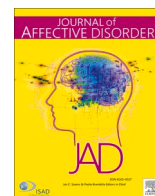


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Research paper

## Depression and anxiety disorders among immigrants living in Finland: Comorbidity and mental health service use

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## ABSTRACT

**Background:** The aims of this study were to (1) compare differences in psychiatric comorbidity of depression and anxiety disorders between immigrants and native Finns and to (2) compare differences in the intensity of psychiatric care received by different immigrant groups and Finnish-born controls with depression and/or anxiety disorders.

**Methods:** The study uses registered-based data, which includes all immigrants living in Finland at the end of 2010 and matched Finnish-born controls. For this study, we selected individuals who had received a diagnosis of depression and/or an anxiety disorder during the follow-up (2011–2015) (immigrants  $n = 6542$ , Finnish-born controls  $n = 9281$ ). We compared differences in comorbidity between the immigrants and the Finnish-born controls using chi-squared tests. Multinomial logistic regression was used to predict psychiatric treatment intensity by immigrant status, region of origin, and other background factors.

**Results:** In both diagnosis groups, Finnish-born participants exhibited greater comorbidity of other psychiatric disorders. Immigrants more often received lower intensity treatment and less often higher intensity treatment. These differences were most striking among those from Eastern Europe, the Middle East, and Africa.

**Limitations:** We did not have the information on the perceived need for the services, which limits us from drawing further conclusions about the mechanisms behind the observed patterns.

**Conclusions:** Immigrants in Finland receive less intensive treatment for depression and anxiety disorders compared to the Finnish-born population. Since lower symptom levels can unlikely alone explain these differences, they could reflect a need for improvement in the psychiatric services for immigrants.

## 1. Introduction

Some immigrant groups tend to have poorer mental health compared to the country's native population (Bas-Sarmiento et al., 2017; Close et al., 2016; Giacco et al., 2018). Refugees have been reported to have a particularly high risk of poor mental health (Aichberger et al., 2010; Close et al., 2016; Mindlis and Boffetta, 2017). Just as among the native population, major depressive disorder and anxiety disorders are among the most common mental health disorders among immigrants. Multiple factors predispose immigrants to these disorders, including pre-migration factors, such as possible traumatic events in the country of

origin, and post-migration factors, such as discrimination, problems in acculturation, and downward social mobility (Das-Munshi et al., 2012; George et al., 2015).

Estimated prevalence rates of depression and anxiety disorders among immigrants have varied widely across studies (Bogic et al., 2015; Fazel et al., 2005; Lindert et al., 2009). A systematic review by Lindert et al. (2009) suggested that the prevalence rates of both depression and anxiety were almost two times greater among refugees than among immigrants who had migrated to seek labor (Lindert et al., 2009). A meta-analysis by Fazel, Wheeler, and Danesh (2005) suggests a point prevalence of five percent for depression and four percent for anxiety

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disorders among refugees (Fazel et al., 2005), although a more recent meta-analysis found considerably higher prevalence rates, especially for depression (Blackmore et al., 2020). In Finland, immigrants have a lower incidence of major depressive disorder compared to the Finnish-born population, with the exception of North African and Middle Eastern origin immigrants (Markkula et al., 2017). Different prevalence rates relate to differences in methodology and risk factors (Steel et al., 2009). Studies of higher methodological quality and larger sample sizes tend to show lower prevalence rates (Bogic et al., 2015; Giacco et al., 2018; Steel et al., 2009).

The comorbidity between depression and anxiety disorders is high (Kaufman and Charney, 2000), and some studies suggest that this comorbidity might even be higher among immigrants (Saraga et al., 2013; Schrier et al., 2012). In addition, post-traumatic stress disorder (PTSD) seems also to be highly comorbid with these disorders among immigrants (Garcini et al., 2017). Among refugees, the comorbidity between depression and PTSD has been shown to be particularly high (Belz et al., 2017; Sogaard et al., 2020; Steel et al., 2009; Tinghög et al., 2017). In Finland, a study on torture survivor refugees found depression, anxiety, and PTSD symptoms to be highly comorbid with each other (Schubert and Punamäki, 2011). However, the comorbidity of depression and anxiety disorders with other psychiatric disorders has rarely been studied among immigrants.

Despite an equal or higher prevalence of common mental disorders, immigrants generally use less mental health services, especially outpatient care, than native populations (Abebe et al., 2017; Derr, 2016; Durbin et al., 2014). We have previously found that in Finland, when not taking into account differences in diagnoses, immigrants use specialized mental health services less and with lower intensity than native Finns (Kiesepää et al., 2019). Barriers to the use of mental health services include cultural and language differences, lack of knowledge about the services, and fear of stigma (Derr, 2016; Whitley et al., 2006). The utilization rates have varied based on the reason for migration, country of origin and length of residence (Abebe et al., 2017; Hollander et al., 2020), which is why it is important to study the service use rates among different immigrant groups. Studies focusing on immigrants' use of mental health services specifically for depression and anxiety disorders are lacking.

The aim of this study is to compare the differences in the background characteristics and comorbidity between immigrants and native Finns diagnosed with depression and/or anxiety disorders in specialized health care, and to compare the intensity of mental health service use.

Possible differences in the background characteristics and comorbid conditions between native Finns and immigrants with these disorders and in the resulting care could have important implications for developing psychiatric services.

## 2. Methods

“The Mental Health of Immigrants Living in Finland” study uses a register-based sample maintained by the Finnish Institute for Health and Welfare (THL). The study utilizes Finnish registers to study the prevalence of visits to mental health care services made by both immigrants and native Finns. THL, the Digitalisation and Population Data Services Agency (Finnish Digital Agency), and Statistics Finland have all given their permission for the use of confidential register data in this study, and the study has been approved by THL's Ethics Committee (589/2013, 798/2018).

### 2.1. Sample

Immigrants were identified from the Finnish Digital Agency by country of birth (other than Finland) and mother tongue (other than Finnish). The original sample includes all immigrants who were over 15 years of age and residents in Finland on December 31<sup>st</sup>, 2010 ( $n = 185,605$ ) and Finnish-born controls ( $n = 185,605$ ). The sample does not

include asylum seekers or recent migrants without a valid personal identity code, which is necessary for the data linkages. The controls were identified from the Finnish Digital Agency and they were matched by sex and age, meaning they were born in the same year and month as the migrant and matched by the municipality of residence on December 31<sup>st</sup>, 2010. Both cases and controls were followed until death, emigration, or December 31<sup>st</sup>, 2015.

For the present study, we only selected individuals who had received a diagnosis of a major depressive disorder (F32-F33) or a diagnosis of a phobic anxiety disorder, other anxiety disorder, or an obsessive-compulsive disorder (F40-F42) during the follow-up (2011–2015) based on the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) criteria. This selection yielded a sample of 5,250 immigrants and 7,114 Finnish-born controls with depression and 2,526 immigrants and 4,501 Finnish-born controls with an anxiety disorder. The groups are partly overlapping, as some individuals had both diagnoses.

### 2.2. Background characteristics

Background characteristics included age, sex, marital status, socioeconomic status, region of origin, and length of residence in Finland. Information on socioeconomic status was derived from Statistics Finland, and information on the other variables was obtained from the Finnish Digital Agency. *Marital status* was classified into two groups: (1) married or in a registered partnership and (2) any other status (single, divorced, separated, or cohabiting without marriage or a registered partnership). *Socioeconomic status* was based on the person's occupation (or lack thereof) in 2010 and, for the purposes of this study, divided into five groups: (1) entrepreneurs and farmers, (2) upper white-collar workers (such as leaders or experts), (3) lower white-collar workers (such as office workers), (4) blue-collar workers (manual work), and (5) any other status (people not in employment, such as students, the unemployed, homemakers, etc.).

*Region of origin* was classified into five groups: (1) the European Union / European Free Trade Association (EU/EFTA), United Kingdom, North America, and Australia, (2) Eastern Europe (including Russia and the former Soviet Union), (3) the Middle East and Northern Africa, (4) Sub-Saharan Africa, and (5) Asia. The number of immigrants from other countries was so small that no separate category was formed for them, and they were thus excluded in the analyses related to region of origin. *Length of residence in Finland* was classified into two groups: (1) less than five years and (2) five years or more.

### 2.3. Psychiatric diagnoses

The information on psychiatric diagnoses was obtained from the hospital discharge register maintained by THL, which covers all public specialized mental health care. The study includes psychiatric diagnoses given by physicians in psychiatric units in public specialized health care. The diagnoses of major depressive disorder, anxiety disorders, and other psychiatric disorders are based on the ICD-10 criteria.

Comorbid psychiatric disorders were defined as other psychiatric disorders diagnosed during the follow-up. We studied the comorbidity of depression and anxiety disorders and the following psychiatric disorders: (1) alcohol-use disorders (F10), (2) other psychoactive substance-use disorders (F11–F19, including F17 nicotine dependence), (3) schizophrenia, schizotypal disorders, and other delusional disorders (F20–F29), (4) manic episodes and bipolar disorders (F30–F31), (5) other mood disorders (F34–F39), (6) post-traumatic stress disorders (PTSD) (F43), (7) dissociative and somatoform disorders (F44–F45), (8) eating disorders (F50), and (9) personality disorders (F60).

### 2.4. Psychiatric treatment

The information on visits to psychiatric services was obtained from

the hospital discharge register. The psychiatric treatment patterns in specialized outpatient mental health care were studied for a one-year period after the diagnosis of either a major depressive disorder or an anxiety disorder. If an individual had received both diagnoses, their treatment patterns were analyzed for a year following whichever diagnosis had been given first. The follow-up period was from 2011 to 2015. Individuals who had received the first diagnosis in 2015 were excluded, since we did not have information on their treatment for a full-year period after the diagnosis. A wash-out period of two years was chosen: individuals who had visited specialized outpatient mental health care units for a diagnosis of depression or an anxiety disorder during the preceding two years before the first diagnosis were excluded. If both diagnoses were given at the same visit, the individual was excluded from the analyses of psychiatric treatment: 139 immigrants and 252 Finnish-born participants were thus excluded. In addition, individuals with a comorbid diagnosis of a psychotic disorder (F20-F29) or mania or a bipolar disorder (F32-F33) were excluded from the analyses of the psychiatric treatment (377 immigrants and 584 Finnish-born controls with these diagnoses were excluded).

We also performed the analyses with a stricter wash-out period, which allowed for no visits to specialized outpatient mental health care units for any reason during the preceding two years before the first diagnosis. Since there were no notable differences in the results, we decided to use the first wash-out period. The results for the stricter wash-out period are available in the supplementary material (supplementary tables 1–3).

The number of visits to outpatient mental health care units during the year after the diagnosis was categorized as follows: (1) *low intensity* (one to three visits) which could not be considered even minimally adequate (Fernández et al., 2007; Wang et al., 2005), (2) *moderate intensity* (four to ten visits), and (3) *high intensity* (eleven visits or more). A description of the rationalization for this categorization can be found elsewhere (Kiesepää et al., 2019). The visits in public outpatient mental health care are free of charge.

### 2.5. Statistical analysis

Chi-square tests of independence were calculated to compare differences in sex, marital status, socioeconomic status, and comorbid psychiatric diagnoses between immigrants and Finnish-born controls. An independent samples *t*-test was conducted to compare the difference in mean age between immigrants and the controls.

Multinomial logistic regression was used to predict the effect of the explanatory variables on the categorized treatment intensity. *High intensity* was the reference category for the outcome variable in all the models, and all models were adjusted for sex, age, and number of other psychiatric diagnoses. In the first model, we predicted the effect of immigrant status on the treatment intensity separately for anxiety and depression. The second model was restricted to immigrants, and the region of origin (EU/EFTA, United Kingdom, North America, and

Australia was the reference category) and the length of residence in Finland were used to predict the categorized treatment intensity separately for anxiety and depression.

### 3. Results

Immigrants were on average older and more often married than the Finnish-born controls in both diagnosis groups (see table 1). The differences in socioeconomic status between immigrants and the Finnish-born controls were also similar in both diagnosis groups: immigrants were more often entrepreneurs or farmers, blue collar workers, or not in employment, whereas the Finnish-born controls were more often lower or upper white-collar workers. There were no significant sex differences between immigrants and controls in either diagnosis group.

The comorbidity patterns were similar in both diagnosis groups (see table 2). In general, comorbidity was much lower among immigrants. Immigrants with depression were less likely than the Finnish-born controls to have additional alcohol use disorders, other psychoactive substance use disorders, mania or bipolar disorders, other mood disorders, anxiety disorders, eating disorders, and personality disorders, and more likely to have PTSD and dissociative and somatoform disorders. Among the immigrants with depression, 50.3% had no other psychiatric disorder, while the respective figure was 40.2% for the Finnish-born controls. Immigrants with anxiety disorders were less likely than Finnish-born controls to have alcohol use disorders, other psychoactive substance use disorders, major depressive disorders, mania or bipolar disorders, other mood disorders, eating disorders, and personality disorders, and more likely to have PTSD. Among the immigrants with an anxiety disorder, 37.1% had no other psychiatric disorder, while the respective figure was 29.7% for the Finnish-born controls. There were no significant differences in the proportions of schizophrenia, schizotypal disorders, and other delusional disorders between immigrants and Finnish-born controls in either diagnosis groups.

Distribution of the immigrants and controls in different treatment intensity categories is shown in table 3. A lower proportion of immigrants received treatment of high intensity among both individuals with depression (27.6% vs. 35.9%) and individuals with an anxiety disorder (21.7% vs. 29.0%) as compared to the Finnish-born controls. Among both diagnosis groups, immigrants from Sub-Saharan Africa received least intensive treatments.

Results of the first regression models are shown in table 4. Among those with a diagnosis of depression, immigrants were more likely to receive treatment of low intensity rather than treatment of high intensity than the Finnish-born controls (OR = 1.44, 95% CI = 1.25–1.67,  $P < 0.001$ ), and the effect of immigrant status was similar among those with a diagnosis of an anxiety disorder (OR = 1.48, 95% CI = 1.15–1.90,  $P = 0.002$ ). Male sex predicted lower treatment intensity, while a number of comorbid psychiatric diagnoses predicted higher treatment intensity in both models.

Finally, table 5 shows the results of regression models where

**Table 1**  
Demographic characteristics of immigrants and natives with depression and/or an anxiety disorder in specialized health care

	Individuals with depression			Individuals with anxiety		
	Immigrants	Controls	p	Immigrants	Controls	p
Total (%)	5250 (42.5)	7114 (57.5)		2526 (35.9)	4501 (64.1)	
Age (mean (standard deviation))	38.4 (13.1)	35.7 (12.7)	<b>&lt; 0.001</b>	34.9 (12.6)	32.6 (11.6)	<b>&lt; 0.001</b>
Sex (male) (%)	2047 (39.0)	2756 (38.7)	0.778	986 (39.0)	1828 (40.6)	0.195
Marital status (married/registered partnership) (%)	2283 (43.5)	1906 (26.8)	<b>&lt; 0.001</b>	1002 (39.7)	1020 (22.7)	<b>&lt; 0.001</b>
Socioeconomic status (%)			<b>&lt; 0.001</b>			<b>&lt; 0.001</b>
(1) Entrepreneurs and farmers	260 (5.0)	287 (4.0)		124 (4.9)	155 (3.4)	
(2) Upper white-collar workers	302 (5.8)	684 (9.6)		149 (5.9)	395 (8.8)	
(3) Lower white-collar workers	639 (12.2)	1698 (23.9)		334 (13.2)	993 (22.1)	
(4) Blue-collar workers	913 (17.4)	1114 (15.7)		456 (18.1)	669 (14.9)	
(5) Other	2536 (48.3)	2907 (40.9)		1201 (47.5)	1960 (43.5)	
Unknown	600 (11.4)	424 (6.0)		262 (10.4)	329 (7.3)	

Bold values indicate significance level of  $p > 0.05$ .

**Table 2**  
Comorbid disorders among immigrants and controls with depression and/or anxiety disorder

	Individuals with depression (n, %)			Individuals with anxiety (n, %)		
	Immigrants	Controls	p	Immigrants	Controls	p
Comorbid disorder (diagnosed 2011-2015)						
Alcohol use disorders (F10)	325 (6.2)	1047 (14.7)	<b>&lt;0.001</b>	188 (7.4)	644 (14.3)	<b>&lt;0.001</b>
Other psychoactive substance use disorders (F11-F19)	190 (3.6)	485 (6.8)	<b>&lt;0.001</b>	146 (5.8)	424 (9.4)	<b>&lt;0.001</b>
Schizophrenia, schizotypal and delusional disorders (F20-F29)	440 (8.4)	554 (7.8)	0.244	236 (9.3)	482 (10.7)	0.076
<b>Major depressive disorder (F32-F33)</b>				1234 (48.9)	2334 (51.9)	<b>0.017</b>
Mania / Bipolar disorder (F30-F31)	224 (4.3)	583 (8.2)	<b>&lt;0.001</b>	133 (5.3)	396 (8.8)	<b>&lt;0.001</b>
Other mood disorders (F34-F39)	363 (6.9)	709 (10.0)	<b>&lt;0.001</b>	168 (6.7)	464 (10.3)	<b>&lt;0.001</b>
<b>Phobic and other anxiety disorders and OCD (F40-F42)</b>	1234 (23.5)	2334 (32.8)	<b>&lt;0.001</b>			
Post-traumatic stress disorder (F43)	508 (9.7)	192 (2.7)	<b>&lt;0.001</b>	189 (7.5)	137 (3.0)	<b>&lt;0.001</b>
Dissociative and somatoform disorders (F44-F45)	203 (3.9)	204 (2.9)	<b>0.002</b>	112 (4.4)	165 (3.7)	0.128
Eating disorders (F50)	79 (1.5)	271 (3.8)	<b>&lt;0.001</b>	38 (1.5)	172 (3.8)	<b>&lt;0.001</b>
Personality disorders (F60)	354 (6.7)	1030 (14.5)	<b>&lt;0.001</b>	225 (8.9)	719 (16.0)	<b>&lt;0.001</b>
Number of other psychiatric diagnoses			<b>&lt;0.001</b>			<b>&lt;0.001</b>
No other diagnosis	2643 (50.3)	2860 (40.2)		938 (37.1)	1336 (29.7)	
1 other psychiatric diagnosis	1641 (31.3)	2241 (31.5)		853 (33.8)	1493 (33.2)	
2 other psychiatric diagnoses	647 (12.3)	1161 (16.3)		466 (18.4)	892 (19.8)	
3 or more other psychiatric diagnoses	319 (6.0)	852 (12.0)		269 (10.6)	780 (17.3)	

Bold values indicate significance level of p > 0.05.

**Table 3**  
Distribution of immigrants and controls in different treatment intensity categories

	Depression Treatment intensity			Anxiety Treatment intensity		
	Low	Moderate	High	Low	Moderate	High
Controls (n,%)	828 (34.2)	725 (29.9)	871 (35.9)	431 (40.8)	319 (30.2)	307 (29.0)
Immigrants (n, %)	851 (40.0)	691 (32.4)	588 (27.6)	320 (48.6)	196 (29.7)	143 (21.7)
EU/EFTA, North America, Australia	228 (40.0)	171 (30.0)	171 (30.0)	101 (43.2)	68 (29.1)	65 (27.8)
Eastern Europe	207 (39.2)	173 (32.8)	148 (28.0)	88 (50.0)	52 (29.5)	36 (20.5)
Middle East and Northern Africa	253 (39.0)	230 (35.5)	165 (25.5)	83 (52.2)	51 (32.1)	25 (15.7)
Sub-Saharan Africa	71 (48.6)	42 (28.8)	33 (22.6)	20 (64.5)	8 (25.8)	3 (9.7)
Asia	65 (36.7)	56 (31.6)	56 (31.6)	21 (51.2)	9 (22.0)	11 (26.8)

**Table 4**  
Immigrant status as a predictor for treatment intensity

	Low intensity		Moderate intensity	
	OR (95 % CI)	p	OR (95 % CI)	p
<b>Depression</b>				
Immigrant (ref. control)	1.44 (1.25–1.67)	<b>&lt;0.001</b>	1.37 (1.18–1.59)	<b>&lt;0.001</b>
Male (ref. female)	1.71 (1.47–1.98)	<b>&lt;0.001</b>	1.35 (1.16–1.57)	<b>&lt;0.001</b>
Age	1.00 (1.00–1.01)	0.127	1.00 (1.00–1.01)	0.622
Number of other diagnoses	0.57 (0.51–0.64)	<b>&lt;0.001</b>	0.75 (0.67–0.83)	<b>&lt;0.001</b>
<b>Anxiety</b>				
Immigrant (ref. control)	1.48 (1.15–1.90)	<b>0.002</b>	1.29 (0.98–1.68)	0.067
Male (ref. female)	1.65 (1.29–2.11)	<b>&lt;0.001</b>	1.24 (0.95–1.61)	0.110
Age	1.02 (1.01–1.03)	<b>&lt;0.001</b>	1.00 (0.99–1.02)	0.404
Number of other diagnoses	0.51 (0.42–0.62)	<b>&lt;0.001</b>	0.83 (0.70–0.98)	<b>0.032</b>

Bold values indicate significance level of p > 0.05. High intensity is the reference category for the outcome variable.

**Table 5**  
Region of origin and length of residence in Finland as the predictors for treatment intensity. Only immigrants are included in the models.

	Low intensity		Moderate intensity	
	OR (95 % CI)	p	OR (95 % CI)	p
<b>Depression</b>				
Region of origin (ref. EU/EFTA, North America, Australia)				
Eastern Europe	1.32 (0.96–1.81)	0.083	1.47 (1.06–2.04)	<b>0.022</b>
Middle East and Northern Africa	1.11 (0.83–1.50)	0.474	1.46 (1.07–1.98)	<b>0.017</b>
Sub-Saharan Africa	1.55 (0.95–2.51)	0.079	1.34 (0.79–2.26)	0.276
Asia	0.88 (0.57–1.35)	0.548	0.98 (0.62–1.55)	0.939
Length of residence				
<5 years (ref. ≥ 5 years)	1.32 (1.02–1.69)	<b>0.032</b>	1.50 (1.16–1.94)	<b>0.002</b>
Male (ref. female)	2.01 (1.58–2.56)	<b>&lt;0.001</b>	1.43 (1.12–1.84)	<b>0.005</b>
Age	1.00 (0.99–1.01)	0.587	1.00 (0.99–1.01)	0.510
Number of other diagnoses	0.42 (0.35–0.52)	<b>&lt;0.001</b>	0.73 (0.62–0.88)	<b>&lt;0.001</b>
<b>Anxiety</b>				
Region of origin (ref. EU/EFTA, North America, Australia)				
Eastern Europe	1.69 (0.99–2.89)	0.054	1.63 (0.91–2.91)	0.099
Middle East and Northern Africa	2.08 (1.17–3.70)	<b>0.012</b>	2.16 (1.17–3.97)	<b>0.014</b>
Sub-Saharan Africa	3.89 (1.09–13.93)	<b>0.037</b>	2.45 (0.60–9.98)	0.213
Asia	1.49 (0.63–3.52)	0.359	1.00 (0.37–2.66)	0.995
Length of residence				
<5 years (ref. ≥ 5 years)	1.58 (1.00–2.50)	<b>0.052</b>	1.40 (0.85–2.29)	0.184
Male (ref. female)	1.47 (0.94–2.29)	0.092	1.08 (0.67–1.74)	0.759
Age	1.02 (1.00–1.04)	<b>0.047</b>	1.01 (0.99–1.03)	0.351
Number of other diagnoses	0.42 (0.29–0.60)	<b>&lt;0.001</b>	0.79 (0.56–1.11)	0.174

Bold values indicate significance level of p > 0.05. High intensity is the reference category for the outcome variable

treatment intensity is predicted based on the region of origin and the length of residence in Finland. Among those with a diagnosis of depression, immigrants from Eastern Europe (OR = 1.47, 95% CI = 1.06–2.04,  $P = 0.022$ ) and the Middle East and Northern Africa (OR = 1.46, 95% CI = 1.07–1.98,  $P = 0.017$ ) more often received treatment of moderate rather than high intensity compared to their Western counterparts. Immigrants who had been living in Finland less than five years rather than longer were more likely to receive treatment of low and moderate intensity than treatment of high intensity.

Among individuals with a diagnosis of an anxiety disorder, immigrants from the Middle East and Northern Africa more often received treatment of low intensity (OR = 2.08, 95% CI = 1.17–3.70,  $P = 0.012$ ) and moderate intensity (OR = 2.16, 95% CI = 1.17–3.97,  $P = 0.014$ ) than high intensity compared to those from Western countries. Immigrants from Sub-Saharan Africa were also more likely to receive treatment of low intensity (OR = 3.89, 95% CI = 1.09–13.93,  $P = 0.037$ ) than high intensity compared to those from Western countries. Immigrants who had been living in Finland less than five years were more likely to receive treatment of low intensity than treatment of high intensity compared to those who had stayed in Finland longer.

The results of the same regression models with the stricter wash-out period can be found in the supplementary material (supplementary tables 1–3). The results were similar, although not all the observed effects were significant due to the smaller sample size.

#### 4. Discussion

Finnish-born participants were more often diagnosed with depression and/or an anxiety disorder than immigrants. Differences in socio-demographic characteristics between immigrants and Finnish-born participants were similar in both diagnosis groups. Immigrants were on average older, more often married, and more often with a lower socioeconomic status. In both diagnosis groups, Finnish-born participants exhibited higher comorbidity of other psychiatric disorders. Immigrants more often received treatment of low intensity and less often treatment of higher intensity, even after adjusting for comorbidity. These differences were most striking among those from Eastern Europe, the Middle East and Africa.

The higher incidence of diagnosed common mental disorders among native Finns compared to immigrants has already been demonstrated in an earlier study with the same data (Markkula et al., 2017), and this slightly contradictory finding conceivably relates to the profile of migrants in Finland (in Finland, refugee migration is relatively low) and high psychiatric morbidity among the Finnish-born population in general. However, since registers can only catch diagnosed mental disorders, immigrants might be more likely to never end up in mental health care and thus never be diagnosed with common mental disorders, even if they are experiencing symptoms related to such disorders. The differences regarding the sociodemographic factors between immigrants and Finnish-born population might reflect differences in the general population or even treatment practices.

##### 4.1. Comorbidity

In both diagnosis groups immigrants exhibited lower comorbidity of other psychiatric disorders. Especially comorbid depression and anxiety disorders were more common among the Finnish-born controls. Other notable differences were in proportions of comorbid personality disorders and alcohol disorders, which were more common among the Finnish-born controls. Only PTSD and dissociative disorders were more common among immigrants.

The differences in comorbidity might reflect the higher incidence of psychiatric disorders among the Finnish-born population in general (Markkula et al., 2017). The differences could also reflect underdiagnosis of some disorders among immigrants. There are challenges related to diagnostic assessment among immigrants: the same psychiatric

assessment tools might not be valid among different immigrant groups (Kuittinen et al., 2014), and it might be more time-consuming due to, for example, working with an interpreter.

An earlier study found that immigrants have much lower alcohol-related mortality compared to Finnish-born persons (Lehti et al., 2017), so the higher proportion of alcohol disorders among the Finnish-born participants here likely reflects true differences. Another Finnish study investigated the comorbidity of substance use, affective symptoms, and suicidal ideation among immigrants of Russian, Kurdish, and Somali origin, finding that those Russian and Kurdish immigrants who reported binge drinking also reported much higher levels of affective symptoms than the general population, and binge drinking was associated with suicidal ideation among Kurdish immigrants, but not with others (Salama et al., 2020). Different comorbidity patterns are thus likely to exist within different immigrant groups.

An earlier study with the same data has shown PTSD to be the only mental health disorder that is more common among immigrants compared to the Finnish-born population (Markkula et al., 2017). Previous studies have shown PTSD to be highly comorbid with depression among immigrants and refugees (Belz et al., 2017; Garcini et al., 2017), and our results support this finding.

##### 4.2. Psychiatric treatment

Immigrants more often received treatment of low intensity and less often treatment of higher intensity. The differences were most striking among those from Eastern Europe, the Middle East, and Africa, which is in line with previous results from the same data (Kiesepää et al., 2019). The trends were similar for depression and anxiety disorders.

One explanation for the observed differences could be lower need for psychiatric services among immigrants, due to “healthy immigrant effect” (McDonald & Kennedy, 2004). This is, however, unlikely to explain all the disparities. In 2014 Finland, 37% of the immigrants from the Middle East and Northern Africa were refugees, and 42% migrated for family reasons, many of them plausibly family of refugees (Sutela and Larja, 2015). The respective figures for immigrants from Sub-Saharan Africa were 31% and 44%. We had no information on the reason for migration, but we can assume that in our sample significant proportions of immigrants from these regions had a refugee background as well. Many studies have shown refugees to have particularly high psychiatric morbidity (Close et al., 2016; Giacco et al., 2018).

Possible explanations for these disparities include structural or cultural barriers, or an unwillingness to use mental health services. Structural barriers include language differences, lack of knowledge about the services, or inadequacy of the services (Derr, 2016; Kim et al., 2011). Fear of stigma related to mental disorders is a commonly reported barrier, especially among immigrants of African background (Derr, 2016). Different interpretations of psychiatric illness and symptoms also affect treatment seeking (Kirmayer et al., 2011). The vocabulary for mental disorders in an immigrant’s culture may be different from the native population’s vocabulary, making it more difficult to communicate the symptoms of depression and anxiety across cultures (Palmer and Ward, 2007), which might make the recognition of such problems harder for both immigrants themselves and mental health professionals.

One explanation for the shorter treatments could be lower symptom levels in general among immigrants. While this might be true for some immigrant groups, it is known that refugees from Sub-Saharan Africa in Finland are at very high risk for symptoms of depression and anxiety (Skogberg et al., 2019), and immigrants of Kurdish origin also report very high levels of depression and anxiety symptoms (Rask et al., 2016), indicating that lower symptom levels most likely do not explain all the disparities in the treatment intensity.

Other comorbid conditions increased the probability of receiving treatment of a higher intensity. Length of residence in Finland was associated with higher treatment intensity, which is in line with previous results (Abebe et al., 2017; Park et al., 2013).

### 4.3. Strengths and limitations

Our study has several strengths. We used nationwide data, which covers the entire immigrant population (apart from asylum seekers and undocumented migrants), and thereby the selection bias was minimal. The information on mental health care use and psychiatric diagnoses was obtained from a mandatory hospital discharge register, which is highly reliable and covers all public specialized mental health care (Sund, 2012).

There are some limitations associated with the study. The comorbidity of other conditions was measured as other conditions diagnosed during the follow-up, which means that they did not necessarily occur at the same time. We did not have information on the perceived need for mental health services, which limits us from drawing further conclusions about the mechanisms behind the observed patterns. Because the sample was restricted to individuals in specialized health care, the results cannot be generalized to the general population. In addition, it is possible that some individuals might have emigrated from Finland after receiving the diagnosis, and thus, could not receive further treatment in Finland, but the number of such people is likely to be small.

### 4.4. Conclusion

Immigrants in Finland are less often diagnosed with depression and anxiety disorders compared to the Finnish-born population. Immigrants with diagnosed depression and anxiety disorders have less often diagnosed comorbid psychiatric conditions as compared to native Finns, with the exception of PTSD and dissociative disorders. Immigrants receive less intensive psychiatric treatment for their depression and anxiety disorders. The differences are especially striking among immigrants from Eastern Europe, the Middle East, and Africa. Lower symptom levels are unlikely to alone explain these differences. Further research is needed to study the mechanisms behind the observed patterns.

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### Contributors

Authors Kiesepää, Lehti, Holm, Jokela and Suvisaari designed the study. Author Kiesepää managed the literature searches and analyses and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

### Declaration of Competing Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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### References

- Abebe, D.S., Lien, L., Elstad, J.I., 2017. Immigrants' utilization of specialist mental healthcare according to age, country of origin, and migration history: a nation-wide register study in Norway. *Soc. Psychiatry Psychiatr. Epidemiol.* 52, 679–687. <https://doi.org/10.1007/s00127-017-1381-1>.
- Aichberger, M.C., Schouler-Ocak, M., Mundt, A., Busch, M.A., Nickels, E., Heimann, H. M., Ströhle, A., Reischies, F.M., Heinz, A., Rapp, M.A., 2010. Depression in middle-aged and older first generation migrants in Europe: Results from the Survey of Health, Ageing and Retirement in Europe (SHARE). *Eur. Psychiatry* 25, 468–475. <https://doi.org/10.1016/j.eurpsy.2009.11.009>.
- Bas-Sarmiento, P., Saucedo-Moreno, M.J., Fernández-Gutiérrez, M., Poza-Méndez, M., 2017. Mental Health in Immigrants Versus Native Population: A Systematic Review of the Literature. *Arch. Psychiatr. Nurs.* 31, 111–121. <https://doi.org/10.1016/j.apnu.2016.07.014>.
- Belz, Maria, Belz, Michael, Özkan, I., Graef-Callies, I.T., 2017. Posttraumatic stress disorder and comorbid depression among refugees: Assessment of a sample from a German refugee reception center. *Transcult. Psychiatry* 54, 595–610. <https://doi.org/10.1177/1363461517745473>.
- Blackmore, R., Boyle, J.A., Fazel, M., Ranasinha, S., Gray, K.M., Fitzgerald, G., Misso, M., Gibson-Helm, M., 2020. The prevalence of mental illness in refugees and asylum seekers: A systematic review and meta-analysis. *PLOS Med* 17, e1003337. <https://doi.org/10.1371/journal.pmed.1003337>.
- Bogic, M., Njoku, A., Priebe, S., 2015. Long-term mental health of war-refugees: a systematic literature review. *BMC Int. Health Hum. Rights* 15. <https://doi.org/10.1186/s12914-015-0064-9>.
- Close, C., Kouvonon, A., Bosqui, T., Patel, K., O'Reilly, D., Donnelly, M., 2016. The mental health and wellbeing of first generation migrants: a systematic-narrative review of reviews. *Glob. Health* 12 (47). <https://doi.org/10.1186/s12992-016-0187-3>.
- Das-Munshi, J., Leavey, G., Stansfeld, S.A., Prince, M.J., 2012. Migration, social mobility and common mental disorders: critical review of the literature and meta-analysis. *Ethn. Health* 17, 17–53. <https://doi.org/10.1080/13557858.2011.632816>.
- Derr, A.S., 2016. Mental Health Service Use Among Immigrants in the United States: A Systematic Review. *Psychiatr. Serv.* 67, 265–274. <https://doi.org/10.1176/appi.ps.201500004>.
- Durbin, A., Lin, E., Moineddin, R., Steele, L.S., Glazier, R.H., 2014. Use of mental health care for nonpsychotic conditions by immigrants in different admission classes and by refugees in Ontario, Canada. *Open Med.* 8, e136–e146.
- Fazel, M., Wheeler, J., Danesh, J., 2005. Prevalence of serious mental disorder in 7000 refugees resettled in Western countries: A systematic review. *The Lancet* 366, 1309–1314.
- Fernández, A., Haro, J.M., Martínez-Alonso, M., Demyttenaere, K., Brugha, T.S., Autonell, J., Girolamo, G.D., Bernert, S., Lépine, J.P., Alonso, J., 2007. Treatment adequacy for anxiety and depressive disorders in six European countries. *Br. J. Psychiatry* 190, 172–173. <https://doi.org/10.1192/bjp.bp.106.023507>.
- Garcini, L.M., Galvan, T., Malcarne, V., Peña, J.M., Fagundes, C.P., Klonoff, E.A., 2017. Mental Disorders Among Undocumented Mexican Immigrants in High-Risk Neighborhoods: Prevalence, Comorbidity, and Vulnerabilities. *J. Consult. Clin. Psychol.* 85, 927–936. <https://doi.org/10.1037/ccp0000237>.
- George, U., Thomson, M., Chaze, F., Guruge, S., 2015. Immigrant Mental Health, A Public Health Issue: Looking Back and Moving Forward. *Int. J. Environ. Res. Public Health* 12, 13624–13648. <https://doi.org/10.3390/ijerph121013624>.
- Giacco, D., Laxhman, N., Priebe, S., 2018. Prevalence of and risk factors for mental disorders in refugees. *Semin. Cell Dev. Biol. Arc/ARG3.1* 77, 144–152. <https://doi.org/10.1016/j.semcdb.2017.11.030>.
- Hollander, A.-C., Mackay, E., Sjöqvist, H., Kirkbride, J.B., Bäärnhielm, S., Dalman, C., 2020. Psychiatric care use among migrants to Sweden compared with Swedish-born residents: a longitudinal cohort study of 5 150 753 people. *BMJ Glob. Health* 5, e002471. <https://doi.org/10.1136/bmjgh-2020-002471>.
- Kaufman, J., Charney, D., 2000. Comorbidity of mood and anxiety disorders. *Depress. Anxiety* 12, 69–76. [https://doi.org/10.1002/1520-6394\(2000\)12:1+<69::AID-DA9>3.0.CO;2-K](https://doi.org/10.1002/1520-6394(2000)12:1+<69::AID-DA9>3.0.CO;2-K).
- Kiesepää, V., Torninen-Holm, M., Jokela, M., Suvisaari, J., Gissler, M., Markkula, N., Lehti, V., 2019. Immigrants' mental health service use compared to that of native Finns: a register study. *Soc. Psychiatry Psychiatr. Epidemiol.* <https://doi.org/10.1007/s00127-019-01774-y>.
- Kim, G., Aguado Loi, C.X., Chiriboga, D.A., Jang, Y., Parmelee, P., Allen, R.S., 2011. Limited English proficiency as a barrier to mental health service use: A study of Latino and Asian immigrants with psychiatric disorders. *J. Psychiatr. Res.* 45, 104–110. <https://doi.org/10.1016/j.jpsychires.2010.04.031>.
- Kirmayer, L.J., Narasiah, L., Munoz, M., Rashid, M., Ryder, A.G., Guzder, J., Hassan, G., Rousseau, C., Pottie, K., 2011. Common mental health problems in immigrants and refugees: general approach in primary care. *CMAJ* 183, E959–E967. <https://doi.org/10.1503/cmaj.090292>.
- Kuittinen, S., Punamäki, R.-L., Mölsä, M., Saarni, S.I., Tiilikainen, M., Honkasalo, M.-L., 2014. Depressive Symptoms and Their Psychosocial Correlates Among Older Somali Refugees and Native Finns. *J. Cross-Cult. Psychol.* 45, 1434–1452. <https://doi.org/10.1177/0022022114543519>.
- Lehti, V., Gissler, M., Markkula, N., Suvisaari, J., 2017. Mortality and causes of death among the migrant population of Finland in 2011–13. *Eur. J. Public Health* 27, 117–123. <https://doi.org/10.1093/eurpub/ckw196>.
- Lindert, J., Ehrenstein, O.S., von, Priebe, S., Mielck, A., Brähler, E., 2009. Depression and anxiety in labor migrants and refugees – A systematic review and meta-analysis. *Soc. Sci. Med.* 69, 246–257. <https://doi.org/10.1016/j.socscimed.2009.04.032>.
- Markkula, N., Lehti, V., Gissler, M., Suvisaari, J., 2017. Incidence and prevalence of mental disorders among immigrants and native Finns: a register-based study. *Soc. Psychiatry Psychiatr. Epidemiol.* 52, 1523–1540. <https://doi.org/10.1007/s00127-017-1432-7>.
- McDonald, J.T., Kennedy, S., 2004. Insights into the 'healthy immigrant effect': health status and health service use of immigrants to Canada. *Soc. Sci. Med.* 59, 1613–1627. <https://doi.org/10.1016/j.socscimed.2004.02.004>.
- Mindlis, I., Boffetta, P., 2017. Mood disorders in first- and second-generation immigrants: Systematic review and meta-analysis. *Br. J. Psychiatry* 210, 182–189. <https://doi.org/10.1192/bjp.bp.116.181107>.
- Palmer, D., Ward, K., 2007. 'Lost': listening to the voices and mental health needs of forced migrants in London. *Med. Confl. Surviv.* 23, 198–212. <https://doi.org/10.1080/13623690701417345>.

- Park, S.Y., Cho, S., Park, Y., Bernstein, K.S., Shin, J.K., 2013. Factors Associated with Mental Health Service Utilization Among Korean American Immigrants. *Community Ment. Health J.* 49, 765–773. <https://doi.org/10.1007/s10597-013-9604-8>.
- Rask, S., Suvisaari, J., Koskinen, S., Koponen, P., Mölsä, M., Lehtisalo, R., Schubert, C., Pakaslahti, A., Castaneda, A.E., 2016. The ethnic gap in mental health: A population-based study of Russian, Somali and Kurdish origin migrants in Finland. *Scand. J. Public Health* 44, 281–290. <https://doi.org/10.1177/1403494815619256>.
- Salama, E., Castaneda, A.E., Suvisaari, J., Rask, S., Laatikainen, T., Niemelä, S., 2020. Substance use, affective symptoms, and suicidal ideation among Russian, Somali, and Kurdish migrants in Finland. *Transcult. Psychiatry*, 1363461520906028. <https://doi.org/10.1177/1363461520906028>.
- Saraga, M., Gholam-Rezaee, M., Preisig, M., 2013. Symptoms, comorbidity, and clinical course of depression in immigrants: Putting psychopathology in context. *J. Affect. Disord.* 151, 795–799. <https://doi.org/10.1016/j.jad.2013.07.001>.
- Schrier, A.C., de Wit, M.A.S., Coupé, V.M.H., Fassaert, T., Verhoeff, A.P., Kupka, R.W., Dekker, J., Beekman, A.T.F., 2012. Comorbidity of anxiety and depressive disorders: A comparative population study in Western and non-Western inhabitants in the Netherlands. *Int. J. Soc. Psychiatry* 58, 186–194. <https://doi.org/10.1177/0020764010390433>.
- Schubert, C., Punamäki, R.-L., 2011. Mental health among torture survivors: cultural background, refugee status and gender. *Nord. J. Psychiatry*.
- Skogberg, N., Mustonen, K.-L., Koponen, P., Tiittala, P., Lilja, E., Ahmed Haji Omar, A., Snellman, O., Castaneda, A.E., 2019. Turvapaikanhakijoiden terveys ja hyvinvointi : Tutkimus Suomeen vuonna 2018 tulleista turvapaikanhakijoista. THL.
- Søgaard, E.G.I., Kan, Z., Koirala, R., Hauff, E., Thapa, S.B., 2020. Variations in psychiatric morbidity between traumatized Norwegian, refugees and other immigrant patients in Oslo. *Nord. J. Psychiatry* 0, 1–10. <https://doi.org/10.1080/08039488.2020.1714724>.
- Steel, Z., Chey, T., Silove, D., Marnane, C., Bryant, R.A., van Ommeren, M., 2009. Association of Torture and Other Potentially Traumatic Events With Mental Health Outcomes Among Populations Exposed to Mass Conflict and Displacement: A Systematic Review and Meta-analysis. *JAMA* 302, 537. <https://doi.org/10.1001/jama.2009.1132>.
- Sund, R., 2012. Quality of the Finnish Hospital Discharge Register: A systematic review. *Scand. J. Public Health* 40, 505–515. <https://doi.org/10.1177/1403494812456637>.
- Sutela, H., Larja, L., 2015. Yli puolet Suomen ulkomaalaistaustaisista muuttanut maahan perhesyistä. Ulkomaista syntyperää olevien työ ja hyvinvointi tutkimus 2014 [verkkojulkaisu] [WWW Document]. URL [http://www.stat.fi/tup/maahanmuutto/art\\_2015-10-15\\_001.html](http://www.stat.fi/tup/maahanmuutto/art_2015-10-15_001.html) (accessed 2.17.21).
- Tinghög, P., Malm, A., Arwidson, C., Sigvardsson, E., Lundin, A., Saboonchi, F., 2017. Prevalence of mental ill health, traumas and postmigration stress among refugees from Syria resettled in Sweden after 2011: a population-based survey. *BMJ Open* 7, e018899. <https://doi.org/10.1136/bmjopen-2017-018899>.
- Wang, P.S., Lane, M., Olfson, M., Pincus, H.A., Wells, K.B., Kessler, R.C., 2005. Twelve-Month Use of Mental Health Services in the United States: Results From the National Comorbidity Survey Replication. *Arch. Gen. Psychiatry* 62, 629–640. <https://doi.org/10.1001/archpsyc.62.6.629>.
- Whitley, R., Kirmayer, L.J., Groleau, D., 2006. Understanding Immigrants' Reluctance to Use Mental Health Services: A Qualitative Study from Montreal. *Can J Psychiatry* 51, 5.