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## Impact of Insecure Immigration Status and Ethnicity on Antenatal Mental Health Among Migrant Women

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### ABSTRACT

**Objective:** There is limited evidence on the prevalence and odds of antenatal common mental disorders (CMDs) among migrant women and the effect on risk of intersecting variables such as immigration status and ethnicity. This study aimed to estimate the prevalence and odds of antenatal CMDs among migrant women compared to UK-born women in an inner-London maternity service.

**Methods:** A cross-sectional survey stratified by response to depression screening questions was administered at first antenatal appointment. CMDs were assessed using the Structured Clinical Interview for DSM-IV. Recruitment took place between November 2014 and June 2016.

**Results:** Prevalence of antenatal CMDs was 21% (95% CI, 16–28) among migrant women (n = 283) and 24% (95% CI, 18–31) among UK-born women (n = 262). There was no significant difference in the odds of CMDs among migrant women compared to UK-born women (OR = 0.86; P = .57; 95% CI, 0.51–1.44). Migrant women, particularly those with insecure immigration status, had increased odds of posttraumatic stress disorder (OR = 29.08; P < .01; 95% CI, 4–188). When analyses were stratified by ethnicity, there was no effect of migrant status for white women, but for ethnic minority (nonwhite) women, migrant status decreased odds of having a CMD (OR = 0.31; P = .02; 95% CI, 0.12–0.82).

**Conclusions:** Antenatal common mental disorders are prevalent among migrant women, but migrant status is unlikely to increase risk on its own. Immigration status, ethnicity, and other intersecting variables of social disadvantage must be investigated simultaneously to examine the perinatal mental health of heterogeneous migrant populations.

*J Clin Psychiatry* 2019;80(5):18m12563

**To cite:** Anderson FM, Hatch SL, Ryan EG, et al. Impact of insecure immigration status and ethnicity on antenatal mental health among migrant women. *J Clin Psychiatry*. 2019;80(5):18m12563.

**To share:** <https://doi.org/10.4088/JCP.18m12563>  
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Across the globe, people are moving from one country to another more than ever,<sup>1</sup> and there is a growing need to examine the mental health of migrant populations. Mental disorders in the perinatal period are common<sup>2</sup> and have adverse outcomes for both mother and infant.<sup>3</sup> A systematic review and meta-analysis<sup>4</sup> of the prevalence and odds of perinatal mental disorders found contradictory evidence as to whether migrant women are at increased risk, with some studies finding increased risk and others none or decreased risk, and the quality of methods was poor. Most research has focused on depression, ignoring other common mental disorders (CMDs) such as anxiety disorders including posttraumatic stress disorder (PTSD). Previous studies have used screening instruments rather than diagnostic measures of disorder. Screening measures using cutoff scores can give an indication of probable disorder or high symptom level but cannot constitute a diagnosis. Moreover, establishing the prevalence of clinical disorders is useful for planning of clinical services. Finally, many studies have substantial sample bias due to exclusions on the basis of language and the exclusion of hard-to-reach women such as asylum-seekers who may have no phone number or fixed address. This study, using data from the WELL-being in pregNancy stuDY (the WENDY study)<sup>5</sup> in an inner city maternity service, was designed to address these gaps in the literature. The present study had the following aims:

1. to estimate the prevalence and odds of antenatal CMDs among migrant women compared to UK-born women in an inner-London maternity service
2. to examine whether the relationship between migrant status and odds of antenatal CMD varies by ethnicity, immigration status, and length of time in the United Kingdom.

Our primary hypothesis was that the prevalence of CMDs at antenatal booking appointment would be higher among migrant women than women born in the United Kingdom. We also aimed to carry out exploratory analyses to examine the relationship between individual CMDs (major depressive disorder, mixed anxiety and depressive disorder, panic disorder, agoraphobia [with and without panic disorder], social phobia, specific phobia, obsessive-compulsive disorder [OCD], PTSD, and generalized anxiety disorder [GAD]) and migrant status and the intersection with ethnicity, immigration status, and length of time in the United Kingdom.

### METHODS

#### Study Setting and Design

The WENDY study<sup>5</sup> was conducted at an inner-city London maternity service (7,000 births per year) with an ethnically and socially diverse population and around 50% of women born outside the United

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### Clinical Points

- The impact of migrant status, ethnicity, and immigration security on risk of antenatal mental disorders is unclear. Disorders other than depression, such as posttraumatic stress disorder, have seldom been investigated, and few studies have used diagnostic measures.
- Common mental disorders are highly prevalent among migrant women during pregnancy; it is important to assess for posttraumatic stress disorder in this population.

Kingdom. The dates of recruitment were November 10, 2014, to June 30, 2016. The study used a 2-phase sampling design drawing a random sample stratified according to being positive or negative on the Whooley depression screening questions<sup>6</sup> asked by midwives at the first comprehensive antenatal booking appointment. This study focuses on the baseline interview data collected within 3 weeks of participants' antenatal booking appointment.

### Participants

All women aged 16 years or over who answered the Whooley questions at antenatal booking were eligible to take part. Women who lacked mental capacity to provide informed consent, women who had already undergone a comprehensive maternity booking in the United Kingdom, and women who had a termination or miscarriage between booking and baseline interview were excluded from the study. There were no exclusions on the basis of language, with telephone and face-to-face interpreters made available. All eligible women who screened positive from the Whooley questions were approached to take part, and all women who screened negative were randomized by the King's Clinical Trials Unit as to whether or not to be approached (further details of this process are provided in the primary publication<sup>5</sup>). Several attempts to contact women were made, including evening and weekend calls and appointments, to minimize selection bias. Home visits were offered as well as covering of travel and childcare costs. Interviews were conducted either at the hospital or at the participant's home and lasted around an hour. For asylum-seeking women staying in hostels, contact was made through the specialist migrant midwife in cases in which women had no access to a phone, and interviews were conducted at the hostel.

### Measures

Sociodemographic information including migration information (region of birth, year arrived in the United Kingdom, current immigration status), and medical and obstetric history were collected at the baseline interview. We collected data on self-defined ethnicity using the UK census categories. For analyses, a binary variable of ethnicity was used, "white" (white English/Welsh/Scottish/Northern Irish/British; white Irish; Gypsy or Traveler; other white) and "nonwhite" (all other categories), to differentiate majority and minority ethnicity. Doing so was necessary due to the

small number of women in groups other than white or black (see Table 1). A binary variable of secure or insecure immigration status was used in analyses, grouping UK nationals, European Economic Area citizens, and those with indefinite leave to remain into "secure immigration status" and all other statuses into "insecure immigration status."

The primary outcome of diagnosis of a CMD was measured using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I),<sup>7</sup> a semistructured gold-standard diagnostic interview used widely in psychiatric research.<sup>8</sup> The SCID-I was used to identify the following mood and anxiety disorders: major depressive disorder, mixed anxiety and depressive disorder, panic disorder, agoraphobia (with and without panic disorder), social phobia, specific phobia, OCD, PTSD), and GAD.

All researchers on the project were postgraduates with either a psychology background or midwifery experience. Researchers were trained in using the SCID over a 3-month period and attended regular supervision with a perinatal psychiatrist to reach consensus on diagnoses. Other instruments used in this analysis and administered at baseline interview were the Alcohol Use Disorder Identification Test,<sup>9</sup> the Drug Use Disorders Identification Test,<sup>10</sup> the Composite Abuse Scale—short version,<sup>11</sup> and the Social Provisions Scale.<sup>12</sup> Validated versions of translated instruments were used when available; otherwise, instruments were translated by the face-to-face interpreters.

### Ethics and Service-User Involvement

Ethical approval for the WENDY study was obtained from London Camberwell St. Giles National Health Service Research Ethics Committee (reference number: 14/LO/0075). Informed consent was obtained from all participants prior to interview. There was a Patient Advisory Group including women who had experienced mental health problems during the perinatal period and some of their partners. They provided input and feedback on aspects of study design, conduct, and progress and met regularly throughout the study.

### Statistical Analysis

All statistical analyses were carried out using Stata 13.<sup>13</sup> A significance level of  $P = .05$  was used for all statistical tests unless otherwise specified. Descriptive statistics were used to summarize the characteristics of the total sample and then stratified by migrant status (migrant or UK-born). As the study oversampled women who screened positive for depression (Whooley-positive women) and undersampled those who screened negative for depression (Whooley-negative women), expansion weights were used when calculating population prevalence estimates and for all other statistical analyses. The weights were calculated as 906/287 for the Whooley positives and 9,057/258 for the Whooley negatives. Univariate associations of key variables with the exposure (migrant status) and the outcome (CMD) were conducted using  $\chi^2$  tests.

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**Table 1. Description of Sample, Total Numbers and Stratified by Migrant Status (n = 545)<sup>a</sup>**

Variable	UK-Born	Migrant	Total Sample
Sample size	262 (48.07)	283 (51.93)	545
Whooley status			
Positive	129 (49.24)	129 (45.58)	287 (52.66)
Negative	133 (50.76)	154 (54.42)	258 (47.34)
<b>Sociodemographics</b>			
Age, y			
<25	23 (8.78)	34 (12.01)	57 (10.46)
25–29	37 (14.12)	64 (22.61)	101 (18.53)
30–34	95 (36.26)	83 (29.33)	178 (32.66)
35–39	90 (34.35)	73 (25.80)	163 (29.91)
40+	17 (6.49)	29 (10.25)	46 (8.44)
Ethnicity			
White	185 (70.61)	99 (34.98)	284 (52.11)
Black	54 (20.61)	123 (43.46)	177 (32.48)
Asian	6 (2.29)	25 (8.83)	31 (5.69)
Mixed	14 (5.34)	9 (3.18)	23 (4.22)
Other	3 (1.15)	27 (9.54)	30 (5.50)
Education			
GCSE <sup>b</sup> /equivalent or less	14 (5.34)	51 (18.02)	65 (11.93)
A-level <sup>c</sup> or equivalent	52 (19.85)	102 (36.04)	154 (28.26)
University degree or higher	196 (74.81)	130 (45.94)	326 (59.82)
Employment			
Paid employment	200 (76.92)	149 (52.65)	349 (64.04)
Voluntary job/student	7 (2.69)	15 (5.30)	22 (4.04)
Not working	43 (16.54)	97 (34.28)	140 (25.69)
Other	10 (3.85)	22 (7.77)	32 (5.87)
Data missing <sup>d</sup>	2 (0.76)	0	2 (0.37)
Gross annual income, £ (in thousands) <sup>e</sup>			
<15	21 (8.02)	56 (19.79)	77 (14.13)
15–45	67 (25.57)	64 (22.61)	131 (24.04)
46+	145 (55.34)	63 (22.26)	208 (38.17)
Would rather not say	26 (9.92)	98 (34.63)	124 (22.75)
Data missing	3 (1.15)	2 (0.71)	5 (0.92)
Relationship status			
Single	15 (5.73)	47 (16.61)	62 (11.38)
Partner not cohabiting	40 (15.27)	42 (14.84)	82 (15.05)
Married/cohabiting	206 (78.63)	186 (65.72)	392 (71.93)
Separated/divorced/widowed	1 (0.38)	8 (2.83)	9 (1.65)
Living status			
Alone	28 (10.69)	43 (15.19)	71 (13.03)
With spouse/partner	198 (75.57)	178 (62.90)	376 (68.99)
With parents, friends, or family	24 (9.16)	34 (12.01)	58 (10.64)
Other	10 (3.82)	26 (9.19)	36 (6.61)
Data missing	2 (0.76)	2 (0.71)	4 (0.73)
Have living children			
No	147 (56.11)	124 (43.82)	271 (49.72)
Yes	115 (43.89)	159 (56.18)	274 (50.28)
<b>Obstetric and Medical Variables</b>			
Late booking			
No	238 (90.84)	212 (74.91)	450 (82.57)
Yes	24 (9.16)	71 (25.09)	95 (17.43)
Planned pregnancy			
Planned	191 (72.90)	165 (58.30)	356 (65.32)
Unplanned	71 (27.10)	118 (41.70)	189 (34.68)
Miscarriages/stillbirths			
No	174 (66.41)	200 (70.67)	374 (68.62)
Yes	88 (33.59)	81 (28.62)	169 (31.01)
Data missing	0	2 (0.71)	2 (0.37)
Terminations			
No	188 (71.76)	187 (66.08)	375 (68.81)
Yes	74 (28.24)	95 (33.57)	169 (31.01)
Data missing	0	1 (0.35)	1 (0.18)
Current smoking			
No	247 (94.27)	276 (97.53)	528 (96.88)
Yes	15 (5.73)	7 (2.47)	17 (3.12)
Body mass index			
Mean (SD) kg/m <sup>2</sup>	24.00 (5.28)	23.79 (4.85)	23.90 (5.07)
Data missing	46 (17.56)	77 (27.21)	123 (22.57)
<b>Other Risk Factors</b>			
Lifetime experience of traumatic events <sup>f</sup>			
None	116 (44.27)	144 (50.88)	260 (47.71)
1 event	76 (29.01)	83 (29.33)	159 (29.17)
2 or more events	64 (24.43)	48 (16.96)	112 (20.55)
Data missing	6 (2.29)	8 (2.83)	14 (2.57)

(continued)

The primary hypothesis of the study, that migrant woman would be at increased risk of CMD compared to UK-born women, was tested using logistic regression alongside weighted prevalence estimates with 95% confidence intervals for CMD stratified by migrant status. The unadjusted logistic regression model was run with presence of any CMD (yes/no) as the outcome variable and migrant status (migrant/UK-born) as the predictor variable.

We then conducted exploratory analyses to examine the association between migrant status and the different individual psychiatric diagnoses (major depressive disorder, mixed anxiety and depressive disorder, panic disorder, agoraphobia [with and without panic disorder], social phobia, specific phobia, OCD, PTSD, and GAD), adjusting for potential confounders. In addition, we conducted analyses to explore the intersection of migrant status with ethnicity, immigration status, and length of time in the United Kingdom and association with CMD.

When possible, scores on scales with missing data were imputed using the participant's mean score on other subscales. Sensitivity analyses were conducted when appropriate to compare associations using all available data for that test, and a complete case analysis was done to assess the impact of missing data on biasing the results.

## RESULTS

### Description of Sample

A total of 545 women were recruited into the WENDY study baseline assessment; a flowchart of participants included in the study has been published.<sup>5</sup> The women in the WENDY sample were representative of the hospital maternity population in terms of ethnicity, age, and the number of children they had. A description of the sample using unweighted frequencies and percentages is provided in Supplementary Table 1.

The sample consisted of 283 (51.93%) migrant women compared to 262 (48.07%) UK-born women. Comparing sociodemographic variables, migrant women were different in terms of ethnicity (fewer white women), less educated, and less likely to be in employment and had lower income than their UK-born counterparts. Migrant women were more likely to be late-bookers for antenatal care, and they were more likely to report their pregnancy as unplanned than their UK-born counterparts. Migrant women were also less likely than UK-born women to be current smokers or report hazardous alcohol or substance misuse. There were no differences

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Table 1 (continued).

Variable	UK-Born	Migrant	Total Sample
<b>Intimate partner violence<sup>a</sup></b>			
No	231 (88.17)	220 (77.74)	451 (82.75)
Yes	12 (4.58)	15 (5.30)	27 (4.95)
Data missing	19 (7.25)	48 (16.96)	67 (12.29)
<b>Social support<sup>h</sup> (continuous)</b>			
Mean (SD)	85.18 (8.11)	79.03 (11.90)	82.13 (10.61)
Data missing	21 (8.02)	46 (16.25)	67 (12.29)
<b>Hazardous alcohol use<sup>i</sup></b>			
No	182 (69.47)	227 (80.21)	409 (75.05)
Yes	64 (24.43)	16 (5.65)	80 (14.68)
Data missing	16 (6.11)	40 (14.13)	56 (10.28)
<b>Hazardous substance use<sup>j</sup></b>			
No	215 (82.06)	243 (85.87)	458 (84.04)
Yes	33 (12.60)	14 (4.95)	47 (8.62)
Data missing	14 (5.34)	26 (9.19)	40 (7.34)
<b>Mental Disorders</b>			
<b>Any common mental disorder</b>			
Yes	106 (40.46)	105 (37.10)	211 (38.72)
No	151 (57.63)	171 (60.42)	322 (59.08)
Data missing	5 (1.91)	7 (2.47)	12 (2.20)
<b>Major depressive disorder</b>			
Yes	62 (23.66)	74 (26.15)	136 (24.95)
No	199 (75.95)	209 (73.85)	408 (74.86)
Data missing	1 (0.38)	0	1 (0.18)
<b>Mixed anxiety/depressive disorder</b>			
Yes	7 (2.67)	4 (1.41)	11 (2.02)
No	255 (97.33)	278 (98.23)	533 (97.80)
Data missing	0	1 (0.35)	1 (0.18)
<b>Panic and phobias</b>			
Yes	34 (12.98)	36 (12.72)	70 (12.84)
No	228 (87.02)	247 (87.28)	475 (87.16)
<b>Obsessive-compulsive disorder</b>			
Yes	15 (5.73)	4 (1.41)	19 (3.49)
No	247 (94.27)	279 (98.59)	526 (96.51)
<b>Posttraumatic stress disorder</b>			
Yes	3 (1.15)	11 (3.89)	14 (2.57)
No	251 (95.80)	259 (91.52)	510 (93.58)
Data missing	8 (3.05)	13 (4.59)	21 (3.85)
<b>Generalized anxiety disorder</b>			
Yes	29 (11.07)	31 (10.95)	60 (11.01)
No	232 (88.55)	252 (89.05)	484 (88.81)
Data missing	1 (0.38)	0	1 (0.18)
<b>Migrant-Specific Variables</b>			
<b>Region of birth</b>			
Europe		74 (26.15)	
Africa		116 (40.99)	
Asia		32 (11.31)	
Americas and Australasia		61 (21.55)	
<b>Year came to the United Kingdom</b>			
> 10 y ago		136 (48.06)	
4–10 y ago		75 (26.50)	
< 4 y ago		72 (25.44)	
<b>Immigration status</b>			
UK National		71 (25.09)	
EEA citizen		78 (27.56)	
Indefinite leave to remain		51 (18.02)	
Exceptional leave to remain or temporary admission		32 (11.31)	
Awaiting initial decision or appealing initial refusal		22 (7.77)	
Spousal/family/ancestral visa		16 (5.65)	
Other (all are temporary visa recipients, unknown, or overstayers)		13 (4.59)	
<b>Interpreter needed</b>			
Yes		40 (14.13)	
No		243 (85.87)	

<sup>a</sup>Values are shown as n (%) unless otherwise noted. <sup>b</sup>General Certificate of Secondary Education (GCSE); exams taken after 2 years of study at the age of 16 years. <sup>c</sup>A-level: exams taken at the age of 18 years. <sup>d</sup>If no "data missing" row is included for a variable, then no data were missing for that variable. <sup>e</sup>1 Pound Sterling equals 1.27 US Dollars. <sup>f</sup>Number of events reported on the Structured Clinical Interview for DSM-IV. <sup>g</sup>Score > 1 on Composite Abuse Scale–short version<sup>11</sup> since year before they found out they were pregnant. <sup>h</sup>In analyses, a binary variable of low social support was used by calculating the bottom quartile of scores on the Social Provisions Scale<sup>12</sup> (< 74). <sup>i</sup>Score > 5 on the Alcohol Use Disorders Identification Test.<sup>9</sup> <sup>j</sup>Score > 1 on the Drug Use Disorders Identification Test.<sup>10</sup>

Abbreviation: EEA = European Economic Area.

between migrant and UK-born women in exposure to traumatic events or intimate partner violence. Migrant women were more likely to have social support scores in the lowest quartile than UK-born women.

Among the whole sample, prevalence of CMD was higher among younger women, women with low income, and single women. Women who reported their pregnancy as being unplanned, those currently smoking, those who reported traumatic events, and those reporting low social support all had higher prevalence of CMD. Immigration status was the only migrant-specific variable associated with CMD; continent of birth, length of time in the UK, and needing an interpreter were not associated with CMD.

The variables considered a priori to be potential confounders of the primary hypothesis were age, ethnicity, socioeconomic status (as indicated by education, employment, and income), experience of traumatic events, and social support. Additional confounders were identified as those variables (hypothesized to be potentially relevant from the literature review) associated with both the exposure (migrant status) and the outcome (CMD). The additional variables identified through these analyses were whether the pregnancy was planned and current smoking. These variables were therefore included in models as confounders alongside the a priori confounders. The primary hypothesis was that the prevalence of CMDs (depression, anxiety disorders, and PTSD) at antenatal booking appointment will be higher among migrant women than women born in the United Kingdom.

The weighted prevalence of CMDs (including PTSD) among migrant women was 21.26% (95% CI, 15.76%–28.04%) and 24.09% (95% CI, 18.14%–31.25%) among UK-born women (Table 2). There was no significant difference in the odds of having a CMD among migrant women compared to UK-born women (OR = 0.85; *P* = .54; 95% CI, 0.51–1.42). Thus, there was no evidence to support the primary hypothesis. When disaggregated by disorder (see Table 1), migrant women had increased odds of PTSD and decreased odds of GAD. There were no significant associations between migrant status and the other outcomes.

In the fully adjusted model (Table 3), younger age and experience of traumatic events were associated with increased odds of CMD. Low social support was marginally significant as a risk factor for CMD, and being unemployed was marginally significant as a protective factor.

### Ethnicity and Migration

White migrants, white UK-born women, and nonwhite migrants all had similar prevalence of

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**Table 2. Weighted Prevalence and Odds of Common Mental Disorders (CMDs) Associated With Migrant Status, Stratified by Diagnosis (n = 533)**

Disorder	UK-Born, % (95% CI)	Migrant, % (95% CI)	Odds Ratio (95% CI) <sup>a</sup>	P
Any CMD	24.09 (18.14–31.25)	21.26 (15.76–28.04)	0.85 (0.51–1.42)	.54
Major depressive disorder	8.48 (5.42–13.02)	11.03 (7.40–16.12)	1.34 (0.70–2.56)	.38
Mixed anxiety and depressive disorder	0.45 (0.21–0.95)	0.25 (<0.01–0.68)	0.56 (0.16–1.97)	.37
Panic and phobias	11.85 (7.62–17.98)	11.19 (7.15–17.09)	0.94 (0.47–1.87)	.85
Obsessive-compulsive disorder	3.54 (0.16–7.64)	0.89 (0.19–4.15)	0.24 (0.04–1.44)	.12
Posttraumatic stress disorder	0.2 (<0.01–0.61)	1.38 (0.47–3.98)	7.09 (1.46–34.47)	.02
Generalized anxiety disorder	6.37 (3.57–11.13)	2.59 (1.42–4.68)	0.39 (0.16–0.93)	.03

<sup>a</sup>UK-born individuals were the reference group.

CMD (approximately 20%), while the nonwhite UK-born group had nearly double the weighted prevalence (39%) (see Table 4). When the groups were stratified by ethnicity, there was no significant difference between migrant and UK-born risk for CMD among white women. For nonwhite women, the risk of CMD was significantly lower in the migrant group, and the effect was stronger after adjustment for potential confounders (see Table 4).

### Security of Immigration Status

There were no significant associations between security of immigration status and CMD in unadjusted or adjusted models. As with the main association, we examined whether the association between security of immigration status and CMD differed by diagnosis by stratifying the analyses by disorder (Table 5).

In this analysis stratifying the association by disorder, migrant women with insecure status were at greater risk of PTSD and at lower risk of MDD than migrant women with secure status (Table 5).

### Length of Time in the United Kingdom

There were no significant differences in the prevalence or odds of CMD among migrant women who had been in the United Kingdom for differing lengths of time. However, the overall trend appeared to be increasing prevalence and odds of CMD with increasing time in the United Kingdom. Again, the largest difference in prevalence was between the white and nonwhite women born in the United Kingdom, with the ethnic minority women reporting around twice the prevalence of CMD.

### Missing Data

We ran a sensitivity analysis, running the main unadjusted logistic regression model with only the complete cases (n = 494), and the results were very similar to those of the unadjusted model including all those with complete data on outcome and exposure (n = 533). The main association including only complete cases (OR = 0.85; 95% CI. 0.49–1.42; P = .51) was very similar to that found from the larger model (OR = 0.86; 95% CI. 0.51–1.44; P = .57). This finding suggests

**Table 3. Logistic Regression Model for Risk of Common Mental Disorders (CMDs) Associated With Migrant Status and All Potential Confounders (n = 494)**

Variable	Odds Ratio	95% CI	P
Migrant status			
UK-born	Reference		
Migrant	0.71	0.35–1.41	.33
Age group, y			
<25	Reference		
25–29	0.09	0.02–0.31	<.01
30–34	0.11	0.04–0.36	<.01
35–39	0.10	0.04–0.32	<.01
40+	0.02	<0.01–0.07	<.01
Ethnicity			
White	Reference		
Nonwhite	1.31	0.60–2.87	.50
Education			
No university degree	Reference		
University degree	1.17	0.52–2.62	.71
Employment			
Employed	Reference		
Unemployed	0.49	0.23–1.06	.07
Income, £ (in thousands) <sup>a</sup>			
<15	Reference		
15–45	0.86	0.33–2.19	.75
46+	0.53	0.17–1.62	.27
Rather not say	0.58	0.20–1.69	.32
Traumatic events			
None reported	Reference		
1 or more	2.57	1.39–4.76	<.01
Low social support			
No	Reference		
Yes	2.20	0.96–5.03	.06
Planned pregnancy			
Planned	Reference		
Unplanned	1.27	0.60–2.69	.54
Current smoking			
No	Reference		
Yes	3.89	0.78–19.34	.10

<sup>a</sup>One Pound Sterling equals 1.27 US Dollars.

that the effect of missing data on changing the associations was minimal.

## DISCUSSION

### Summary of Results

This study found that CMDs were highly prevalent in early pregnancy among both migrant and UK-born women.

However, there was no overall increased risk of antenatal CMDs among migrant women compared to UK-born women, despite the migrant group's being significantly more exposed to risk factors for CMD—minority ethnicity, lower educational level, being unemployed, lower income, more unplanned pregnancy, and lower social support. In addition, the odds of PTSD were significantly higher in the migrant group, while odds of GAD were significantly lower than for the UK-born women. Similarly, there was no overall increased risk of CMD associated with insecure immigration status, but the migrant women with insecure immigration status had significantly increased odds of PTSD and significantly decreased odds of depression compared to migrant women with secure immigration status. After stratification by ethnicity, among white women there was no overall effect of migrant status on risk for CMD; however, among nonwhite women, migrant status lowered the odds of CMD, and the protective effect of migrant status was strengthened after adjustment for confounders. Again, there was no significant effect of length of time in the United Kingdom on risk for CMD, although the trend in the sample

was that increased time in the United Kingdom increased the risk of CMD.

### Comparison With Previous Literature

The prevalence estimates of depression, anxiety, and PTSD were lower than those found in previous studies,<sup>4</sup> very likely reflecting the difference between symptom screening measures and a diagnostic measure of disorder. The finding of no increased risk of CMD associated with migrant status is supported by the inconclusive evidence found in studies examining symptoms of depression in the perinatal period<sup>4</sup> and may reflect the “healthy migrant effect” observed in other areas of health.<sup>14</sup> The increased odds of PTSD among migrant women, in particular those with insecure status, is supported by a previous study<sup>15</sup> that investigated PTSD symptoms among immigrants, refugees, and asylum-seekers in Canada. Although the migrant women in our study were at increased risk of PTSD, they were not significantly more likely to have experienced traumatic events in their lifetime than their UK-born counterparts. However, the timing and the nature or severity of traumatic events were not investigated, and it is plausible that differences in these could account for this discrepancy. Previous research<sup>16</sup> into PTSD in asylum-seekers found that although those with PTSD symptoms did report significantly more trauma events compared to those without, those with PTSD symptoms also reported more stress in relation to post-migratory factors relevant to the asylum-seeking process. This finding was suggested to be because ongoing PTSD symptoms may be exacerbated by such stressors.<sup>16</sup> A systematic review of pre-displacement and post-displacement factors affecting the mental health of refugees and asylum-seekers found that the post-displacement conditions were more predictive of health outcome than the pre-displacement factors.<sup>17</sup> This finding may help explain the increased risk of PTSD among migrant women with insecure status despite the absence of increased exposure to lifetime traumatic events in this study.

**Table 4. Weighted Prevalence of Common Mental Disorders (CMDs) Stratified by Migrant Status and Ethnicity (n = 533) and Odds of CMD Associated With Migrant Status,<sup>a</sup> Stratified by Ethnicity**

Ethnicity	Weighted Prevalence of CMDs, % (95% CI)					
	Migrant	UK-Born				
White	20.44 (12.09–32.42)	19.12 (13.17–26.93)				
Nonwhite	21.74 (14.97–30.46)	39.12 (25.10–55.20)				
	Odds of CMD Associated With Migrant Status					
	Unadjusted Model (n = 533)			Adjusted Model (n = 494) <sup>b</sup>		
	OR	95% CI	P	OR	95% CI	P
White	1.09	0.50–2.34	.83	1.07	0.45–2.57	.88
Nonwhite	0.43	0.20–0.96	.04	0.31	0.12–0.82	.02

<sup>a</sup>UK-born individuals were the reference group.

<sup>b</sup>Adjusted for age, education, employment, income, traumatic events, social support, planned pregnancy, and smoking.

Abbreviation: OR = odds ratio.

**Table 5. Prevalence and Odds of Common Mental Disorders (CMDs) Associated With Insecure Immigration Status Among Migrant Women (n = 276)**

Disorder	Prevalence, % (95% CI)		Odds Associated With Insecure Status <sup>a</sup>		
	Secure Immigration Status	Insecure Immigration Status	OR	95% CI	P
Any CMD	18.41 (9.93–31.60)	22.24 (15.73–30.48)	0.78	0.34–1.82	.58
Major depressive disorder	12.91 (8.10–19.75)	5.76 (3.52–9.28)	0.41	0.20–0.85	.02
Mixed anxiety and depressive disorder	0.34 (0.13–0.93)	<0.01	Perfect prediction		
Panic and phobias	11.98 (7.23–19.20)	8.96 (3.26–22.30)	0.72	0.22–2.42	.60
Obsessive-compulsive disorder	1.21 (0.25–5.61)	<0.01	Perfect prediction		
Posttraumatic stress disorder	0.18 (<0.01–0.71)	4.86 (1.47–14.83)	29.08	4.49–188.08	<.01
Generalized anxiety disorder	2.83 (1.37–5.76)	1.92 (0.90–4.03)	0.67	0.23–1.95	.46

<sup>a</sup>Individuals with secure immigration status were the reference group.

Abbreviation: OR = odds ratio.

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Our results support the growing consensus that ethnicity and migrant status must be considered simultaneously as intersecting social categories impacting on health, as important differences emerged when the analyses were stratified. Evidence from the Millennium Cohort Study (MCS)<sup>18</sup> in the United Kingdom investigating postnatal depression found similar findings to those of the present study. The MCS found that mothers born abroad were less likely to be depressed than UK-born mothers, whereas mothers in the other white, Indian, and Pakistani ethnic groups were more likely to be depressed than white British/Irish mothers irrespective of country of birth and demographic and socioeconomic differences.<sup>18</sup> The results from this study did not find length of time in the United Kingdom to be a statistically significant risk factor, aside from the most recent ethnic minority migrants being at decreased risk of CMD compared to ethnic minority UK-born women. However, the trend was toward increasing risk with length of time in the United Kingdom, particularly among ethnic minority women. One explanation for the deterioration of migrant health is that of increased exposure to minority status and the increase in stressors that entails, such as discrimination and relative social disadvantage.<sup>19</sup> This increased exposure would help to explain the findings of an overall protective effect of migrant status on the mental health of ethnic minority women.

## Strengths and Limitations

The most important and novel strength of this study was that we used a diagnostic instrument rather than a screening tool to identify CMDs during pregnancy. This study is one of the first to do so. This difference means that, unlike in previous studies, the prevalence estimates presented are the estimates for disorder rather than high symptoms or “probable” disorder. The differentiation between disorder and high symptom level is important both for furthering our understanding of the epidemiology of mental disorders and also for the planning of services, as meeting criteria for disorder is usually the cutoff for receiving treatment. It was also a strength that we identified disorders other than depression, including PTSD, which have been underresearched in the perinatal period. The very diverse sample is another strength of this study. Our lack of restrictions on the languages women could speak to take part in the study, and our focused efforts on recruiting hard-to-reach groups of women such as asylum-seekers, means that the diversity of the population was reflected in the study.

The study was cross-sectional in design, meaning that causal effects and potential mediating variables could not be investigated. However, for clinical practice, the causal implications of the independent effect of migration on mental health are less relevant than knowing which groups are at risk. Although the diverse sample was a great strength of the study, the population of women is quite unique to London and therefore may not be generalizable to more rural areas or countries with different immigration patterns. Furthermore, although efforts were made to reduce selection bias, it is probable that women with mental health problems and women with insecure immigration status were less likely to take part in research, which may have biased the findings. Finally, although the sample size was very large for an epidemiologic study using a diagnostic instrument, it was not sufficiently powered to fully explore the heterogeneity of disorder (eg, the differential diagnoses) or the heterogeneity of the population (eg, simultaneous modeling of ethnicity, social class, immigration status, length of time in the United Kingdom).

## Implications

For clinicians, particularly in maternity services, it is important to be aware of the high prevalence of antenatal CMDs for all women. The increased prevalence among ethnic minority women born in the United Kingdom is important for clinicians to be aware of and needs to be investigated further. Future research should focus on elucidating the mechanisms by which minority ethnicity, migration, and other social inequalities impact on mental health in the pursuit of guiding interventions and services that meet the needs of diverse populations of women.

## CONCLUSIONS

Common mental disorders in early pregnancy are highly prevalent, for both migrant women and women born in the United Kingdom. Migrant women may be at increased risk of PTSD, in particular those migrant women with insecure immigration status. Ethnicity and migrant status must be considered simultaneously, as the effect of migrant status on mental health may differ by ethnic group. Results from stratified analyses and examination of length of time in the United Kingdom suggest a deleterious effect of living in the United Kingdom on the mental health of ethnic minorities, with migration serving as a protective factor for this group. Future research using an intersectional approach to elucidate the effect of multiple axes of disadvantage, including migration, on the mental health of perinatal populations is needed to investigate these findings further.

**Submitted:** September 6, 2018; accepted March 18, 2019.

**Published online:** July 30, 2019.

**Potential conflicts of interest:** Dr Howard chaired the National Institute for Health and Care Excellence CG192 guidelines development group on antenatal and postnatal mental health in 2012–2014. Drs Anderson, Hatch, Ryan, and Trevillion have no declarations of interest.

**Funding/support:** This article summarizes independent research funded by the National Institute for Health Research (NIHR) under the Programme Grants for Applied Research programme (ESMI Programme: grant reference number RP-PG-1210–12002) and the NIHR/Wellcome Trust Kings Clinical Research Facility and the NIHR Biomedical Research Centre at South London and Maudsley National Health Service (NHS) Foundation Trust and Kings College

London. Dr Howard is also supported by an NIHR Research Professorship (NIHR-RP-R32–011).

**Role of the sponsors:** The providers of support had no role in the conduct and publication of the study.

**Disclaimer:** The views expressed are those of the authors and not necessarily those of the NHS, the NIHR, or the Department of Health and Social Care. The study team acknowledges the

study delivery support given by the South London Clinical Research Network.

**Supplementary material:** Available at [PSYCHIATRIST.COM](http://PSYCHIATRIST.COM).

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**Supplementary Material**

**Article Title:** The Impact of Insecure Immigration Status and Ethnicity on Antenatal Mental Health Among Migrant Women

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**DOI Number:** <https://doi.org/10.4088/JCP.18m12563>

**List of Supplementary Material for the article**

1. [Table 1](#) Weighted associations of variables of interest with the exposure, migrant status, and the outcome, CMD (n=545 unless missing specified)

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**Supplementary Table 1: Weighted associations of variables of interest with the exposure, migrant status, and the outcome, CMD (n=545 unless missing specified)**

Variable	Level	UK-born % (95% CIs)	Migrant % (95% CIs)	Chi <sup>2</sup> <i>p</i>	No CMD % (95 % CIs)	CMD % (95% CIs)	Chi <sup>2</sup> <i>p</i>
<b>Whooley status</b> <i>0 missing</i>	Negative	91.52 (89.43-93.22)	90.31 (88.05-92.17)	0.39	80.88 (75.52-85.29)	19.12 (14.71-24.48)	<0.01
	Positive	8.48 (6.78-10.57)	9.69 (7.83-11.95)		42.40 (36.55-48.06)	57.80 (51.94-63.45)	
<b>Sociodemographics</b>							
<b>Age</b> <i>0 missing</i>	<25	4.70 (2.40-8.97)	6.60 (3.79-11.24)	0.29	33.71 (16.87-56.04)	66.29 (43.96-83.13)	<0.01
	25-29	14.63 (9.84-21.20)	22.50 (16.62-29.72)		76.92 (64.73-85.82)	23.08 (14.18-35.27)	
	30-34	35.11 (27.95-43.02)	34.53 (27.44-42.38)		78.12 (69.65-84.74)	21.88 (15.26-30.35)	
	35-39	36.73 (29.43-44.70)	28.17 (21.63-35.77)		80.01 (71.30-86.58)	19.99 (13.42-28.70)	
	40+	8.83 (5.18-14.66)	8.20 (4.85-13.51)		94.54 (89.87-97.13)	5.46 (2.87-27.48)	
<b>Ethnicity</b> <i>0 missing</i>	White	74.43 (66.97-80.69)	36.18 (29.01-44.02)	<0.01	80.45 (74.14-85.51)	19.55 (14.49-25.86)	0.06
	Black	17.65 (12.43-24.45)	43.42 (35.86-51.30)		73.99 (64.59-81.60)	26.01 (18.40-35.41)	
	Asian	2.32 (0.82-6.40)	9.22 (5.56-14.90)		87.90 (69.68-95.83)	12.10 (4.17-30.32)	
	Mixed	4.12 (1.93-8.57)	2.48 (0.94-6.36)		48.16 (19.78-77.78)	51.84 (22.22-80.22)	
	Other	1.48 (0.39-5.45)	8.71 (0.52-14.22)		65.55 (39.62-84.66)	34.45 (15.34-60.38)	
<b>Education</b> <i>0 missing</i>	GCSE/equiv alent or less	3.48 (1.55-7.61)	12.77 (8.50-18.73)	<0.01	68.30 (49.71-82.45)	31.70 (17.55-50.29)	0.23
	A-level or	16.23	37.00		73.57 (63.30-81.79)	26.43 (18.21-36.70)	

	equivalent	(11.25-22.85)	(29.78-44.86)				
	University degree or higher	80.29 (73.35-85.78)	50.23 (42.44-58.02)		79.98 (74.13-84.79)	20.02 (15.21-25.87)	
<b>Employment</b> <i>2 missing</i>	Paid employment	80.01 (72.96-85.58)	55.89 (48.02-63.47)	<0.01	76.88 (70.85-23.12)	23.12 (18.01-29.15)	0.97
	Voluntary job/student	1.09 (0.30-3.97)	7.32 (4.08-12.77)		78.07 (50.63-92.51)	21.93 (7.49-49.37)	
	Not working	15.03 (10.20-21.59)	31.59 (24.80-39.26)		79.09 (68.89-86.59)	20.91 (13.41-31.11)	
	Other	3.87 (1.73-8.42)	5.21 (2.72-9.73)		74.54 (50.00-81.53)	25.46 (10.45-50.00)	
<b>Income</b> <i>5 missing</i>	0-15k	6.60 (3.62-11.75)	15.01 (10.32-21.33)	<0.01	57.10 (40.58-72.17)	42.90 (27.83-59.42)	<0.01
	15-45	24.00 (17.86-31.45)	23.81 (17.75-31.16)		74.83 (64.11-83.18)	25.17 (16.82-35.89)	
	46+	63.78 (55.86-71.02)	26.94 (20.49-34.53)		82.51 (75.47-87.85)	17.49 (12.15-24.53)	
	rather not say	5.62 (3.02-10.21)	34.24 (27.22-42.04)		80.78 (70.14-88.26)	19.22 (11.74-29.86)	
<b>Relationship status</b> <i>0 missing</i>	Single	6.12 (3.24-11.28)	9.97 (6.33-15.34)	0.50	48.13 (29.89-66.89)	51.87 (33.11-70.11)	<0.01
	Partner not cohabiting	9.01 (5.54-14.31)	10.93 (7.00-16.65)		74.67 (59.39-85.59)	25.33 (14.41-40.61)	
	Married/cohabiting	84.16 (77.66-89.04)	77.97 (71.09-83.58)		80.43 (75.18-84.78)	19.57 (15.22-24.82)	
	Separated/divorced/widowed	0.71 (<0.01-4.89)	1.14 (0.33-3.87)		82.90 (50.62-95.82)	17.10 (4.18-49.38)	
<b>Living status</b> <i>4 missing</i>	Alone	9.61 (5.85-15.38)	11.00 (7.07-16.73)	0.45	69.53 (52.64-82.41)	30.47 (17.59-47.36)	0.06
	With spouse/partner	80.40 (73.40-85.91)	73.73 (66.46-79.91)		79.89 (74.47-84.41)	20.11 (15.59-25.53)	

	tner						
	With parents, friends or family	6.10 (3.32-10.94)	10.44 (6.56-16.21)		75.53 (57.30-87.65)	24.47 (12.35-42.70)	
	Other	3.90 (1.75-8.48)	4.83 (2.53-9.01)		52.03 (27.50-81.52)	47.97 (24.38-72.50)	
<b>Have living children</b> <i>0 missing</i>	No	52.63 (44.69-60.45)	44.12 (36.52-52.00)	0.14	75.88 (68.65-81.89)	24.12 (18.11-31.35)	0.54
	Yes	47.37 (39.55-55.31)	55.88 (48.00-63.48)		78.68 (71.96-84.15)	21.32 (15.85-28.04)	
<b>Obstetric/medical</b>							
<b>Late booking</b> <i>0 missing</i>	No	90.08 (84.16-93.94)	80.24 (73.40-85.67)	0.02	77.53 (72.28-82.04)	22.47 (17.96-27.72)	0.83
	Yes	9.92 (6.06-15.84)	19.76 (14.33-26.60)		76.15 (62.76-85.81)	23.85 (14.19-37.24)	
<b>Planned pregnancy</b> <i>0 missing</i>	Planned	78.68 (71.60-84.39)	67.09 (59.44-73.92)	0.02	81.37 (75.95-85.80)	18.63 (14.20-24.05)	<0.01
	Unplanned	21.32 (15.61-28.40)	32.91 (26.08-40.56)		66.63 (56.39-75.50)	33.37 (24.50-43.61)	
<b>Miscarriages/still births</b> <i>2 missing</i>	No	64.04 (56.09-71.29)	70.65 (63.02-77.28)	0.22	75.47 (69.36-80.70)	24.53 (19.30-30.64)	0.22
	Yes	35.96 (28.71-43.91)	29.35 (22.72-36.98)		81.36 (73.11-87.51)	18.64 (12.49-26.89)	
<b>Terminations</b> <i>1 missing</i>	No	75.26 (67.86-81.43)	67.24 (59.50-74.15)	0.12	78.60 (72.93-83.35)	21.40 (16.65-27.07)	0.38
	Yes	24.74 (18.57-32.14)	32.76 (25.85-40.50)		74.16 (64.42-81.98)	25.84 (18.02-35.58)	
<b>Current smoking</b> <i>0 missing</i>	No	96.46 (92.36-98.40)	99.56 (99.06-99.79)	<0.01	77.97 (73.14-82.14)	22.03 (17.86-26.86)	0.04
	Yes	3.54 (1.60-7.64)	0.44 (0.21-0.94)		45.93 (16.48-78.53)	54.07 (21.47-83.52)	
<b>BMI</b> <i>123 missing</i>	<i>Mean (SD)</i>	24.24 (23.28-25.20)	23.42 (22.57-24.28)	<i>(ttest p)</i> 0.20	23.67 (22.96-24.38)	24.36 (22.77-25.96)	<i>(ttest p)</i> 0.42

Other risk factors							
<b>Traumatic events</b> <i>14 missing</i>	None	49.22 (41.26-57.22)	56.86 (48.93-64.45)	0.19	82.96 (76.67-87.82)	17.04 (12.18-23.33)	0.03
	1 event	30.08 (23.24-37.94)	29.77 (23.08-37.47)		73.28 (63.57-81.17)	26.72 (18.83-36.43)	
	2 or more events	20.70 (15.00-27.87)	13.37 (8.93-19.54)		67.63 (54.45-78.50)	32.37 (21.50-45.55)	
<b>IPV</b> <i>67 missing</i>	No	95.79 (91.07-98.07)	95.92 (91.22-98.15)	0.96	79.45 (74.42-83.71)	20.55 (16.29-25.58)	0.82
	Yes	4.21 (1.93-8.93)	4.08 (1.85-8.78)		76.92 (48.49-92.19)	23.08 (7.81-51.51)	
<b>Low social support</b> <i>25 missing</i>	No	93.49 (88.69-96.33)	78.70 (71.72-84.34)	<0.01	80.22 (75.00-84.57)	19.78 (15.43-25.00)	<0.01
	Yes	6.51 (3.67-11.31)	21.30 (15.66-28.28)		61.20 (46.99-73.73)	38.80 (26.27-53.01)	
<b>Hazardous alcohol use</b> <i>56 missing</i>	No	75.00 (67.27-81.41)	95.13 (90.12-97.66)	<0.01	79.08 (73.68-83.62)	20.92 (16.38-26.32)	0.42
	Yes	25.00 (18.59-32.73)	4.87 (2.34-9.88)		73.76 (59.26-84.45)	26.24 (15.55-40.74)	
<b>Hazardous substance use</b> <i>40 missing</i>	No	89.05 (82.97-93.14)	96.88 (92.77-98.68)	<0.01	78.69 (73.61-83.01)	21.31 (16.99-27.39)	0.49
	Yes	10.95 (6.86-17.03)	3.12 (1.32-7.23)		72.49 (51.03-86.95)	27.51 (13.05-48.97)	
Migrant-specific variables (n=283)							
<b>Continent of birth</b> <i>0 missing</i>	Europe				80.84 (67.27-89.65)	19.16 (10.35-32.73)	0.19
	Africa				79.20 (68.28-87.07)	20.80 (12.93-31.72)	
	Asia				92.38 (83.85-96.59)	7.62 (3.41-16.15)	
	Americas & Australasia				69.06 (51.47-82.45)	30.94 (17.55-48.53)	
<b>Year came to the UK</b>	Over 10 years				75.67 (64.81-84.01)	24.33 (15.99-35.19)	0.57

<i>0 missing</i>	10-4 years	79.54 (66.44-88.41)	20.46 (11.59-33.56)	
	Less than 4 years	83.92 (70.13-92.06)	16.08 (7.94-29.87)	
<b>Immigration status</b> <i>0 missing</i>	UK National	70.76 (55.46-82.47)	29.24 (17.53-44.54)	0.03
	EEA citizen	82.04 (68.67-90.49)	17.96 (9.51-31.33)	
	Indefinite leave to remain	81.16 (64.30-91.16)	18.84 (8.84-35.70)	
	Exceptional leave to remain or temporary admission	73.34 (47.60-89.29)	26.66 (10.71-52.40)	
	Awaiting initial decision or appealing initial refusal	47.56 (17.46-79.55)	52.44 (20.45-82.54)	
	Spousal/family/ancestral visa	97.42 (91.19-99.28)	2.58 (0.72-8.81)	
	Other (all are temporary visas, unknown or overstayers)	97.61 (89.53-99.49)	2.39 (0.51-10.47)	
<b>Interpreter needed</b> <i>0 missing</i>	Yes	78.84 (71.57-84.64)	21.16 (15.36-28.43)	0.92
	No	77.90 (54.90-91.08)	22.10 (8.92-45.10)	