults, particularly during the preceding 20 years.[24] To date, it is not known, however, if this increase occurred only in the Swedish-born population or also in migrant populations, such as young refugees. For this reason, effects of the time period of resettlement in the association between refugee status and subsequent CMD treatment also needs to be enquired.

Aims

The study aimed to identify (i) if the risk of treatment for CMDs in young refugees varies by their country of birth, compared with the Swedish-born population and (ii) if time period of resettlement influences these possible associations.

Methods

Design and study population

Individuals aged 16–25 years who were either Swedish-born or were granted refugee status and thereby residence permit and residing in Sweden on 31 December 1999, 2004 and 2009 were identified from nationwide registers. Non-refugee immigrants were not included. These cohorts were followed for 4 years each for the outcome of treated CMDs in inpatient healthcare in order to study potential effects of the time period of resettlement. Here, the calendar years during different time periods (i.e. 2000–03, 2005–08 and 2010–13 for the respective cohort) of residence in Sweden were considered as the time period of resettlement. To assure measurement of incident treatment for CMDs in inpatient healthcare, individuals who had any hospitalization due to CMD in the previous 4 years (1996–99, 2001–04 and 2006–09, respectively) were excluded. This yielded a population of 948 904 (refugees 3.2%), 968 805 (refugees 4.3%) and 1 076 282 (refugees 4.1%) individuals for the 1999, 2004 and 2009 cohort, respectively. Among the individuals who met the inclusion criteria for the 1999 cohort ($N = 948\,904$), 49.4% were also included in the 2004 cohort (based on the inclusion criteria for 2004 cohort). Similarly, 50.6% of the individuals included in the 2004 cohort were also included in the 2009 cohort. No individuals were overlapping between the 1999 and 2009 cohort. A sensitivity analysis was conducted focussing on individuals between 21 and 25 years of age in 1999, 2004 and 2009 who naturally did not overlap among these cohorts.

In order to study differences according to country of birth, the 2009 cohort was followed for a longer time period, i.e. until 2016. For this cohort, not only information on inpatient healthcare but also on specialized outpatient healthcare and antidepressant

treatment was available. Due to the intention to create a cohort without previous CMD, individuals who were treated in inpatient or specialized outpatient healthcare due to any CMD diagnosis during 2006–2009 or who were prescribed antidepressants during 2009 were excluded. This yielded a population of 1 018 520 individuals (refugees 4.1%). A diagnosis of CMD was coded according to the International Classification of Diseases version 10 (ICD-10) codes: depressive disorders (ICD-10 F32–F33), anxiety disorders (ICD-10 F40–F42), post-traumatic stress disorder (ICD-10 F43.1) and other stress-related disorders (ICD-10 F43 except F43.1).[25] The Anatomical Therapeutic Chemical Classification System (ATC) code: N06A was used to measure prescription of antidepressants.[26]

Data sources

Longitudinal data for each individual were available up to 31 December 2016 through register linkages by the unique de-identified personal number from the following sources:

(1) Statistics Sweden: LISA database (longitudinal integration database for health insurance and labour market studies)[27] contains personal data on socio-demographic factors, i.e. age, sex, country of birth, educational level, family situation, type of residential area and factors related to labour market marginalization, i.e. number of annual net days with sickness absence , disability pension and number of annual days with unemployment from 1990 onwards; STATIV database (Longitudinal database for integration studies) includes data on reason for residence (e.g. refugee) since 1997.
(2) National Board of Health and Welfare: National patient register with data on date and diagnosis of inpatient and specialized outpatient healthcare starting from 1987 and 2001, respectively; Cause of death register containing date and cause of death from 1960 and onwards[28]; Prescribed drug register including information on date and amount of prescribed and purchased drugs available since July 2005.[29]

Refugees and the Swedish-born population

Individual granted refugee status, following an asylum-seeking period, by the Swedish Migration Agency with the following reason for residence were identified as refugees: 'refugee', 'in need of protection' and 'humanitarian grounds'.[30,31] A sensitivity analysis was carried out excluding the 'in need of protection' and 'humanitarian grounds' groups as refugees. This analysis showed similar results to our main analysis. Individuals born in Sweden were classified as 'Swedish-born'.

Country of birth

Analyses were carried out for those countries of birth with the largest numbers of refugees to Sweden, i.e. Eritrea, Ethiopia, Somalia, Afghanistan, Iran, Iraq, Syria, Chile and countries of former Yugoslavia.

Outcome measures

In this study, the outcome measures, in determining the association between country of birth and treated CMD using the 2009 cohort, comprised the first treatment for CMDs in inpatient or specialized outpatient healthcare[25] or the first prescription of antidepressant,[26] during the follow-up (2010–16). To ensure comparability among the cohorts, only treatment for CMDs in inpatient healthcare was regarded as the outcome when looking at the effects of time period of resettlement in such associations. This was due to the fact that information only on inpatient healthcare was available for all three cohorts. The follow-up in the latter analyses was from 1 January 2000, 2005 and 2010 to 31 December 2003, 2008 and 2013, respectively.

Covariates

Socio-demographic factors

Sex, age, educational level, family situation and type of residential area were measured at 31 December of the baseline year of each cohort (1999, 2004 and 2009), respectively.

Factors regarding labour market marginalization

Days with full-time unemployment, net days with sickness absence (e.g. 4 days on 25% sickness absence accumulate to one net day of sickness absence) and granted disability pension were considered as labour market marginalization factors. These factors were measured during the whole baseline year of each cohort (1999, 2004 and 2009, respectively).

Morbidity factors

History of inpatient and/or specialized outpatient healthcare due to any psychiatric diagnoses (other than CMDs) or somatic diagnoses during the 4 years before the start of follow-up (2006–9) was taken into account in the analyses using cohort 2009. The analyses for the effects of time period of resettlement were controlled for inpatient healthcare due to psychiatric or somatic diagnoses during the 4 years prior to follow-up (1996–99, 2001–04, 2006–09 for the respective cohort). Both main and secondary diagnoses were used. Missing values for a covariate were coded as a separate category. Categorization of the covariates can be seen in table 1.

Statistical analyses

Cox proportional hazard regression models were applied to compare refugees, in total and by their country of birth, with the Swedish-born population regarding subsequent treated CMDs. For the analyses on country of birth and subsequent CMD treatment, the models were adjusted in the following manner: Model 1, socio-demographic covariates measured at baseline; Model 2, labour market marginalization factors in 2009, and covariates in Model 1; Model 3, morbidity factor during for the respective cohorts and covariates in Model 2. Data were censored in the event of emigration, death and end of follow-up, whichever occurred first. The assumption of proportional hazard was confirmed by plotting log-minus-log Kaplan–Meier survival curves.

Ethics

Ethical approval was obtained from the Regional Ethical Review Board, Karolinska Institutet, Stockholm, Sweden.

Results

Table 1 shows the socio-demographic, labour market marginalization and morbidity characteristics, and cumulative incidence of treated CMDs in refugees and Swedish-born people in the three cohorts. The proportions of males were slightly higher in refugees compared with the Swedish-born in all cohorts. While the educational level was lower in refugees, the proportions of individuals who are cohabiting, living in big cities and with previous inpatient healthcare were higher in refugees compared with their Swedish-born peers. Unemployment was much more prevalent in refugees compared with the Swedish-born in all three cohorts, whereas sickness absence was more common in the Swedish-born in the 1999 cohort.

The cumulative incidence rate of treated CMDs was lower in young refugees compared with their Swedish-born peers and increased from 1999 to 2009 in both the Swedish-born and refugees (table 1). Incidence of CMD treatment was higher in young refugees in the 1999 cohort, though, but considerably lower in the cohort 2009. In all three cohorts, the incidence of depressive disorders and anxiety disorders was higher in persons born in Sweden, whereas incidence rates of post-traumatic stress disorder and other stress-related disorders were higher in refugees (table 1).

Table 2 shows the hazard ratios (HRs) for the treatment of CMDs in refugees in the 2009 cohort, during a 7-year follow-up period, in comparison with the Swedish-born population. The estimates for the risk for treated CMDs among refugees, following adjustment of potential socio-demographic, labour market marginalization and morbidity factors, were 25% lower compared with the Swedish-born. This lower risk was observed in refugees from almost all countries of birth, with the exception of Iran (HR 1.15, CI: 1.05–1.26), which showed a higher risk for treated CMDs compared with the Swedish-born. The lower risk for treated CMDs compared with the Swedish-born was especially pronounced in refugees from Somalia, Eritrea, Syria and Ethiopia (range of HRs 0.43–0.54).

In table 3, the risk estimates for treated CMDs within 4 years in all three cohorts are shown. In the crude models, there was a 19% lower risk for refugees, observed only in the 2009 cohort, compared with the Swedish-born. In the model adjusted for socio-demographic variables, refugees from all three cohorts showed a significant lower risk for treated CMDs, compared with the Swedish-born. The change from non-significant estimates in the crude models to significantly lower risk was mostly due to adjustment for educational level in the 1999 cohort, and for age in the 2004 cohort (data not shown). In the models adjusted additionally for labour market marginalization factors (Model 2) and morbidity factor (Model 3), there was a significant lower risk for treated CMDs in refugees in all three cohorts, compared with the Swedish-born (table 3). In a sensitivity analysis including only individuals between 21 and 25 years of age in 1999, 2004 and 2009 who were not overlapping among these cohorts, similar patterns as in the main results were seen (Supplementary table S1).

Discussion

Main findings

In this study, we found that refugees, aged 16–25 years, living in Sweden in 2009 had a 25% lower risk for treated CMD within 7 years, when compared with the Swedish-born. There were considerable differences according to the country of birth of the refugees. While refugees from Iran had a higher risk for treated CMDs than the Swedish-born, this risk was substantially lower in refugees from Somalia, Eritrea, Syria and Ethiopia. No effect of time period of resettlement was observed in the association of refugee status with subsequent treatment for CMDs.

Comparison with previous studies

In general, the prevalence of CMDs has been reported to be considerably higher in refugees compared with the host population.[32] Due to several reasons, healthcare due to CMDs, however, has been found to be lower in refugees.[33] Our findings are therefore in line with the current literature.[6–8] Reasons for lower healthcare consumption in refugees include restricted access to healthcare, limited knowledge of the structure and functioning of the healthcare system, high levels of stigma attached to mental disorders and frequent lack of knowledge in transcultural psychiatry of the treating physician.[15] Our findings have to be interpreted in the context of the universal nature of the healthcare system in Sweden, which implies that the access for refugees with residence permit is the same as for the Swedish-born majority. This applies for both somatic and mental healthcare. Still, other reports specializing on a particular patient group, i.e. patients with suicide attempt, showed lower rates of psychiatric healthcare use in refugees, compared with the Swedish-born.[34] This lower psychiatric healthcare utilization raises concerns regarding prevailing gaps between mental healthcare needs and psychiatric healthcare utilization in refugees. For this reason, education

Table 1 Descriptive statistics of socio-demographic, labour market marginalization and morbidity characteristics of individuals aged 16–25 years with Swedish-born or refugee[a] backgrounds and resident in Sweden in 1999, 2004 and 2009 who did not have any hospitalization due to CMD in the previous 4 years (1996–99, 2001–04 and 2006–09, respectively) (N = 948 904, 968 805 and 1 076 282, respectively)

Characteristics	1999 cohort, n (%)		2004 cohort, n (%)		2009 cohort, n (%)	
	Swedish-born	Refugees	Swedish-born	Refugees	Swedish-born	Refugees
All (row percentage)	918 254 (96.8)	30 650 (3.2)	927 211 (95.7)	41 594 (4.3)	976 636 (95.7)	41 884 (4.1)
Socio-demographic factors (1999, 2004, 2009)						
Age in years, mean (SD)	20.6 (2.9)	20.1 (2.9)	20.3 (2.9)	20.3 (2.8)	20.3 (2.8)	21.1 (2.7)
Sex						
Women	444 836 (48.4)	14 042 (45.8)	448 744 (48.4)	19 523 (46.9)	499 282 (48.4)	20 385 (46.5)
Men	473 418 (51.6)	16 608 (54.2)	478 467 (51.6)	22 071 (53.1)	533 132 (51.6)	23 483 (53.5)
Educational level (years)						
Compulsory school (0–9)	358 088 (39.0)	16 010 (52.2)	372 073 (40.1)	18 954 (45.6)	406 777 (39.4)	16 092 (36.7)
High school (10–12)	410 418 (44.7)	9765 (31.9)	381 868 (41.2)	15 056 (36.2)	452 728 (43.9)	18 000 (41.0)
College or university (>12)	133 617 (14.6)	1645 (5.4)	154 783 (16.7)	5080 (12.2)	153 416 (14.9)	7531 (17.2)
Missing	16 131 (1.8)	3230 (10.5)	18 487 (2.0)	2504 (6.0)	19 493 (1.9)	2245 (5.1)
Family situation						
Married/cohabiting without children at home	7166 (0.8)	1016 (3.3)	6307 (0.7)	1573 (3.8)	6248 (0.6)	1861 (4.2)
Married/cohabiting with children at home	33 137 (3.6)	2139 (7.0)	28 416 (3.1)	2510 (6.0)	31 076 (3.0)	2954 (6.7)
Single[b] without children at home	474 896 (51.7)	11 878 (38.8)	450 980 (48.6)	17 620 (42.4)	483 026 (46.8)	22 858 (52.1)
Single[b] with children at home	9958 (1.1)	602 (2.0)	8219 (0.9)	632 (1.5)	8555 (0.8)	819 (1.9)
Children (≤20 years old) living at home	393 097 (42.8)	15 006 (49.0)	433 289 (46.7)	19 255 (46.3)	503 509 (48.8)	15 374 (35.0)
Missing		9 (0.0)		4 (0.0)		2 (0.0)
Type of residential area[c]						
Big cities	310 666 (33.8)	14 254 (46.5)	312 207 (33.7)	18 363 (44.1)	355 082 (34.4)	17 910 (40.8)
Medium-sized cities	345 096 (37.6)	11 533 (37.6)	353 599 (38.1)	16 669 (40.1)	391 638 (37.9)	18 723 (42.7)
Small cities/villages	262 492 (28.6)	4863 (15.9)	261 405 (28.2)	6562 (15.8)	285 694 (27.7)	7235 (16.5)
Labour market marginalization at baseline (1999, 2004, 2009)						
Unemployed, 1–180 days	185 753 (20.2)	8355 (27.3)	164 610 (17.8)	9969 (24.0)	155 659 (15.1)	9820 (22.4)
Unemployed, >180 days	11 295 (1.2)	810 (2.6)	13 347 (1.4)	1226 (2.9)	10 551 (1.0)	1260 (2.9)
Sickness absence, 1–90 net days	29 280 (3.2)	488 (1.6)	24 192 (2.6)	1148 (2.8)	20 171 (2.0)	827 (1.9)
Sickness absence, >90 net days	5383 (0.6)	90 (0.3)	8221 (0.9)	392 (0.9)	3851 (0.4)	167 (0.4)
Disability pension[d]	9306 (1.0)	241 (0.8)	12 027 (1.3)	506 (1.2)	16 935 (1.6)	741 (1.7)
Morbidity (1996–99, 2001–04, 2006–09)						
History of inpatient healthcare[e]	118 355 (12.9)	4581 (14.9)	141 408 (15.3)	7234 (17.4)	157 174 (15.2)	7667 (17.5)
Outcome (2000–03, 2005–08, 2010–13)						
CMDs[f] (rate per 100 000 per year) of which	5057 (137.7)	176 (143.6)	7236 (195.1)	324 (194.7)	10 206 (247.1)	349 (198.9)
Depressive disorders	2460 (67.0)	56 (45.7)	3304 (89.1)	124 (74.5)	4266 (103.3)	111 (63.3)
Anxiety disorders	1137 (31.0)	37 (30.2)	2100 (56.6)	74 (44.5)	3511 (85.0)	99 (56.4)
Post-traumatic stress disorder	49 (1.3)	<10[g]	82 (2.2)	11 (6.6)	154 (3.7)	14 (8.0)
Other stress-related disorders	1411 (38.4)	78 (63.6)	1750 (47.2)	115 (69.1)	2275 (55.1)	125 (71.2)

Differences between the Swedish-born and refugees regarding all socio-demographic, labour market marginalization and morbidity factors were statistically significant based on χ^2 tests (P < 0.0001) except for sickness absence and disability pension which showed non-significant differences in the 2004 and 2009 cohort (P > 0.05). Mean age differences between the Swedish-born and refugees were statistically significant according to t tests (P < 0.05) for all three cohorts.

a: Individuals who resettled in Sweden as 'refugee' or 'in need of protection' or, 'humanitarian grounds.

b: Single/divorced/separated/widowed.

c: Type of residential area: big cities—Stockholm, Gothenburg and, Malmö; medium-sized cities—cities with more than 90 000 inhabitants within 30 km distance from the centre of the city; small cities/villages.

d: Individuals having a disability pension during 1999, 2004, 2009 for respective cohort.

e: At least one episode of inpatient healthcare due to any psychiatric diagnosis [measured as any International Classification of Diseases version 10 (ICD-10) F code as main or secondary diagnosis except those for CMDs] or somatic diagnosis (measures as all other ICD-10 codes as main or secondary diagnosis except F codes) during 1995–1999, 2000–2004 and 2005–2009 for respective cohort.

f: First incident inpatient or specialized outpatient healthcare due to depressive disorders (ICD-10 F32-F33), anxiety disorders (ICD-10 F40-F42), post-traumatic stress disorder (ICD-10 F43.1) and other stress-related disorders (ICD-10 F43 except F43.1) as main diagnosis during the follow-up period (2000–2003, 2005–2008 and 2010–2013) for respective cohort.

g: To avoid the risk of identification of individuals, if the number of CMDs is <10, it is not reported for ethical reasons.

and training for healthcare staff in transcultural medicine and implementation of health literacy programmes for refugees are crucial to decrease these gaps in healthcare utilization of young refugees.

We found clear differences in the risk for treated CMDs in refugees according to the respective countries of birth, particularly showing that refugees from all countries but Iran had a lower risk. In Norway, young immigrants from Iran were found to use specialized mental healthcare more than ethnic Norwegians.[35] On the contrary, young immigrants from other refugee generating countries like Iraq or Somalia had a much lower use of specialized mental healthcare.[35] Refugees from Iran were also found to be more

educated than their origin population.[36] Therefore, they may have more knowledge of mental health problems and are more inclined to seek healthcare than other refugee groups.

There are other possible explanations for the variation in the risk for treated CMDs in refugees according to their countries of birth. First, there are differences in the prevalence of CMDs in refugees originating from different countries.[37] Secondly, the differences in the risk for developing CMDs can be due to the differences in stressors related to reasons for leaving the home country, the asylum and acculturation process.[38] Social integration in the host country might differ for refugees from different countries and might be

Table 2 Crude and multivariate HRs with 95% CIs for treated CMDs[a] during 2010–16 in refugees, aged 16–25 years, from different countries of birth, in comparison with the Swedish-born population of same age and resident in Sweden in 2009

	Population n (%)	CMDs, n (rate per 100 000 person-years)	Crude HR (CI)	Model 1[b] HR (CI)	Model 2[c] HR (CI)	Model 3[d] HR (CI)
Swedish-born	976 636 (95.9)	155 576 (2500.8)	1	1	1	1
Refugees[e]	41 884 (4.1)	5701 (2123.7)	**0.85 (0.83–0.87)**	**0.77 (0.75–0.79)**	**0.75 (0.73–0.77)**	**0.75 (0.73–0.77)**
Non-western countries[f]						
Africa (region)						
Eritrea	316 (0.0)	30 (1489.3)	**0.60 (0.42–0.86)**	**0.52 (0.37–0.75)**	**0.52 (0.36–0.75)**	**0.53 (0.37–0.75)**
Ethiopia	317 (0.0)	35 (1697.8)	**0.68 (0.49–0.95)**	**0.61 (0.44–0.85)**	**0.59 (0.42–0.82)**	**0.60 (0.43–0.84)**
Somalia	1685 (0.2)	178 (1648.7)	**0.66 (0.57–0.77)**	**0.46 (0.39–0.53)**	**0.44 (0.38–0.51)**	**0.43 (0.37–0.50)**
Asia (region)						
Afghanistan	1191 (0.1)	200 (2717.2)	1.09 (0.95–1.25)	0.93 (0.81–1.07)	0.92 (0.80–1.06)	0.94 (0.81–1.07)
Iran	2627 (0.3)	491 (3028.3)	**1.21 (1.11–1.33)**	**1.18 (1.08–1.29)**	**1.16 (1.06–1.27)**	**1.15 (1.05–1.26)**
Iraq	6559 (0.6)	924 (2219.8)	**0.89 (0.83–0.95)**	**0.79 (0.74–0.84)**	**0.75 (0.71–0.81)**	**0.76 (0.71–0.81)**
Syria	988 (0.1)	101 (1560.7)	**0.63 (0.52–0.76)**	**0.56 (0.46–0.69)**	**0.55 (0.45–0.66)**	**0.54 (0.44–0.65)**
South America (region)						
Chile	634 (0.1)	113 (2877.6)	1.15 (0.96–1.39)	0.94 (0.78–1.13)	0.92 (0.77–1.11)	0.93 (0.77–1.12)
Western country[f]						
Former Yugoslavia	18 806 (1.8)	2457 (2013.3)	**0.80 (0.77–0.84)**	**0.77 (0.74–0.80)**	**0.74 (0.71–0.77)**	**0.74 (0.71–0.77)**

HRs with 95% CIs in bold indicates statistically significant associations (*P* values <0.05).

a: First incident inpatient or specialized outpatient healthcare due to depressive disorders [International Classification of Diseases version 10 code (ICD-10) F32–F33], anxiety disorders (ICD-10 F40–F42), Post-traumatic stress disorder (ICD-10 F43.1) and other stress-related disorders (ICD-10 F43 except F43.1) as main diagnosis or first prescription of antidepressant medication (Anatomical Therapeutic Chemical Classification System code N06A) during the follow-up period (2010–16).

b: Model 1: adjusted for age, sex, educational level, family situation, type of residential area measured at baseline (2009).

c: Model 2: adjusted for Model 1 covariates, and labour market marginalization factors [unemployment in 2009 (0, 1–180, >180 days), sickness absence in 2009 (0, 1–90, >90 net days) and disability pension in 2009 (No, Yes)].

d: Model 3: adjusted for Model 2 covariates, and morbidity factors [main or side diagnosis from inpatient and specialized outpatient healthcare during 2006–2009 for any psychiatric diagnosis (measured as any ICD-10 F code except those for CMDs) or somatic diagnosis (measures as all other ICD-10 codes except F codes)].

e: Individuals who settled in Sweden as 'refugee' or 'in need of protection' or 'humanitarian grounds'.

f: Countries which generated the largest number of refugees to Sweden. Estimates for other African countries, other Asian countries, Other South American countries and rest of the world are not presented.

Table 3 Crude and multivariate HRs with 95% CIs for treated CMDs[a] in refugees, aged 16–25 years, compared with the Swedish-born population of same age, in three time period cohorts i.e. 1999, 2004 and 2009 cohort, each with 4 years of follow-up

Cohort	Refugee status	Person-years	n (rate per 100 000 person-years)	Crude HR (CI)	Model 1[b] HR (CI)	Model 2[c] HR (CI)	Model 3[d] HR (CI)
1999	Swedish-born	3 642 117	5057 (138.8)	1	1	1	1
	Refugees[e]	121 076	176 (145.4)	1.05 (0.90–1.22)	**0.79 (0.68–0.92)**	**0.80 (0.69–0.93)**	**0.80 (0.69–0.94)**
2004	Swedish-born	3 672 707	7236 (197.0)	1	1	1	1
	Refugees[e]	164 187	324 (197.3)	1.00 (0.89–1.12)	**0.86 (0.77–0.97)**	**0.85 (0.76–0.96)**	**0.86 (0.77–0.96)**
2009	Swedish-born	4 083 276	10 206 (249.9)	1	1	1	1
	Refugees[e]	173 025	349 (201.7)	**0.81 (0.73–0.90)**	**0.71 (0.64–0.79)**	**0.69 (0.62–0.77)**	**0.70 (0.63–0.78)**

HRs with 95% CIs in bold indicate statistically significant associations (*P* values < 0.05).

a: First incident inpatient healthcare due to depressive disorders (International Classification of Diseases version 10 code (ICD-10) F32-F33), anxiety disorders (ICD-10 F40-F42), post-traumatic stress disorder (ICD-10 F43.1) and other stress related disorders (ICD-10 F43 except F43.1) as main diagnosis during the follow-up period.

b: Model 1: adjusted for age, sex, educational level, family situation, type of residential area.

c: Model 2: adjusted for Model 1 covariates and labour market marginalization factors [unemployment in 1999, 2004, 2009 (0, 1–180, >180 days), sickness absence in 1999, 2004, 2009 (0, 1–90, >90 net days) and disability pension in 1999, 2004, 2009 (No, Yes) for respective cohorts].

d: Model 3: adjusted for Model 2 covariates, morbidity factors (main or side diagnosis from inpatient healthcare for specific somatic or psychiatric disorders during 1996–1999, 2001–2004, 2006–2009 for respective cohort).

e: Individuals who settled in Sweden as 'refugee' or 'in need of protection' or 'humanitarian grounds'.

hampered by language difficulties, level of education and potential discrimination.[33] Lastly, the prevailing culture in the country of origin might have a strong influence on perception and expression of mental health complaints, the likelihood of seeking help and the compliance with medical treatment.[15] Culturally specific differences in the stigmatization of mental disorders might play a vital role in explaining differences in the underutilization of mental healthcare according to country of birth.[15,38] Interestingly, similar patterns

regarding country of birth shown in this study were also found in a recently published study on refugees and their risk of suicidal behaviour.[39]

Our analysis indicated little to no effects of time period of resettlement in the association between refugee status and subsequent treatment for CMDs. Levels of treated CMDs were lower in refugees in all three cohorts in the main and sensitivity analyses. These results show that temporal increases of treated CMDs occurred in both young refugees and Swedish-born. The strong increase in utilization of psychiatric healthcare—particularly due to CMDs, in young adults in Sweden, is a topic of considerable concern and frequent discussion.[39] Reasons for this are plentiful, including improved help-seeking behaviour, changes in diagnostic criteria as well as structural changes including alterations in family structures, the school system and higher demands at the labour market.[40] Our findings suggest that both Swedish-born and refugees are equally influenced by these temporal changes. Further studies are warranted to investigate which factors have influenced mental healthcare utilization in refugees over time, in order to design culturally sensitive intervention strategies.

Strengths and limitations

Strengths of the study include the high quality of the Swedish register data with national coverage,[27–29] the prospective cohort design and the long follow-up period, which allowed us to stratify by refugees' countries of birth. Another strength is the possibility to adjust for a wide range of covariates like socio-demographic, labour market marginalization and morbidity factors. Moreover, available data allowed time period analyses, which is a unique contribution to the current scientific knowledge base.

There are also limitations which need to be mentioned. In the analyses for a potential effect of time period of resettlement, we could obtain information on treated CMDs only from inpatient healthcare. This means that only most severe cases could be observed, whereas the majority of CMDs are usually treated in primary healthcare. Still, estimates in the period analyses and the analyses with a longer follow-up and including specialized outpatient healthcare and antidepressant prescription were similar. This suggests that the association between refugee status and subsequent treated CMDs does not differ if only inpatient healthcare is concerned. There is a possibility that educational level and labour market conditions changed over time, especially in a population that was 16–25 years old at baseline and particularly, in refugees. Still, due to the marginal effect of adjustment for these factors in the main analyses, adding them as time-dependent variables in the fully-adjusted model might hardly have had a strong influence on the findings. Information on sickness absence (a measure of labour market marginalization) did not include data on the first 14 days of a sick-leave spell for employees. Still, as both short- and long-term sickness absence were considered in the analyses, the lack of information on the first 2 weeks has likely not made a considerable impact on the estimates. Moreover, familiarity with accessing psychiatric healthcare services in the new country is expected to increase with a longer duration of residence and evidently so, the risk of treated CMDs was reported to increase with longer duration of residence in young refugees.[33] In light of the fact that our refugee cohorts were quite homogenous regarding this covariate, i.e. 70%, 90% and 84% of refugees (data not shown) in the 1999, 2004 and 2009 cohort, respectively, had a duration of residence longer than 5 years, we do not believe that our results are significantly affected by differences in duration of residence.

Conclusions

Healthcare utilization due to CMDs is lower in young refugees compared with their Swedish-born peers, and varies according to their country of birth. This association is constant over time. Wide

implementation of health literacy programmes and continuous education in transcultural psychiatry of healthcare staff are crucial components in the attempt to lower the treatment gap in refugees. These programmes should focus particularly on the healthcare needs of young refugees from the Horn of Africa and Syria.

Supplementary data

Supplementary data are available at *EURPUB* online.

Key points

- Young refugees had a lower risk for treated CMDs, compared with the Swedish-born population of the same age.
- The risk for treated CMDs in young refugees varied according to their country of birth and refugees from Iran had a higher risk for CMDs, compared with the Swedish-born.
- No effect of time period of resettlement was observed in the association between refugee status and subsequently treated CMDs in inpatient healthcare.
- Implementation of health literacy programmes and continuous education in transcultural psychiatry of healthcare personnel are essential to address the underutilization of mental healthcare in young refugees.

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