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**IS FOOD INSECURITY ASSOCIATED WITH MATERNAL HEALTH AMONG UK ETHNIC
GROUPS? AN EXPLORATION OF WOMEN IN THE BIB COHORT**

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ABSTRACT

Food insecurity is a determinant of maternal health; however research on the health impact of food insecurity among mothers of varying ethnicities is under-developed. We assessed the association of food insecurity and health among white British and Pakistani mothers. Data from the Born in Bradford cohort were matched with data on food insecurity and self-reported health from the nested BiB1000 study (N=1280). Food insecurity was associated with elevated odds of fair/poor health among white British mothers but not Pakistani mothers. Adjusting for financial security, the association between food insecurity and poor health was not significant among either white British or Pakistani mothers.

Key words: food insecurity, financial insecurity, ethnicity, maternal health

INTRODUCTION

Food insecurity among women during the postnatal period may have serious implications for the well-being of the mother and development of the child. Mothers in food insecure households often compromise their own intake to ensure their children have sufficient food.(1) While this may attenuate the direct effect of food insecurity on children's consumption, it may not protect children from the wider effects of food insecurity, including strain in parent-child interactions and poor infant feeding practices.(1)

The strength of the association between food insecurity and poor maternal health may be dependent on ethnicity. In the UK, despite the consistent relative health disadvantage of Pakistani/Bangladeshi groups compared to the white ethnic majority, the degree to which ethnic inequalities in health are attributable to socioeconomic differences between and within ethnic groups is equivocal.(2) This may be to do with difficulties in measuring entrenched social disadvantage within and between ethnic minority groups,(2) racial discrimination and/or socio-cultural factors, including social and familial networks and varying dietary behaviors.(3) This study utilises Born in Bradford (BiB) cohort data to further explore health inequalities between ethnic groups by comparing the association between food insecurity and health among Pakistani and white British mothers over a 30 month postnatal period.

METHODS

The design was cross-sectional, with additional longitudinal data on self-reported health. Ethics approval for data collection was granted by Bradford/Leeds NHS Research Ethics Committee (Ref 07/H1302/112).

We matched baseline data from the BiB cohort with data on self-reported health and food insecurity (the latter collected between April 2009 and April 2010) from the nested BiB1000 study.⁽⁴⁾ The history and aims of BiB have been described elsewhere.^(3, 5) The outcome was self-reported general health; and the exposure was food insecurity, re-coded as a binary variable to increase sample size: food secure and food insecure. Food insecurity was defined as “Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways”.⁽⁶⁾ The prevalence of food insecurity in the BiB1000 study was 14%.⁽³⁾

Household food insecurity was assessed when babies were 12-18 months old using the validated 18-item US National Household Food Security Survey measure.⁽³⁾ Within the BiB1000 12 month data collection, 14 women were excluded from the food insecurity analysis due to missing data or responding ‘don’t know’/‘refuse to answer’.

Maternal health was assessed when babies were 6-12, 12-18, 18-24 and 24-30 months old using the question: ‘How would you describe your own health generally? Would you say it is ...’ Answers were recoded as binary variables: excellent/good health and fair/poor health.⁽⁴⁾

The analyses were adjusted for perception of financial insecurity (‘subjective poverty’) as a marker of household income. Household income was not included in the dataset and, while objective measures such as maternal education and paternal employment were available, previous research with BiB data has indicated that subjective poverty is in fact the best

measure for showing gradients among Pakistanis.(7) It is also a reliable measure for assessing socioeconomic status among white British households.(7)

We used multiple logistic regression analysis in the full sample (N=1280) and within the two largest ethnic groups (white British [N=480] and Pakistani [N=624]) to calculate unadjusted Odds Ratios (OR) of food insecurity in relation to fair/poor health. In addition, we calculated adjusted ORs for food insecurity in relation to fair/poor health, adjusted for subjective poverty. All analyses were conducted using Stata 14.0. See Supplementary Material (Table 1) for full sample characteristics.

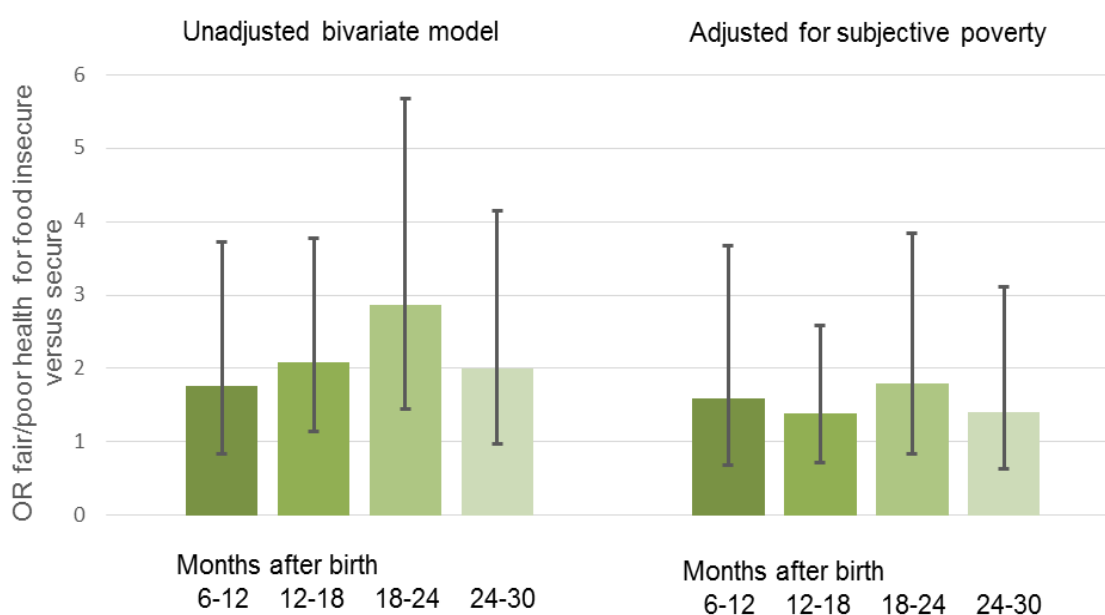
RESULTS

In the unadjusted stratified models, among white British women, food insecurity was associated with poor/fair health at three of the four time points (Figure 1), with the strongest association found at 18-24 months (unadjusted OR 2.86, 95% CI 1.44; 5.67). This increased reporting of poor/fair health was not significant at 6-12 months after birth (unadjusted OR 1.77, 95% CI 0.84 to 3.72). Among Pakistani women, OR were lower and the elevated odds of poor/fair health were not statistically significant at any time point.

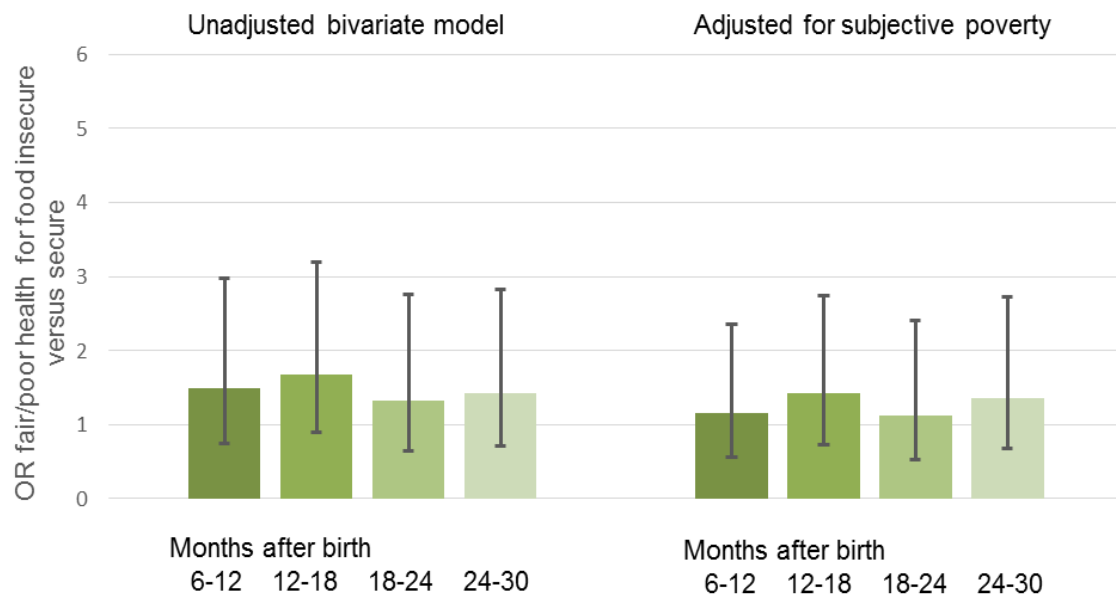
As seen in the adjusted models (Figure 1), subjective poverty seemed to explain much of the association between food insecurity and fair/poor health among both ethnic groups. However, the greatest reduction in risk estimates were found in the white British group (Figure 1 (a)). The adjusted association was not significant at any time point for white British or Pakistani women.

Figure 1. Fair/ poor health for food insecure versus food secure women

a)



b)



DISCUSSION

In unadjusted analyses, food insecurity was associated with poor health among white British women in three out of four separate postnatal periods but not among Pakistani women at any time point. However, among both ethnic groups, but particularly for white British women, a woman's perception of her financial situation seemed to account for the association between food insecurity and poor health.

The timings of the measurements – food insecurity at 12-18 months had the strongest association with health at 18-24 months but was not associated with health at 6-12 months – suggest that food insecurity precedes episodes of poor health. Although our findings cannot resolve questions of causality, evidence suggests both that food insecurity leads to poor health and that poor health precipitates food insecurity.⁽⁷⁾ In this study, especially among white British women, financial insecurity appeared to explain the relationship between food insecurity and poor health. This is consistent with evidence that socioeconomic status is both a robust predictor of poor health outcomes and a key determinant of food insecurity.⁽³⁾ Our finding of a weaker association between food insecurity and health among Pakistani than white British women is partially supported by evidence of health variations by ethnicity among food insecure groups in the US.⁽⁸⁾ However, the weaker link between food insecurity and health – and the lesser impact of subjective poverty on this association – among Pakistani women may also be attributable to their higher likelihood of poor health outcomes compared to white British women, independent of socioeconomic status,⁽⁴⁾ and/or to residual confounding from entrenched social disadvantage and poor measurement of socioeconomic status among the Pakistani group.⁽⁷⁾

The sample is more ethnically diverse and more deprived than the UK average. The findings may, therefore, have limited relevance outside Bradford. Sample size limitations restricted the number of ethnic groups for analysis and, hence, our study focused on health outcomes

in the two largest ethnic groups. Food security was assessed at one time point and, thus, it is not possible to determine the temporal direction of the association between food insecurity and health. In addition, exposure, outcome and control variables were based on self-report, raising the possibility of negative affectivity; analysis of the association between food insecurity and health employing objective measures of health, such as GP records, would be a valuable line of further research. The self-reported health measure, which does not distinguish between physical and mental health, can only be interpreted as a reflection of general health, additional research employing separate physical and mental health measures would significantly enhance our understanding of the epidemiology of UK food insecurity.

The finding that socioeconomic status attenuates the relationship between food insecurity and poor health adds to a large body of evidence on the association between material deprivation and health outcomes. It further highlights the association between financial insecurity and food insecurity, which has become increasingly apparent since 2010.⁽¹⁰⁾ The weaker association between food insecurity and health in the Pakistani sub-sample may be a result of under-diagnosis of food insecurity, inadequate measurement of socioeconomic status among Pakistani households and/or the protective role of social networks within ethnic minority groups (3) – an important line for further research.

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CONFLICTS OF INTEREST

None declared.

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KEY POINTS

- The association between food insecurity and poor health was significant among white British women at three out of four time points but not among Pakistani women at any time point.
- A woman's perception of her financial situation seemed to explain much of the association between food insecurity and poor health, although this occurred to a greater extent among white British than among Pakistani women.
- Further investigation of the weaker association between food insecurity and health in the Pakistani sub-sample is required to clarify the nature and impact of food insecurity among this group.

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Supplementary material

Table 1 Sample characteristics BiB1000 12 month survey wave

Individual characteristics	Number in sample	Pakistani	White British
<i>N</i>	1280 (%/sd)	624 (%/sd)	480 (%/sd)
Ethnic group (baseline)			
Pakistani	780 (48.87)		
White British	596 (37.34)		
Mixed Other	87 (5.45)		
Indian	65 (4.07)		
Bangladeshi	36 (2.26)		
Black	32 (2.01)		
Mean maternal age at delivery (baseline)	27.49 (sd 5.61)	27.70 (sd 5.13)	26.91 (6.10)
Occupation of the father (baseline)			
Non-manual	669 (42.10)	266 (34.59)	300 (51.81)
Manual	494 (31.09)	302 (39.27)	137 (23.66)
Self-employed	187 (11.77)	112 (14.56)	53 (9.15)
Unemployed	177 (11.14)	77 (10.01)	75 (12.95)
Other (Don't know/student)	62 (3.90)	12 (1.56)	14 (2.42)
Mother's education (baseline)			
<5 GCSE equivalent	353 (23.93)	201 (27.13)	120 (21.90)
5 GCSE equivalent	513 (34.78)	249 (33.60)	217 (39.60)
A-level equivalent	217 (14.71)	89 (12.01)	95 (17.34)
Higher than A-level	392 (26.58)	202 (27.26)	116 (21.17)
Subjective poverty (baseline)			
Living comfortably	421 (26.49)	215 (27.71)	141 (23.78)
Doing alright	666 (41.91)	315 (40.59)	257 (43.34)
Just about getting by	366 (23.03)	191 (24.61)	143 (24.11)
Finding it difficult or very difficult to manage	136 (8.56)	55 (7.09)	52 (8.77)
Receiving means-tested benefits (baseline)			
Yes	646 (40.55)	352 (45.19)	221(37.27)
No	947 (59.45)	427 (54.81)	372 (62.73)
Cohabitation status (baseline)			
Living with the baby's father or another partner	1,372 (86.29)	739 (95.11)	441 (74.49)
Not living with a partner	218 (13.71)	38 (4.89)	151 (25.51)
Household size (12 months)			
2-4 people	749 (53.81)	220 (32.35)	412 (79.54)
5-15 people	643 (46.19)	460 (67.65)	106 (20.46)
Food insecurity (12 months)			
Food secure	1101 (86.02)	560 (89.74)	393 (81.88)
Moderate food insecurity	133 (10.39)	50 (8.01)	62 (12.92)
Food insecure with hunger	39 (3.04)	12 (1.92)	22 (4.56)
Food insecure with severe hunger	7 (0.55)	2 (0.32)	3 (0.62)