The Impact of the Pandemic on Mental Health in Ethnically Diverse Mothers: Findings from the Born in Bradford, Tower Hamlets and Newham COVID-19 Research Programmes

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Abstract: Restrictions implemented by the UK Government during the COVID-19 pandemic have served to worsen mental health outcomes, particularly amongst younger adults, women, those living with chronic health conditions, and parents of young children. Studies looking at the impact for ethnic minorities have reported inconsistent findings. This paper describes the mental health experiences of mothers from a large and highly ethnically diverse population during the pandemic, using secondary analysis of existing data from three COVID-19 research studies completed in Bradford and London (Tower Hamlets and Newham). A total of 2807 mothers participated in this study with 44% White British, 23% Asian/Asian British Pakistani, 8% Other White and 7% Asian/Asian British Bangladeshi backgrounds. We found that 28% of mothers experienced clinically important depressive symptoms and 21% anxiety symptoms during the pandemic. In unadjusted analyses, mothers from White Other, and Asian/Asian British Bangladeshi backgrounds had higher odds of experiencing symptoms, whilst mothers from Asian/Asian British Indian backgrounds were the least likely to experience symptoms. Once loneliness, social support and financial insecurity were controlled for, there were no statistically significant differences in depression and anxiety by ethnicity. Mental health problems experienced during the pandemic may have longer term consequences for public health. Policy and decision makers must have an understanding of the high risk of financial insecurity, loneliness and a lack of social support on mother’s mental health, and also recognise that some ethnic groups are far more likely to experience these issues and are, therefore, more vulnerable to poor mental health as a consequence.

Keywords: COVID-19; mental health; ethnicity; ethnic minorities; health inequalities; deprivation

1. Introduction

The UK Government lockdown measures imposed to control the spread of the COVID-19 pandemic have been shown to have unintended negative consequences on the health of the UK population [1]. These measures have affected some groups more than others, with those from ethnic minorities or socioeconomically deprived backgrounds experiencing the greatest negative impact on their physical health, mental health, financial insecurity and food insecurity [2–4].

The closure of workplaces and schools during the early phases of the pandemic in the UK caused increased financial insecurity, particularly in those working in low paid/self-employed roles and those having to juggle childcare and work [2,5]. The link between financial insecurity and mental ill health is well established, and increased prevalence of
mental ill health during the pandemic has been reported for those who are socially and economically disadvantaged [5,6]. Minority ethnic groups were found to be at increased risk of being hospitalised and of death from COVID-19, with those from Black African, Black Caribbean, Pakistani, Bangladeshi, and Indian backgrounds identified as most at risk of the disease when compared to White British or White Irish backgrounds [7]. This increased fear of becoming ill or dying of the disease and served to worsen mental health outcomes amongst those from ethnic minority backgrounds [8]. Women from ethnic minority backgrounds have been identified in some studies as the most vulnerable to mental ill-health during the pandemic, with those from Black, Asian, or Hispanic backgrounds reporting worse mental health outcomes than individuals who identified as White [9].

In addition, the pandemic and associated lockdown measures served to further accentuate gender disparities, especially for employed mothers or single parent mothers due to the disproportionate responsibility placed on women for domestic duties and childcare [10].

Poor mental health during the COVID-19 pandemic has also been reported as having a higher prevalence among those living alone, younger adults (≤40 years), women, those living with chronic physical or mental health conditions, and parents of young children [11].

We have conducted three studies on the impact of the COVID-19 restrictions on mothers from a range of ethnic backgrounds, with a range of socio-economic status, and found varied prevalence between ethnic groups and differing associations between ethnicity and mental health during the pandemic [2,12,13].

In a longitudinal study in Bradford comparing levels of depression and anxiety from before, to during the pandemic in mothers from mainly Pakistani heritage (48%) or White British backgrounds (34%), we found increases in the number of mothers reporting clinically significant symptoms [14] with higher rates in mothers from White British compared to Pakistani heritage. An increase in poor mental health was associated with loneliness, financial, food, and housing insecurity, a lack of physical activity, and a poor partner relationship. Once these variables were controlled for, there were no clear differences in the increases in poor mental health by ethnic group. There was however variation in the magnitude of the associations by ethnicity. For example, compared to White British mothers, those from a Pakistani heritage had greater odds of an increase in depression and anxiety if they were lonely or had an average/poor relationship and had much-reduced odds of an increase in depression if they lived in a large household. In contrast, mothers of White British ethnicity had greater odds of an increase in depression if they were financially insecure and/or physically inactive compared with Pakistani heritage mothers [14].

In two cross sectional studies in London, based in Tower Hamlets (36% Bangladeshi, 34% White British) and Newham (12.9% Bangladeshi, 6.3% Black African, 16.9% Other White) higher incidences of clinically important depression and anxiety were reported by mothers from Black (42%) and Bangladeshi (21%) backgrounds compared to other ethnic groups (White British/Irish: 18%, Asian Other: 15%). Similar to the Bradford mothers, poor mental health was associated with financial, food and housing insecurity, loneliness, a lack of social support, an average/poor partner relationship and a lack of physical activity.

To explore the potential associations between ethnicity and mental health in more detail we combined and analysed cross-sectional data from our three uniquely ethnically diverse areas in England, all with high rates of socio-economic deprivation: Bradford, Tower Hamlets, and Newham. The combined data across these three areas allows for more nuanced exploration of the association between a range of ethnic groups and mental health for mothers. The objectives of this study are:

- Explore what factors are associated with poor mental health during the COVID-19 pandemic across a range of ethnic groups in three areas in England.
- Explore in depth, the association between financial insecurity and mental health.
- Explore the association between loneliness and mental health.
- Identify how any ethnic differences in mother’s mental health are modified by financial insecurity, loneliness, and social support.
2. Materials and Methods

2.1. Setting

Two of the studies are nested within the ActEarly Research programme: Born in Bradford and Families in Tower Hamlets, and the third is the Families in Newham study. The ActEarly research programme is designed to work with local communities and authorities to understand how to help families to live healthier and more active lives [15]. The study teams collaborated to collect similar measures (All three programmes were linked to ActEarly (2019–2024), a UKPRP funded network to leverage research and evaluation to improve health and life chances of children). The three study areas are characterised by ethnic diversity and high variance in levels of financial insecurity. Bradford has a young, ethnically diverse population with the largest proportion of people of Pakistani heritage (20.3%) in England [16]. In Tower Hamlets, more than two thirds (69%) of the borough’s population are from minority ethnic groups and it is the 16th most ethnically diverse local authority in England [17], whilst in Newham, just under half (48%) of residents were born outside of the UK, with the proportion of residents identifying as Bangladeshi (12.4%), Black African (11.1%), Indian (14.8%), and Pakistani heritage (9.8%) greater than the London average [18].

2.2. Study Design and Participants

2.2.1. Bradford

The Born in Bradford participants were drawn from the Born in Bradford COVID-19 study within which existing cohort participants were invited to complete longitudinal surveys to understand the impact of the pandemic [2,19]. In the first survey (March 2020–June 2020), a total of 2043 mothers who had children aged 0 to 11 participated.

2.2.2. Tower Hamlets

The Tower Hamlets participants were drawn from Families in Tower Hamlets, a study of the impacts of COVID-19 on families with young children or expecting a baby that took place between 2020–2022. Parents were recruited through general and targeted borough communications channels and asked to complete an online (Qualtrics) survey. Data reported here are from the first wave of the survey (July–November 2020) with a total of 732 mothers. Full details of this study have been published previously [12].

2.2.3. Newham

The Families in Newham study ran in parallel to Families in Tower Hamlets and involved the Qualtrics survey used in the Families in Tower Hamlets study. Recruitment was via borough public health personnel. Data reported here are from the survey that ran from August–December 2020 and included 1252 mothers.

2.3. Data Collection

Participants were recruited to all studies using a combination of emails, text, and phone, and in their main language wherever possible. Surveys were completed by participants online, on the telephone, or using postal surveys.

2.4. Measures

2.4.1. Outcomes

Mental health information was self-reported using the PHQ-8 for depressive symptoms [20] and the GAD-7 for anxiety symptoms [21]. PHQ-8 and GAD-7 are validated instruments and widely used to measure the severity of symptoms in depression and anxiety in the general population and ethnic minority populations in the U.K.
2.4.2. Exposures

Ethnicity

The 2011 UK Census ethnic categories were used to recategorize ethnicity into 10 groups including White British, White Irish, other White, Black African, Black Caribbean, Asian Indian, Asian Pakistani, Asian Bangladeshi, other Asian, and other ethnic groups [22].

Financial Insecurity

Information on financial insecurity was self-reported using the question ‘How well would you say you are managing financially right now?’ with response options including ‘living comfortably’, ‘doing alright’, ‘just about getting by’, ‘finding it quite difficult’, ‘finding it very difficult’, ‘don’t know’, and ‘prefer not to answer’.

Loneliness

Loneliness was self-reported using the question ‘How often have you felt lonely during the past week?’ with answer options including: ‘none, or almost none of the time’, ‘some of the time’, ‘most of the time’, ‘all or almost all of the time’, ‘don’t know’, and ‘prefer not to answer’.

Other Household Characteristics

Information on all other household factors including relationship status and quality, pregnancy status, living in a damp or mouldy house, worrying about current employment status, food insecurity, and presence of social support at the time of survey (including the number of people you can count on) was also self-reported and details on response options are presented in Table 1.

Location of Residency

For the purpose of this study, for the final analysis Tower Hamlets and Newham were combined into one location comparator referred to as ‘London’.

2.5. Data Analysis

To combine the three datasets, we created a 3-level cohort variable (Bradford, Tower Hamlets or Newham) and the location of residency variable. The questions asked in all three surveys were linked together and categorised as follows:

Depression & Anxiety measures: We used total scores and standard categories of PHQ-8 (0–4 no depressive symptoms, 5–9 mild depressive symptoms, 10–14 moderate depressive symptoms, 15–19 moderately severe depressive symptoms, and 20–24 severe depressive symptoms) and GAD-7 (0–4 no anxiety symptoms, 5–9 mild anxiety symptoms, 10–14 moderate anxiety symptoms, and 15–21 severe anxiety symptoms). These categories were collapsed into no clinically significant symptoms (none or mild); and clinically significant symptoms (moderate, moderately severe, and severe) for the final analysis.

Ethnicity variables were collapsed into seven categories including: White British, White Other (all other White categories), Asian/Asian British Indian, Asian/Asian British Pakistani, Asian/Asian British Bangladeshi, Black/Black British Caribbean/African, and Other ethnic groups.

Financial insecurity was reclassified into a binary variable as secure (living comfortably/doing alright) and insecure (just getting by/finding it quite difficult/finding it very difficult). Loneliness was also reclassified as never lonely (none/almost none of the time), sometimes lonely (some of the time) or always lonely (Most/all or almost all of the time) for the final analysis.

Participants with missing data on any of the variables were excluded from all analyses. Descriptive statistics were calculated to compare maternal and household characteristics for different levels of depressive and anxiety symptoms using proportions and the corresponding 95% confidence intervals (CI). To further explore the potential contributing
factors to mothers’ mental health, we estimated the odds of developing clinically important depressive symptoms for ethnicity, location of residency, financial insecurity, loneliness, and social support using univariate logistic regression models. We then examined the individual effect of location of residency, financial insecurity, loneliness, and social support on the association between ethnicity and clinically important depressive symptoms using four individual multivariate regression models.

Furthermore, to explore the combined effect of ethnicity and financial insecurity on the development of clinically important depressive symptoms during the COVID-19 pandemic, we conducted a regression model to estimate the predictive probability [23] of experiencing clinically important depressive symptoms among different ethnic groups adjusting for location of residency and financial insecurity with an interaction term between ethnicity and financial insecurity. Finally, since social support has been shown to be an important factor in improving mental health, especially among certain ethnic minorities [24], we added the social support variable and an interaction term between ethnicity and social support. We repeated all the steps, replacing financial insecurity with loneliness to explore the combined effect of loneliness on the relationship between ethnicity and experiencing clinically important depressive symptoms. We fitted a regression model with all the aforementioned variables and interaction terms included. We repeated all the analysis steps for anxiety symptoms. The odds ratios, the predictive probabilities (percentages) of clinically important depressive/anxiety symptoms and the corresponding 95% CIs are presented. All analyses were conducted in STATA (version 16.)

3. Results

3.1. Sample Characteristics

The combined dataset included 4024 mothers. Of these, 1217 were excluded from the analysis, leaving a total of 2807 mothers with 52% (n = 1466) from Bradford, 16% (n = 445) from Tower Hamlets, and 32% (n = 896) from Newham. The mean depressive symptoms score was 6.4 (SD = 5.3) ranging from 0–24 and 28% (n = 777) of mothers experienced clinically important depressive symptoms. The mean anxiety symptoms score was 5.7 (SD = 5.0) ranging from 0–21 and 21% (n = 586) of mothers experienced clinically important anxiety symptoms (Table 1).

Of the 2807 participants, 44% (n = 1237) were White British, 23% (n = 659) were of Asian/Asian British Pakistani heritage, 8% (n = 219) were of other White background and 7% (n = 200) were of Asian/Asian British Bangladeshi heritage (Figure 1).

![Figure 1](image-url)
Table 1. Sample characteristics overall and by study site.

| Characteristics                        | Overall | Bradford | Tower Hamlets | Newham |
|----------------------------------------|---------|----------|---------------|--------|
|                                        | n = 2807 | n = 1466 | n = 445 | n = 896 |
|                                        | %       | %        | %      | %      |
| **Depressive symptoms**                |         |          |        |        |
| None                                   | 1236    | 44%      | 876    | 60%    | 154    | 35%    | 206    | 23%    |
| Mild                                   | 794     | 28%      | 344    | 23%    | 136    | 31%    | 314    | 35%    |
| Moderate                               | 561     | 20%      | 148    | 10%    | 90     | 20%    | 323    | 36%    |
| Moderately severe                      | 163     | 6%       | 73     | 5%     | 51     | 11%    | 39     | 4%     |
| Severe                                 | 83      | 2%       | 25     | 2%     | 14     | 3%     | 14     | 2%     |
| **Anxiety symptoms**                   |         |          |        |        |
| None                                   | 1360    | 48%      | 930    | 63%    | 182    | 41%    | 248    | 28%    |
| Mild                                   | 861     | 31%      | 335    | 23%    | 138    | 31%    | 388    | 43%    |
| Moderate                               | 421     | 15%      | 120    | 8%     | 82     | 18%    | 219    | 24%    |
| Severe                                 | 165     | 6%       | 81     | 6%     | 43     | 10%    | 41     | 5%     |
| **Ethnicity**                          |         |          |        |        |
| White British                          | 1237    | 44%      | 609    | 42%    | 176    | 40%    | 452    | 50%    |
| Irish                                  | 121     | 4%       | <5     | —      | <5     | —      | 116    | 13%    |
| Any other White                        | 219     | 8%       | 39     | 3%     | 58     | 13%    | 122    | 14%    |
| **Black/Black British/Mixed Caribbean/African** | | | | |
| Caribbean                              | 46      | 2%       | 21     | 1%     | 8      | 2%     | 17     | 2%     |
| African                                | 35      | 1%       | 16     | 1%     | 12     | 3%     | 7      | 1%     |
| **Asian/Asian British/Mixed**          |         |          |        |        |
| Indian                                 | 94      | 3%       | 51     | 3%     | 11     | 2%     | 32     | 4%     |
| Pakistani                              | 659     | 23%      | 623    | 43%    | 8      | 2%     | 28     | 3%     |
| Bangladeshi                            | 200     | 7%       | 37     | 3%     | 129    | 29%    | 34     | 4%     |
| Any other Asian                        | 81      | 3%       | 32     | 2%     | 18     | 4%     | 31     | 4%     |
| Any other ethnic group/Mixed           | 115     | 4%       | 36     | 2%     | 22     | 5%     | 57     | 6%     |
| **Relationship status**                |         |          |        |        |
| Single                                 | 328     | 12%      | 188    | 13%    | 67     | 15%    | 73     | 8%     |
| Married/civil partnership              | 2194    | 78%      | 1117   | 76%    | 329    | 74%    | 748    | 83%    |
| Not married but in a relationship      | 285     | 10%      | 161    | 11%    | 49     | 11%    | 75     | 8%     |
| **Pregnancy status**                   |         |          |        |        |
| No                                     | 2515    | 90%      | 1415   | 97%    | 369    | 83%    | 731    | 82%    |
| Yes                                    | 292     | 10%      | 51     | 3%     | 76     | 17%    | 165    | 18%    |
| **Home condition—mould or damp house** |         |          |        |        |
| No                                     | 2114    | 75%      | 1090   | 74%    | 322    | 72%    | 702    | 78%    |
| Yes                                    | 693     | 25%      | 376    | 26%    | 123    | 28%    | 194    | 22%    |
| **Worrying about job security**        |         |          |        |        |
| Strongly disagree                      | 383     | 14%      | 272    | 19%    | 33     | 7%     | 78     | 9%     |
| Disagree                               | 691     | 25%      | 392    | 27%    | 69     | 16%    | 230    | 26%    |
| Neither agree or disagree              | 659     | 24%      | 296    | 20%    | 133    | 30%    | 230    | 26%    |
| Agree                                  | 735     | 26%      | 338    | 23%    | 150    | 34%    | 247    | 28%    |
| Strongly agree                         | 339     | 12%      | 168    | 11%    | 60     | 13%    | 111    | 12%    |
| Characteristics | Overall | Bradford | Tower Hamlets | Newham |
|-----------------|---------|----------|---------------|--------|
| **Food insecurity—Food didn’t last** | | | | |
| Never true | 2061 | 73% | 1243 | 85% | 271 | 61% | 547 | 61% |
| Sometimes true | 512 | 18% | 174 | 12% | 133 | 30% | 205 | 23% |
| Often true | 234 | 8% | 49 | 3% | 41 | 9% | 144 | 16% |
| **Food insecurity—Couldn’t afford balanced meals** | | | | |
| Never true | 2072 | 74% | 1238 | 84% | 265 | 60% | 569 | 64% |
| Sometimes true | 474 | 17% | 156 | 11% | 135 | 30% | 183 | 20% |
| Often true | 261 | 9% | 72 | 5% | 45 | 10% | 144 | 16% |
| **Food insecurity—Have been hungry?** | | | | |
| No | 2467 | 88% | 1413 | 96% | 376 | 84% | 678 | 76% |
| Yes | 340 | 12% | 53 | 4% | 69 | 16% | 218 | 24% |
| **Financial insecurity—how are you getting on** | | | | |
| Living comfortably | 597 | 21% | 342 | 23% | 82 | 18% | 173 | 19% |
| Doing alright | 1172 | 42% | 666 | 45% | 158 | 36% | 348 | 39% |
| Just about getting by | 728 | 26% | 341 | 23% | 126 | 28% | 261 | 29% |
| Finding it quite difficult | 212 | 8% | 85 | 6% | 47 | 11% | 80 | 9% |
| Finding it very difficult | 98 | 3% | 32 | 2% | 32 | 7% | 34 | 4% |
| **Quality of relationship with partner** | | | | |
| NA- Single | 328 | 12% | 188 | 13% | 67 | 15% | 73 | 8% |
| Excellent | 1002 | 36% | 643 | 44% | 133 | 30% | 226 | 25% |
| Good | 1051 | 37% | 508 | 35% | 166 | 37% | 377 | 42% |
| Average | 348 | 12% | 103 | 7% | 52 | 12% | 193 | 22% |
| Poor | 50 | 2% | 14 | 1% | 17 | 4% | 19 | 2% |
| Very poor | 28 | 1% | 10 | 1% | 10 | 2% | 8 | 1% |
| **Social support—No of people you can count on** | | | | |
| 0–2: Low | 683 | 24% | 273 | 19% | 131 | 29% | 279 | 31% |
| 3–6: Medium | 1397 | 50% | 651 | 44% | 235 | 53% | 511 | 57% |
| 7 and more: High | 727 | 26% | 542 | 37% | 79 | 18% | 106 | 12% |
| **Social support—No of people you can count on living locally** | | | | |
| 0–2: Low | 1386 | 49% | 573 | 39% | 253 | 57% | 560 | 63% |
| 3–6: Medium | 1069 | 38% | 608 | 41% | 165 | 37% | 296 | 33% |
| 7 and more: High | 352 | 13% | 285 | 19% | 27 | 6% | 40 | 4% |
| **Loneliness** | | | | |
| None/almost none of the time | 1313 | 47% | 899 | 61% | 163 | 37% | 251 | 28% |
| Some of the time | 995 | 35% | 450 | 31% | 198 | 44% | 347 | 39% |
| Most of the time | 384 | 14% | 84 | 6% | 50 | 11% | 250 | 28% |
| All/almost all of the time | 115 | 4% | 33 | 2% | 34 | 8% | 48 | 5% |

Characteristics of mothers by categories of depressive symptoms are presented in Table 2. Overall, during the COVID-19 pandemic, mothers of Asian/Asian British Pakistani, Bangladeshi and Black/Black British Caribbean/African backgrounds, single mothers, pregnant women, mothers living in damp houses, mothers worried about job security, mothers experiencing food insecurity and financial insecurity, mothers with low levels of social support, and those experiencing loneliness were more likely to experience clinically important depression.
Table 2. Differences in maternal and home characteristics by levels of depressive symptoms ($n = 2807$).

| Characteristics                              | None                  | Mild                  | Moderate              | Moderately Severe | Severe               |
|---------------------------------------------|-----------------------|-----------------------|-----------------------|--------------------|----------------------|
| Overall                                     | 1236                  | 794                   | 561                   | 163                | 53                   |
| Overall % (95% CI)                          | 44% (42–46%)          | 28% (27–30%)          | 20% (19–22%)          | 6% (5–7%)          | 2% (1–2%)            |
| Ethnicity                                   |                       |                       |                       |                    |                      |
| White                                       |                       |                       |                       |                    |                      |
| British                                     | 462                   | 437                   | 253                   | 68                 | 17                   |
| British % (95% CI)                          | 37% (35–40%)          | 35% (33–38%)          | 20% (18–23%)          | 6% (4–7%)          | 1% (1–2%)            |
| Irish                                       | 13                    | 21                    | 84                    | <5                 | —                    |
| Any other White                             | 21                    | 82                    | 82                    | 12                 | 5                    |
| Black/British Black                         |                       |                       |                       |                    |                      |
| Caribbean                                   | 23                    | 8                     | 7                     | 5                  | <5                   |
| African                                     | 17                    | 9                     | <5                    | —                  | <5                   |
| Asian/British Asian                         |                       |                       |                       |                    |                      |
| Indian                                      | 57                    | 24                    | 8                     | 5                  | 0                    |
| Pakistani                                   | 415                   | 127                   | 69                    | 35                 | 13                   |
| Bangladeshi                                 | 71                    | 60                    | 41                    | 22                 | 6                    |
| Any other Asian                             | 43                    | 21                    | 11                    | 6                  | <5                   |
| Any other ethnic group/Mixed                | 53                    | 32                    | 17                    | 6                  | 7                    |
| Relationship status                         |                       |                       |                       |                    |                      |
| Single                                      | 130                   | 89                    | 49                    | 43                 | 17                   |
| Married/civil partnership                   | 980                   | 618                   | 462                   | 108                | 26                   |
| Not married but in a relationship           | 126                   | 87                    | 50                    | 12                 | 10                   |
| Pregnancy status                            |                       |                       |                       |                    |                      |
| No                                          | 1147                  | 733                   | 435                   | 150                | 50                   |
| Yes                                         | 89                    | 61                    | 126                   | 13                 | <5                   |
| Home condition—mould or damp house          |                       |                       |                       |                    |                      |
| No                                          | 976                   | 629                   | 384                   | 97                 | 28                   |
| Yes                                         | 260                   | 165                   | 177                   | 66                 | 25                   |
| Worrying about job security                 |                       |                       |                       |                    |                      |
| Strongly disagree                           | 219                   | 80                    | 53                    | 23                 | 8                    |
| Disagree                                    | 339                   | 182                   | 139                   | 25                 | 6                    |
| Neither agree or disagree                   | 271                   | 175                   | 155                   | 39                 | 19                   |
| Agree                                       | 297                   | 237                   | 146                   | 48                 | 7                    |
| Strongly agree                              | 110                   | 120                   | 68                    | 28                 | 13                   |

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| Characteristics                          | Depressive Symptoms                                                                 |
|-----------------------------------------|--------------------------------------------------------------------------------------|
|                                         | None                                                                                   |
|                                         | Mild                                                                                   |
|                                         | Moderate                                                                               |
|                                         | Moderately Severe                                                                     |
|                                         | Severe                                                                                 |
|                                         | Total                                                                                  |
| n % (95% CI)                            | n % (95% CI)                                                                           |
| n % (95% CI)                            | n % (95% CI)                                                                           |
| n % (95% CI)                            | n % (95% CI)                                                                           |
| n % (95% CI)                            | n % (95% CI)                                                                           |
| n % (95% CI)                            | n % (95% CI)                                                                           |
| Food insecurity—Food didn’t last        |                                                                                       |
| Never true                              | 1074 52% (50–54%)                                                                     |
| Sometimes true                          | 132 26% (22–30%)                                                                      |
| Often true                              | 30 13% (9–18%)                                                                        |
| Food insecurity—Couldn’t afford balanced meals |                                                                                     |
| Never true                              | 1065 51% (49–54%)                                                                     |
| Sometimes true                          | 125 26% (23–31%)                                                                      |
| Often true                              | 46 18% (13–23%)                                                                        |
| Food insecurity—Have been hungry?       |                                                                                       |
| No                                      | 1208 49% (47–51%)                                                                     |
| Yes                                     | 28 8% (6–12%)                                                                          |
| Financial insecurity—How are you getting on? |                                                                                     |
| Living comfortably                      |                                                                                       |
| Doing alright                          |                                                                                       |
| Just about getting by Finding it quite difficult |                                                                                   |
| Finding it very difficult               |                                                                                       |
| Relationship quality with partner       |                                                                                       |
| NA-Single                               |                                                                                       |
| Excellent                               |                                                                                       |
| Good                                    |                                                                                       |
| Average                                 |                                                                                       |
| Poor                                    |                                                                                       |
| Very poor                               |                                                                                       |
| Social support—No. of people you can count on |                                                                                     |
| 0–2: Low                                |                                                                                       |
| 3–6: Medium                             |                                                                                       |
| 7 and more: High                        |                                                                                       |
| Social support—No. of people you can count on living locally |                                                                                   |
Table 2. Cont.

| Characteristics | Depressive Symptoms |
|-----------------|---------------------|
|                 | None | Mild | Moderate | Moderately Severe | Severe | Total |
|                 | \( n \) | \% (95% CI) | \( n \) | \% (95% CI) | \( n \) | \% (95% CI) | \( n \) | \% (95% CI) | \( n \) | \% (95% CI) |
| Loneliness      |      |      |          |                  |       |      |          |                  |       |      |          |                  |       |      |          |                  |       |      |          |                  |       |      |          |                  |       |      |          |                  |       |      |          |                  |
| None/almost none of the time | 891 | 68% (65–70%) | 288 | 22% (20–24%) | 106 | 8% (7–10%) | 22 | 2% (1–3%) | 6 | 0.5% (0.2–1%) | 1313 |
| Some of the time | 314 | 32% (29–35%) | 371 | 37% (34–40%) | 2401 | 24% (22–27%) | 60 | 6% (5–8%) | 10 | 1% (1–2%) | 995 |
| Most of the time | 26 | 7% (5–10%) | 113 | 29% (25–34%) | 77 | 46% (41–51%) | 47 | 12% (9–16%) | 21 | 5% (4–8%) | 384 |
| All/almost all of the time | 5 | 4% (2–10%) | 22 | 19% (13–27%) | 38 | 33% (25–42%) | 34 | 30% (22–39%) | 16 | 14% (9–22%) | 115 |

3.2. Factors Associated with Clinically Important Depressive Symptoms

To explore the association between ethnicity, location of residency, financial insecurity, loneliness, social support, and depressive symptoms during the COVID-19 pandemic, we conducted a series of logistic regression models among participants. In the univariate models, being from a White other, Black/Black British Caribbean/African, and Asian/Asian British Bangladeshi background, residing in London, feeling lonely most of the time, having low or medium levels of social support and being financially insecure were significantly associated with experiencing clinically important depressive symptoms during the pandemic (Table 3). The odds of experiencing clinically important depressive symptoms remained significant only for mothers of White other ethnicity compared to White British mothers after adjusting for location of residency (OR = 1.88, 95% CI = 1.45, 2.43), level of loneliness (OR = 1.81, 95% CI = 1.37, 2.39), social support (OR = 2.23, 95% CI = 1.73, 2.88), and financial insecurity (OR = 2.36, 95% CI = 1.83, 3.04) (Table 3). In the unadjusted models the odds of experiencing clinically important depressive symptoms was significantly lower for Asian/Asian British Indian mothers (OR = 0.43, 95% CI = 0.23, 0.78) compared to White British mothers and remained unchanged after adjusting for the location of residency (OR = 0.43, 95% CI = 0.34, 0.80), social support (OR= 0.43, 95% CI = 0.23, 0.79) and financial insecurity (OR= 0.43, 95% CI =0.24, 0.79). Similarly, the odds of experiencing clinically important depressive symptoms were significantly lower for Asian/Asian British Pakistani mothers than White British mothers after adjusting for social support (OR= 0.59, 95% CI = 0.47, 0.75) and financial insecurity (OR= 0.52, 95% CI = 0.41, 0.66).

Table 3. Associations between ethnicity and clinically important depressive symptoms (\( n = 2807 \)).

| Univariate | Multivariate |
|------------|-------------|
| Unadjusted | Adjusted for Location of Residency Only | Adjusted for Loneliness Only | Adjusted for Social Support Only | Adjusted for Financial Insecurity Only |
| OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Ethnicity | \( \text{White other} \) | 2.63 | (2.05–3.36) | 1.88 | (1.45–2.43) | 1.81 | (1.37–2.39) | 2.23 | (1.73–2.88) | 2.36 | (1.83–3.04) |
| | \( \text{Black/British Black: Caribbean/African} \) | 1.12 | (0.68–1.83) | 1.09 | (0.65–1.80) | 1.24 | (0.71–2.18) | 1 | (0.59–1.64) | 0.91 | (0.55–1.51) |
| | \( \text{Asian/British Asian: Indian} \) | 0.43 | (0.23–0.78) | 0.43 | (0.24–0.80) | 0.57 | (0.30–1.09) | 0.43 | (0.23–0.79) | 0.43 | (0.24–0.79) |
### Table 3. Cont.

|                      | Univariate | Multivariate |
|----------------------|------------|--------------|
|                      | Unadjusted | Adjusted for Location of Residency Only | Adjusted for Loneliness Only | Adjusted for Social Support Only | Adjusted for Financial Insecurity Only |
|                      | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Asian/British Asian: |            |              |              |              |              |
| Pakistani            | 0.57       | (0.45–0.73)  | 0.82         | (0.64–1.07)  | 0.59         | (0.47–0.75)  | 0.52         | (0.41–0.66)  |
| Bangladeshi          | 1.4        | (1.02–1.92)  | 1.39         | (0.98–1.98)  | 1.35         | (0.97–1.87)  | 1.04         |
| Other                | 0.84       | (0.59–1.19)  | 0.97         | (0.66–1.43)  | 0.78         | (0.55–1.12)  | 0.75         |
| White British        | 1          | 1            | 1            | 1            | 1            |

**Location of residency**

|                      | London | Bradford |
|----------------------|--------|----------|
|                      | 3.25   | 1        |
| (2.73–3.87)          | (2.32–3.54) | |

**Loneliness**

|                      | Some of the time | All of the time |
|----------------------|------------------|-----------------|
|                      | 3.98             | 17.65           |
| (3.18–4.98)          | (13.64–22.85)    |                 |
|                      | 3.67             | 15.31           |
| (2.93–4.61)          | (11.76–19.93)    |                 |
|                      | None of the time |                  |
|                      | 1                | 1               |

**Social Support**

|                      | Medium (3–6) | Low (0–2) | High (+7) |
|----------------------|--------------|-----------|-----------|
|                      | 2.68         | 4.65      | 1         |
| (2.10–3.42)          | (3.57–6.06)  |           |           |
|                      | 2.43         | 4.08      | 1         |
| (1.90–3.12)          | (3.11–5.34)  |           |           |

**Financial insecurity**

|                      | Insecure | Secure |
|----------------------|----------|--------|
|                      | 2.59     | 1      |
| (2.19–3.07)          |          |        |
|                      | 2.57     | 1      |
| (2.15–3.06)          |          |        |

### 3.3. Ethnic Differences in the Risk of Clinically Important Depressive Symptoms and Role of Financial Insecurity

To examine whether financial insecurity during the COVID-19 pandemic modified the risk of experiencing depressive symptoms for different ethnic groups, we estimated the predictive probability of experiencing clinically important depressive symptoms and the corresponding 95% CIs for each ethnic group (Figure 2 and Supplementary Table S2). In the unadjusted model, mothers from White other (49.7%, 95% CI: 44.4–55.0%) and Asian/Asian British Bangladeshi (34.5%, 95% CI: 27.9–41.1%) backgrounds had the highest chance of experiencing clinically important depressive symptoms compared to other ethnic groups, while Asian/Asian British Indian (13.8%, 95% CI: 6.9%, 20.8%) and Asian/Asian British Pakistani (17.8%, 95% CI: 14.8%, 20.7%) mothers had the lowest chance. (Figure 2, Panel a; Supplementary Table S2 Model (a)). In the adjusted model for financial insecurity only, the predictive probability of experiencing clinically important depressive symptoms remained significant for mothers from White other backgrounds only (47.7%, 95% CI: 42.5%, 52.9%) (Figure 2, Panel b; Supplementary Table S2 Model (b)). Mothers from the White other background (39%, 95% CI: 33.9%, 44%) continued to have a statistically significant
higher predictive probability of experiencing clinically important depressive symptoms compared to White British, Asian/Asian British Indian, Pakistani, Bangladeshi, and women from other ethnic backgrounds, in the model adjusted for location of residency, financial insecurity, and the interaction between ethnicity and financial insecurity (Figure 2, Panel c; Supplementary Table S2 Model (c)). The addition of social support, and an interaction term between ethnicity and social support to the regression model did not change the ethnic differences seen in the previous models and mothers from White other background continued to have a significantly higher predictive probability of clinically important depressive symptoms compared to mothers of White British, Asian/British Asian Indian, Pakistani, Bangladeshi, and other ethnic backgrounds (Figure 2, Panel d; Supplementary Table S2 Model (d)).

3.4. Ethnic Differences in the Risk of Clinically Important Depressive Symptoms and the Role of Loneliness

We repeated the analyses to explore the potential modifying role of loneliness in the relationship between ethnicity and depressive symptoms (Figure 3; Supplementary Table S3).
Table S3). In the regression model adjusted for loneliness alone, there were no statistically significant differences in the predictive probability of clinically important depressive symptoms among ethnic groups (Figure 3, Panel a; Supplementary Table S3, Model (a)). Similarly, the addition of location of residency and an interaction term between ethnicity and loneliness (Figure 3, Panel b; Supplementary Table S3, Model (b)) produced no significant differences between ethnic groups. Finally, the addition of social support and an interaction term between ethnicity and social support did not change the findings (Figure 3, Panel c; Supplementary Table S3, Model (c)).

Finally, we ran a regression model adjusting for location of residency, financial insecurity, loneliness, and social support with interaction terms between ethnicity and financial insecurity, loneliness, and social support also included. In this model, there were no differences for the risk of experiencing clinically important depressive symptoms between ethnic groups (Figure 4).
3.5. Clinically Important Anxiety Symptoms

We repeated all analyses to estimate the predictive probability of clinically important anxiety and found very similar results (Supplementary Tables S4–S6).

4. Discussion

This study examined the association between ethnicity and mental health during the COVID-19 pandemic in a large and highly ethnically diverse population, whilst controlling for potential confounding socio-economic circumstances. We found that 28% of mothers experienced clinically important depressive symptoms, and 21% reported clinically important symptoms of anxiety. These findings reflect those of other studies which have reported similar instances of clinically important symptoms of depression and anxiety amongst mothers during the COVID-19 pandemic [9,11,25]. Rates of clinically important symptoms of depression and anxiety were higher in those who reported feeling lonely, having low or medium levels of social support and/or being financially insecure.

In unadjusted analyses, mothers from a White other, and Asian/Asian British Bangladeshi backgrounds had higher odds of experiencing clinically important symptoms during the pandemic, whilst mothers from Asian/Asian British Indian backgrounds were the least likely to experience symptoms. However, once loneliness, social support and financial insecurity were controlled for, no statistically significant differences were found between the ethnic groups. This finding suggests that the important factors associated with
depression and anxiety during the pandemic are loneliness, a lack of social support and financial insecurity. Any effects reported by ethnicity are most likely a consequence of the fact that mothers in some ethnic groups are far more likely to be lonely, lack social support and/or be financially insecure. Ethnic differences in household structure and support networks may explain in part why these differences exist, as differing cultural practices and local networks mean that some ethnic groups had less support and financial resilience during the pandemic than others [24,26].

An interesting and unanticipated finding was the increased likelihood of depression and anxiety symptoms in the London compared to the Bradford participants. This may again be due to increased isolation, less availability of social support and higher living costs in London compared to the relatively close-knit Bradford communities where the cost of living is also lower. However, there were also small differences in the timing of the surveys, the population who participated, and there may also be other unidentified confounders which were not identified in this analysis. Nevertheless, this finding warrants further investigation, in particular in terms of any long-lasting increases in poor mental health for mothers residing in London, particularly in light of the cost-of-living crisis unfolding in the post-pandemic era.

A strength of this study is that the women included were from a wide range of ethnically diverse backgrounds. Many research studies group ethnic populations under the umbrella terms of ‘BAME’ or ‘South Asian’ due to a lack of diversity in their samples; however, a major strength of this study is the heterogeneity of participants. This allowed us to gain nuanced insight into the mental health experiences of those from often under-researched and under-represented backgrounds. We also collected data from three different locations within England strengthening the generalisability of our findings.

Whilst a strength of our study is the diversity of the sample, there are relatively small numbers included in some ethnic groups. This therefore may have limited the power of the study to detect statistically significant differences in the probability of experiencing clinically important symptoms of depression or anxiety in some ethnic groups. Furthermore, the cross-sectional design of this study does not allow us to determine any causation of our results. We did not include age of the mothers in the sample as an exposure, as this variable was not available in the Newham sample, however all mothers had a child aged 0–11 years meaning there will not be huge variation by age. We do however recognise this as a limitation of the study.

Research studies describing the associations between ethnicity and mental health during the COVID-19 pandemic are limited. Future research should focus on understanding the longer-term impacts of the pandemic on mental health, particularly in light of ongoing changes in social and economic circumstances in the UK. By conducting inclusive research which attempts to understand the experiences of those from minority ethnic groups, we have demonstrated here the ability to better understand and support the needs of those who have struggled during the COVID-19 pandemic and into the future.

5. Conclusions

The COVID-19 pandemic has served to exacerbate existing inequalities, having a greater impact on those already vulnerable. The cost-of-living crisis has placed further challenges on families, with financial insecurity rising and limitations on family’s opportunities to socialise.

Our results show that financial insecurity, loneliness, levels of social support, and location of residency were all associated with clinically important depression and anxiety during the pandemic. Once these key variables were controlled for, there were no differences in symptoms by ethnicity.

These findings speak to two main policy areas: (i) poverty and inequality of income; and (ii) support available through community and neighbourhoods. Policy and decision makers must have an understanding of these factors when considering methods to support vulnerable families as the Government begins to implement plans on ‘Levelling up’ during
the post pandemic recovery [27]. They should also be aware that some ethnic groups are far more likely to experience these issues, that this may have a negative impact on their mental wellbeing, and that support targeting these key groups would be of great benefit.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/ijerph192114316/s1, Table S1: Differences in maternal and home characteristics by levels of anxiety symptoms (n = 2807); Table S2: Predictive probabilities (as percentages) and the corresponding 95% CIs of clinically important depressive by ethnicity for the effect of financial insecurity during the pandemic (n = 2807); Table S3: Predictive probabilities (as percentages) and the corresponding 95% CIs of clinically important depressive by ethnicity for the effect of loneliness during the pandemic (n = 2807); Table S4: Associations between ethnicity and clinically important anxiety symptoms (n = 2807); Table S5: Predictive probabilities (as percentages) and the corresponding 95% CIs of clinically important anxiety by ethnicity for the effect of financial insecurity during the pandemic (n = 2807); Table S6: Predictive probabilities (as percentages) and the corresponding 95% CIs of clinically important anxiety by ethnicity for the effect of loneliness during the pandemic (n = 2807).

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Abbreviations
The following abbreviations are used in this manuscript:
- UK United Kingdom
- PHQ-8 Patient Health Questionnaire 8
- GAD-7 Generalised Anxiety Disorder Assessment 7
- SD Standard Deviation
- OR Odds Ratio
- CI Confidence Intervals
- Ref Reference group
- BAME Black, Asian, and Minority Ethnic
- Est Estimate

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