**The influence of social support on ethnic differences in well-being and depression in adolescents: findings from the prospective Olympic Regeneration in East London (ORiEL) study**

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**Abstract**

**Purpose**

This study examines the extent to which in adolescent positive mental well-being and depressive symptoms varies across ethnic groups, and prospectively examines whether social support is protective against low/poor well-being and depression.

**Methods**

A longitudinal survey of 2426 adolescents from the Olympic Regeneration in East London (ORiEL) study measured well-being and depressive symptoms at baseline at ages 11 to 12 and at follow up two years later at ages 13 to 14. Social support was assessed at ages 11 to 12 years by the Multi-dimensional Scale of Perceived Social Support, by the level of parental support for school, by the frequency of family activities and by friendship choices. Ethnic differences in well-being and depression in Bangladeshi (N=337) and Black African (N=249) adolescents compared to their White UK counterparts (N=380) were estimated adjusted stepwise for socio-demographic factors and domains of social support.

**Results**

Black African and Bangladeshi adolescents scored significantly higher for well-being than their White UK counterparts. There were no significant ethnic differences in the prevalence of depressive symptoms. Lower levels of social support were prospectively associated with lower well-being and higher rates of depression in all ethnic groups. Adjustment for multiple domains of social support did not account for ethnic differences in well-being.

**Conclusion**

Bangladeshi and Black African adolescents in East London may have a positive mental health advantage over their White UK counterparts though social support did not fully explain this difference. Further investigation of the reasons for lower well-being in the White UK group is needed.

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**INTRODUCTION**

Poor mental health during adolescence is of increasing concern to public health. In the UK it is estimated that 10% of children have a mental health problem, with half of lifetime mental health problems starting by age 14 [1]. Longitudinal surveys suggest that the rise in young people’s well-being between 1994 and 2008 appears to have been curtailed and may even be in reverse [1].Yet despite the re-emergence of this issue for young people there is a marked lack of data on their mental health with the most reliable estimates for prevalence of common mental disorders dating back to 2004 [2].

Notwithstanding these research limitations, it has been established that the prevalence of mental health disorders varies across ethnic minority groups [3], though it is important to note that mental health of minority groups is not necessarily poorer than that of the White majority population. A systematic review of 31 population-based and 18 clinic-based studies described a lower prevalence of common mental disorder for Indian and Black African children than their White counterparts, whereas there were no ethnic differences for Mixed ethnicity, Pakistani, Bangladeshi and Black Caribbean children [3]. These patterns are broadly supported by community-based samples of young people using the Strengths and Difficulties Questionnaire. The studies have described lower total difficulties score for Black African, Indian and also Black Caribbean children [4], and lower emotional symptoms scores for a combined Black African/Caribbean group [5]. Therefore a contemporary and longitudinal examination of ethnic differences may offer insights into the causes of the differences in child mental health more generally which may enable the effective promotion of mental health to all ethnic groups.

There is compelling evidence that relationships are at the centre of young people’s health [6] and wellbeing and that social support is protective for mental health [7]. Social support has been commonly defined as the resources provided by other persons [8], and may include a range of social, emotional and informational types of support. Social support may act directly on a person’s health as a consequence of receiving positive support or a negative lack of support, or, social support can indirectly buffer against adversity by moderating the impact of acute or chronic stressors on health [9]. Though social support has long been documented as influencing depressive symptoms in adults [10], more recent evidence from adolescents has emerged showing that low levels of parental support in particular are also associated with an increased risk of depression [11]. Moreover, nationally representative [12] and local community studies [13] have described significant ethnic variations in levels of social support which have been associated with poorer mental health. Family activities and collective behaviours may also be an indirect measure of family social support with evidence to suggest that ethnic minorities participate more frequently than White majority adolescents [14]. However, a number of studies have shown that differences in social support do not explain ethnic differences in the prevalence of common mental disorder [12], depression, psychological distress [13] or well-being [14].

However, much of this research has focussed on family-based social support networks. These may be considered as ‘imposed’ upon young people according to their family type rather than being a product of their own agency. Friendship choices are a consequence of an individual’s agency and may be a particularly salient form of support for of ethnic minority adolescents growing more independent of parental influences and negotiating their own ethnic identities with maturation. Importantly these choices also appear to be independently associated with mental health. Culturally integrated friendship choices, whereby friends came from their own and other ethnic groups have been associated with a lower total difficulties score whereas marginalised and more socially isolated friendship choices were associated with poorer mental health [4]. Alternative friendship types exist such as assimilated where friends are from the other ethnic groups rather than one’s own. Less is known about whether these alternative friendship types may affect mental health.

So while there is a relative lack of contemporary data on the mental health of young people generally compared to adults, data is especially weak for understanding the causes of ethnic differences [3] due in part to well-established under-recruitment of ethnic minority participants in population health surveys [15]. The ORiEL (Olympic Regeneration in East London) Study is uniquely placed to overcome previous difficulties in ethnic minority recruitment by sampling within an ethnically diverse localised area of East London. The study captures a wide range of ethnic minority groups and is longitudinal in nature, allowing the investigation of the temporal relationship between social support and mental health. In this paper we will use the ORiEL Study to firstly, establish whether there are significant ethnic differences in well-being and depressive symptoms in adolescence. Secondly, to assess the whether social support in early adolescence is associated with well-being and depressive symptoms two years later. Finally, to investigate whether ethnic differences in social support in early adolescence might explain later differences in well-being and depressive symptoms. We hypothesise that there are significant ethnic inequalities in adolescent positive mental well-being and depressive symptoms at ages 13-14, with ethnic minority groups expected to be in better health. We further hypothesise ethnic variation in low social support at ages 11-12 correlates with, and consequently explains, ethnic inequalities in well-being and depression at ages 13-14.

**METHODS**

**Study design and participants**

The ORiEL study is a prospective cohort study assessing the impact of urban regeneration on the health of young people and their families. The full study protocol is published elsewhere [16]. Respondents were recruited from six schools in each of the London boroughs of Newham, Hackney and Barking and Dagenham and from seven schools in Tower Hamlets. Schools were selected using simple randomisation within each borough with refusals replaced by eligible schools from the same borough. The schools recruited varied in size, were mixed and single sex schools and were affiliated to a variety of religious denominations.

The baseline survey comprised 3,106 adolescents in year 7 of secondary school (aged 11-12 years) who completed a paper-based questionnaire during the 6 months (January to July 2012) prior to the start of the London 2012 Olympic and Paralympic Games. This cohort was followed up for two consecutive years with an overall retention rate of 73%. This analysis includes respondents who were present at baseline and at second follow-up (aged 13-14 years).The boroughs sampled are characterised by higher levels of social, economic and environmental deprivation than the English and London average [17] as well as being highly ethnically diverse with around two thirds of residents self-identifying with an ethnic minority group at the 2011 Census [18]. Consequently 80% of the total sample is from an ethnic minority [19] with each ethnic group more likely to received means tested free school meals than the national average [20]. Ethnicity was self-reported using the wording and adapted categories of the 2011 England and Wales Census [21]. The analysis is restricted to the three largest ethnic groups in the study, namely: White UK (N=380), Bangladeshi (N=337) and Black African (N=249). Further demographic indicators included gender, length of residence in the UK and whether the respondent was born in the UK.

**Mental health outcomes**

Positive mental well-being was assessed at baseline (age 11/12 years) and at follow up (age 13/14 years) using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) [22]. This is a positively-worded 14 point scale with five response categories capturing eudaimonic and hedonic perspectives of positive mental health (α=0.84 aged 11/12 years; α= 0.90 aged 13/14 years) The total score ranges between 14 (lowest well-being) and 70 (highest) and is reported as a mean value within groups. It has been validated in adolescents [23] and cross culturally [24] and was introduced as a core module to the national Health Survey for England in 2010 [25].

Depressive symptoms were investigated at baseline (age 11/12 years) and at follow up (age 13/14 years) using the Short Moods and Feelings Questionnaire [26]. This is a validated 13 item short form of the 32 item Moods and Feelings Questionnaire scored on a three point scale between “true”, “sometimes true” and “not true” (α=0.88 aged 11/12 years; α= 0.91 aged 13/14 years). Scores range between 0 (lowest risk of depressive symptoms) and 26 (highest) and the variable was dichotomised with a total score of eight or more indicating clinically relevant depressive symptoms [26]. This instrument has been validated within a range of ethnic groups in a variety of contexts and across languages [27,28].

**Exposures**

*Social support*

Social support was assessed at baseline (age 11/12 years) using the Multidimensional Scale of Perceived Social Support (MSPSS) [29]. This is a reliable and validated 12-item instrument and is designed to assess perceptions about support from family, friends and a significant other. It is rated on a seven point Likert scale ranging from “very strongly agree” to “very strongly disagree”. The scale has a high construct and discriminant validity and high test-retest reliability (α= 0.92) [29] and has been validated in non-UK adolescents in an urban setting [30]. Summed scores for each domain and the overall total score were split into tertiles owing to a skewed positive distribution.

*Family activities*

Adolescents were asked at baseline (age 11/12 years) how many times they ate an evening meal with their family in the past week. Responses ranged between never, once or twice, 3 or 4 times or 6 or 7 times a week. Responses were dichotomised to 6/7 times a week versus less.

*Parental involvement with school*

Respondents were asked at baseline (age 11/12 years) how often their parents: are ready to help them if they have a problem at school; are willing to attend school to talk to teachers, and; encourage them to do well at school. Responses were on a five point scale ranging between always to never and scores were summed and dichotomised so that a low score was <12 out of 15.

*Cultural identity*

Baseline respondents (age 11/12 years) were asked how many good friends they had who belonged to their own ethnic group (none/some; quite a lot/most of them) and how many good friends belonged to other ethnic groups (none/some ; quite a lot/most of them) [31]. The binary responses to each question were combined to assign one of four acculturative identity groups [32]. An integrated cultural identity was defined as having friendships with own and with other ethnic groups, a traditional cultural identity included friendships only with own ethnic group, an assimilated cultural identity was assigned where friendships were with other ethnic groups only, and a marginalised cultural identity was a consequence of no friendships with any ethnic groups [32,31].

*Household socioeconomic factors*

Household socioeconomic circumstances were quantified by the Family Affluence Scale (FAS) [33] at baseline (age 11/12 years). This four item scale has been validated in young people cross-nationally [33] and is predictive of self-reported general and mental health [34]. The summed scores were categorised using validated cut-offs to derive high, moderate and low levels of affluence.

**Statistical analysis**

All descriptive analyses and regression models were estimated using data imputed under a “Missing at Random” assumption [35] with a joint multivariate normal modelling approach through the Bayesian estimation method Markov Chain Monte Carlo (MCMC). A burn in of 20,000 iterations was used to stabilise the Markov chains and a further 25,000 iterations were run creating 50 imputed datasets at every 500th iteration. Markov chains were checked and stability was satisfied. Sensitivity analyses employed mixed effects multilevel modelling to account for clustering of individuals within schools. No significant effects were observed at school level for both mental health outcomes hence individual level models were used throughout the final analysis. All analyses were performed using Stata MP version 13.1 (StataCorp, TX, US). Firstly, a descriptive analysis of the analytic sample at baseline (ages 11 to 12) describes ethnic differences in depressive symptoms and well-being, demographic factors, social support domains, frequency of family activity, parental support scores and friendship choices. Secondly, associations between social support and outcomes are tested for in order to justify further inclusion of social support in explanatory models. Prospectively, logistic regression analysis was employed to estimate the odds of depressive symptoms at follow up (age 13-14 years) within each baseline (age 11-12 years) domain of social support adjusted for socio-demographic factors, within each ethnic group. This prospective approach was repeated using linear regression to estimate the association between baseline measures of social support and mean WEMWBS scores at follow up. Multiple imputation models which enable statistical modelling for ethnic differences in the association between social support and depressive symptoms/well-being would not converge. Therefore these associations between social support and outcomes are interpreted as a within-ethnic group effect; between-group comparisons of this specific association should be made cautiously. The influence of ethnic differences in social support is accounted for in the final analysis step. These final models derived the odds of depressive symptoms and mean WEMWBS scores respectively in the Bangladeshi and Black African groups compared to the White UK majority. Models were adjusted stepwise for baseline well-being/depressive symptoms, socio-demographic factors, MSPSS social support domains, family activity, parental support for school and friendship choices.

**RESULTS**

Table 1 describes ethnic differences in the baseline socio-demographic, social support and mental health profiles for the imputed sample. Bangladeshi respondents were more likely to be male and were a part of less affluent families than their White UK or Black African counterparts. Though the majority of Black African adolescents were born in the UK (64.4%) they were the most likely to have been born overseas and to have lived in the UK for fewer than 6 years. Bangladeshi adolescents were significantly more likely to have traditional friendship groups than White UK adolescents. White UK and Black African adolescents tended towards the integrated approach but such ethnic differences in friendship choices were not significant. In terms of social support, there were ethnic group variations across all three MSPSS domains, but in the majority of cases these differences were not significant. The singular exception was for Bangladeshi adolescents who were significantly more likely to be in the lowest scoring tertile in the significant other domain. The Bangladeshi group was also the most likely to have fewer than six family meals per week. Black African and Bangladeshi adolescents reported significantly higher well-being scores than their White UK counterparts but there were no significant ethnic differences in depressive symptoms.

[Table 1 here]

The odds of having depressive symptoms at follow-up across all markers of baseline social support are described for each ethnic group in table 2. Lower levels of social support across all domains were weakly associated with depressive symptoms at follow-up for all ethnic groups, though were significant only for family support for White UK and Bangladeshi adolescents. There was an elevated risk of depressive symptoms in all ethnic groups eating fewer than six family meals a week and for those reporting lower levels of parental support for school but this was only significant in the Bangladeshi group. There were no significant associations between friendship choices and depressive symptoms.

[Table 2 here]

The association between levels of social support and mean well-being scores after controlling for socio-demographic factors are described in table 3. There was a significant dose/response relationship between decreasing levels of total support, family support, friends support, support from a significant other and parental support for school and lower well-being scores for White UK, Bangladeshi and Black African adolescents. Eating fewer than six family meals a week was also associated with lower well-being in all groups but was only significant for Bangladeshi adolescents. Non-integrated friendship choices in White UK adolescents were negatively associated with well-being and were significant for those with traditional choices. There were no significant differences in well-being scores by friendship choices for all other ethnic groups.

[Table 3 here]

Tables 4 and 5 describe the effect of potential explanatory factors on ethnic differences in depressive symptoms and well-being respectively. The odds of reporting depressive symptoms were slightly lower in Black African and Bangladeshi adolescents compared to their White UK counterparts, but overall there were no significant ethnic differences in depressive symptoms either before or after adjustment. However, Bangladeshi (OR:1.94 95%CI:[0.47,3.42]) and Black African (3.44 [1.83,5.05]) groups reported significantly higher well-being scores than the White UK comparison group after adjusting for baseline well-being. Stepwise adjustment showed that demographic factors, MSPSS social support domains and family meals accounted for a small proportion of the difference whereas controlling for levels of parental support increased the well-being score to the greatest extent for the non-White UK ethnic groups. Overall, the mean scores for the Black African and Bangladeshi groups were significantly higher than the White UK group in fully adjusted models.

[Tables 4 & 5 here]

*Sensitivity analyses*

Overall, the Black African respondents had a higher proportion of missing data than the White British and Bangladeshi groups (see Table 1). Sensitivity analyses showed that the general characteristics of the imputed and complete case samples did not differ significantly though the association between social support and depressive symptoms and well-being was weaker for the Black African group due to the reduced sample size resulting in wider confidence intervals. Importantly, ethnic differences in well-being and the lack of differences in depressive symptoms were consistent between the two analytic samples, in unadjusted and adjusted models. Imputed models were further tested for departures from the assumption that data was missing at random [36]. Coefficients for each mental health outcome varied by a maximum of 9.5% after missing scores were set to the maximum level. This suggests that even if the data are missing not at random the bias in the estimation of coefficients and their relationships between ethnic groups is minimal.

**DISCUSSION**

This investigation found that Black African and Bangladeshi adolescents reported significantly higher well-being than their White UK counterparts but there were no significant ethnic differences in depressive symptoms. Low levels of social support were prospectively and strongly associated with lower well-being but more weakly associated with an increase in risk of depressive symptoms for all ethnic groups. Ethnic differences in social support were small, so it was unexpected that the White UK group reported significantly poorer levels of mental health given similar levels of purportedly protective social support. More salient was the effect of parental support for school. Bangladeshi advantage, and to a lesser extent the Black African advantage in well-being, increased once the level of parental support was accounted for. Overall, these findings suggest that social support from family, friends and significant others explained little variation in the ethnic inequalities in mental health which were established by adolescence. One potential explanation for these findings may be that the previously documented protective effect of social support does not operate within adolescents at this stage of their development, or in this local community context [7,6]. Further development of panel data focussing on the increasingly recognised critical period of adolescence [37] will be needed to confirm or refute such arising hypotheses.

The considerable Black African advantage in adolescent well-being observed here is not well documented within contemporary literature, possibly due to the parental generation’s more recent migratory history to the UK which limits comparisons with previous findings. However, these data show some similarity and some differences with a Bangladeshi cohort of similar ages from the same geographical location carried out over ten years ago. The baseline RELACHS study observed that Bangladeshi adolescents were significantly less likely to have high scores on psychological distress than the White UK comparison group in keeping with the high levels of well-being in the Bangladeshi group in this study. Conversely the Bangladeshi group was more likely to experience depressive symptoms at follow up than the White UK comparison group. As observed here, social support did not fully account for these differences [5]. Potential explanations for an ethnic minority mental health advantage have been more commonly explored within the Indian group though advantages have been confined to a lower prevalence of externalising problems such as hyperactivity and behavioural issues [38]. Nevertheless, the Indian advantage has been associated with two factors which may be related to both the Bangladeshi and Black African adolescents in this study. First, a higher prevalence of two parent families was observed for Indian adolescents intimating a role for the family unit [38]. So it is therefore of note that Bangladeshi participation, and to a lesser extent Black African participation at baseline, in family activities such as regular evening meals, parental support for school work and the family social support were the factors most strongly prospectively associated with depression and well-being in this investigation. This suggests that these adolescents may be especially sensitive to differences in family life and support and could be particularly vulnerable when support levels are low. This vulnerability may be exacerbated particularly within Bangladeshi adolescents where the family norm is high cohesion thus low support may indicate dysfunctional families. Second, Indian mental health advantage has been associated with greater academic ability [38]. Most recent data from the English National Pupil Database shows that Bangladeshi and Black African academic performance is currently significantly above that of the White UK comparison group and is comparable to that of Indian adolescents [39]. There is a possibility of a period effect whereby current attainment data contrasts with trends in attainment data used in previous investigations into ethnic differences in mental health [3,2]. It is possible that such differences in academic ability, shown to influence mental health in other ethnic groups, has contributed to the Bangladeshi and Black African adolescents’ mental health advantage over their White UK counterparts. This academic period effect might be explained through demographic differences with earlier studies. A greater proportion of the ORiEL study’s Bangladeshi population was born in the UK or lived most of their life within the UK than was observed in the earlier RELACHS cohort. The higher educational attainment may be a consequence of a greater familiarity with the English schools environment and a greater likelihood of proficiency in English due to being UK born or having longer duration of residency. This investigation did not have access to attainment records and this hypothesis cannot be confirmed at this stage. Therefore the explanation for the Black African and Bangladeshi adolescent advantage in well-being and comparable levels of depression compared to White UK adolescents is an area for future investigation.

This study also identified relative mental health disadvantages as well as advantages. The greater vulnerability to depression and lower well-being for the White UK group requires consideration. One possible reason may be that the White UK group do not access alternative forms of protective social support which may protect against depression or lower well-being and which are available to other ethnic groups. For instance, traditional friendship groups are protective for Bangladeshi adolescents, albeit weakly in this study, but have shown to be significantly so in higher powered analysis [4]. Due to the White UK position as the majority ethnic group it may be that this potentially protective resource is not as applicable to the White UK group. Furthermore nationally representative data highlights that White UK adolescents are the lowest performing ethnic group educationally [39] suggesting further investigation of the association between school performance and mental health. Given also that low parental support for school work was highly correlated with depressive symptoms and well-being, schools based interventions could be a potential means for improving mental health in this group. But it does appear that whichever reason is responsible for the differences in well-being and depression between ethnic groups, these are not fully explained by social support irrespective of its source among this age group.

*Strengths and limitations*

A major strength of this study is the prospective design which allowed us to test the effect of social support in early adolescence on later life mental health. A further strength of this approach is use of population based sampling which avoids ethnic biases inherent in previous adolescent prevalence estimates based upon contact with mental health services [40,41]. For example, earlier studies describe ethnic variation in rates of admission and diagnosis where Black and Asian adolescents with psychosis in particular were more likely to be admitted, which is consistent with findings in adult populations describing differentials in pathways to care [42]. Though the pseudo-anonymised questionnaire in this study is equipped to capture undiagnosed cases though self-completion, we cannot exclude the possibility of social desirability biases. The ORiEL study builds upon previous studies by disaggregating the ‘Black’ group into the more refined Black African group thereby identifying differing levels of depression, well-being and levels of social support and socioeconomic backgrounds within this more specific group. Lastly, although the mental health scales used have been successfully administered across a range of ethnic groups and contexts there is still the possibility that the item responses may be interpreted differently between ethnic groups in this study. Relatedly, the lower response rates for the social support questions could suggest a response bias. However, these items were positioned at the end of the questionnaire which was completed during a specified time period at school and are therefore a consequence of non-completion as opposed to active non-response. Sensitivity analysis further suggests that missing data was not significantly different from that observed.

*Conclusion*

This study suggests that Black African and Bangladeshi adolescents may have a mental health advantage over their White UK counterparts in terms of well-being but not depressive symptoms. This advantage was slightly moderated by parental support for school work suggesting that these families and parents may require assistance in encouraging and supporting children in the early years of adolescence. The reasons for lower well-being in White UK adolescents require further explanation in order to identify possible interventions to improve their mental health.

Table 1: Socio-demographic, social support and mental health characteristics of the ORiEL imputed analytic cohort by ethnic group

|  |  |  |  |
| --- | --- | --- | --- |
|  | **White UK (%)** | **Bangladeshi (%)** | **Black African (%)** |
| ***N*** | *(380)* | *(337)* | *(249)* |
| **Gender** |  |  |  |
| Male | 55.3 | 63.5\* | 59.8 |
| *% data missing* | *0.0* | *0.0* | *0.0* |
| **Family affluence category** |  |  |  |
| High | 41.9 | 25.3\*\*\* | 33.0\*\*\* |
| Moderate | 46.4 | 62.5\*\*\* | 58.0\*\* |
| Low | 11.7 | 12.2 | 9.0 |
| *% data missing* | *4.3* | *3.5* | *6.4* |
| **Nativity** |  |  |  |
| UK Born | 99.2 | 88.6\*\*\* | 64.4\*\*\* |
| *% data missing* | *0.5* | *2.2* | *4.1* |
| **Duration of residence** |  |  |  |
| Over 10 years | 98.2 | 92.4\*\*\* | 65.5\*\*\* |
| 6-10 years | 1.6 | 3.4 | 16.0\*\*\* |
| 0-5 years | 0.3 | 4.2\*\*\* | 18.4\*\*\* |
| *% data missing* | *0.2* | *1.9* | *3.0* |
| **Friendship choices** |  |  |  |
| Integrated | 37.3 | 32.8 | 34.6 |
| Assimilated | 17.2 | 11.7 | 20.3 |
| Traditional | 23.2 | 41.6\*\*\* | 17.9 |
| Marginalised | 22.3 | 13.8\* | 27.2 |
| *% data missing* | *40.7* | *30.0* | *53.0* |
| **Total social support score** |  |  |  |
| Lowest tertile | 31.0 | 35.3 | 33.6 |
| *% data missing* | *43.1* | *34.1* | *56.4* |
| **Family domain score** |  |  |  |
| Lowest tertile | 29.8 | 32.3 | 33.9 |
| *% data missing* | *40.5* | *30.5* | *53.8* |
| **Friends domain score** |  |  |  |
| Lowest tertile | 32.1 | 30.9 | 35.5 |
| *% data missing* | *42.4* | *30.6* | *52.3* |
| **Significant person domain score** |  |  |  |
| Lowest tertile | 30.8 | 40.5\* | 33.2 |
| *% data missing* | *41.2* | *29.7* | *52.3* |
| **Eats family evening meals** |  |  |  |
| Fewer than 6-7 days/week | 24.4 | 46.6\*\*\* | 36.1\*\*\* |
| *% data missing* | *41.2* | *32.1* | *53.8* |
| **Parental support score** |  |  |  |
| Low (vs High) | 24.3 | 24.7 | 28.2 |
| *% data missing* | *33.3* | *22.6* | *42.4* |
| **SMFQ score** |  |  |  |
| Depressive symptoms >=8 | 26.6 | 22.7 | 21.4 |
| *% data missing* | *6.0* | *4.6* | *10.9* |
|  |  |  |  |
| **Mean WEMWBS score** | 49.8 | 51.8\*\* | 53.3\*\*\* |
| *% data missing* | *2.9* | *1.9* | *4.6* |

Notes: Results presented are for the imputed sample; SMFQ: Short Moods and Feelings Questionnaire; WEMWBS: Warwick-Edinburgh Mental Well-Being Scale

\* = significantly different to the White UK group: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Table 2: Odds ratios for depressive symptoms by social support and ethnicity adjusted for socio-demographic factors

|  |  |  |  |
| --- | --- | --- | --- |
|  | **White UK (N=380) a** | **Bangladeshi (N=337) a** | **Black African (N=249) a** |
| **Total social support score** |  |  |  |
| High† | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Moderate | 2.05 [0.99,4.24] | 0.97 [0.45,2.09] | 1.10 [0.42,2.85] |
| Low | 1.81 [0.89,3.67] | 1.80 [0.84,3.83] | 1.60 [0.63,4.05] |
|  |  |  |  |
| **Family support** |  |  |  |
| High† | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Moderate | 1.50 [0.72,3.13] | 1.06 [0.47,2.37] | 1.27 [0.49,3.33] |
| Low | 2.08\* [1.03,4.19] | 2.38\* [1.12,5.03] | 1.51 [0.64,3.59] |
|  |  |  |  |
| **Friends support** |  |  |  |
| High† | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Moderate | 1.07 [0.53,2.16] | 1.04 [0.48,2.24] | 1.00 [0.36,2.82] |
| Low | 1.71 [0.86,3.43] | 1.80 [0.84,3.84] | 1.83 [0.70,4.77] |
|  |  |  |  |
| **Significant other support** |  |  |  |
| High† | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Moderate | 1.38 [0.69,2.73] | 0.97 [0.45,2.11] | 0.85 [0.32,2.26] |
| Low | 1.13 [0.55,2.34] | 1.26 [0.60,2.62] | 1.32 [0.52,3.36] |
|  |  |  |  |
| **Parental support** |  |  |  |
| High† | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Low | 1.76 [0.95,3.25] | 2.06\* [1.05,4.04] | 1.76 [0.80,3.86] |
|  |  |  |  |
| **Eats family evening meals** |  |  |  |
| 6 to 7 days/week † | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Fewer than 6 days/week | 1.50 [0.82,2.74] | 2.51\* [1.31,4.81] | 1.47 [0.65,3.35] |
|  |  |  |  |
| **Friendship choices** |  |  |  |
| Integrated † | 1 [1.00,1.00] | 1 [1.00,1.00] | 1 [1.00,1.00] |
| Assimilated | 1.70 [0.76,3.80] | 0.72 [0.25,2.04] | 1.44 [0.45,4.63] |
| Traditional | 0.90 [0.40,2.02] | 0.66 [0.31,1.40] | 1.50 [0.47,4.80] |
| Marginalised | 1.38 [0.66,2.86] | 1.19 [0.48,2.95] | 2.10 [0.75,5.89] |

*Notes:* a adjusted for age in months, gender, nativity, length of residence in the UK, family affluence and baseline risk of depression; \* p<0.05; † reference group

Table 3: Difference in mean WEMWBS scores by social support and ethnicity

|  |  |  |  |
| --- | --- | --- | --- |
|  | **White UK (N=380) a** | **Bangladeshi (N=337) a** | **Black African (N=249) a** |
| **Total social support score** |  |  |  |
| High† | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Moderate | -3.66\* [-6.31,-1.01] | -1.22 [-3.97,1.53] | -2.53 [-6.10,1.03] |
| Low | -5.12\* [-7.66,-2.57] | -4.08\* [-6.79,-1.37] | -5.23\* [-8.73,-1.73] |
|  |  |  |  |
| **Family support** |  |  |  |
| High† | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Moderate | -3.30\* [-5.97,-0.62] | -2.53 [-5.21,0.15] | -4.13\* [-7.77,-0.49] |
| Low | -5.29\* [-7.82,-2.76] | -4.65\* [-7.37,-1.93] | -5.27\* [-8.78,-1.76] |
|  |  |  |  |
| **Friends support** |  |  |  |
| High† | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Moderate | -2.11 [-4.80,0.59] | -2.00 [-4.87,0.87] | -1.08 [-4.93,2.78] |
| Low | -3.79\* [-6.36,-1.22] | -4.08\* [-7.04,-1.12] | -4.09\* [-7.69,-0.48] |
|  |  |  |  |
| **Significant other support** |  |  |  |
| High† | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Moderate | -2.37 [-4.92,0.18] | -1.95 [-4.85,0.95] | -1.96 [-5.70,1.77] |
| Low | -3.65\* [-6.29,-1.01] | -3.30\* [-6.09,-0.51] | -4.66\* [-8.36,-0.96] |
|  |  |  |  |
| **Parental support** |  |  |  |
| High† | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Low | -3.22\* [-5.75,-0.69] | -2.62\* [-5.23,-0.01] | -5.06\* [-8.28,-1.84] |
|  |  |  |  |
| **Eats family evening meals** |  |  |  |
| 6 to 7 days/week † | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Fewer than 6 days/week | -2.06 [-4.83,0.71] | -3.41\* [-5.67,-1.15] | -2.29 [-5.37,0.80] |
|  |  |  |  |
| **Friendship choices** |  |  |  |
| Integrated † | 0 [0.00,0.00] | 0 [0.00,0.00] | 0 [0.00,0.00] |
| Assimilated | -2.85 [-5.89,0.19] | 0.29 [-3.53,4.12] | 0.09 [-4.12,4.30] |
| Traditional | -3.62\* [-6.44,-0.81] | -0.39 [-3.18,2.40] | -1.92 [-6.56,2.73] |
| Marginalised | -2.42 [-5.45,0.61] | -1.54 [-5.27,2.19] | -2.39 [-6.11,1.33] |

*Notes:* a adjusted for age in months, gender, nativity, length of residence in the UK, family affluence; \* p<0.05; † reference group

Table 4: Odds of depressive symptoms in Bangladeshi and Black African ethnic groups compared to White UK adjusted stepwise for socio-demographic factors, social support, family activity, parental support and friendship choices.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **White UK *(N=380)*** † | **Bangladeshi *(N=337)*** | **Black African *(N=249)*** |
| **Model 1** | 1 | 0.91 [0.63,1.31] | 0.79 [0.52,1.19] |
| **Model 2** | 1 | 1.01 [0.68,1.49] | 0.87 [0.54,1.40] |
| **Model 3** | 1 | 1.04 [0.70,1.55] | 0.84 [0.52,1.36] |
| **Model 4** | 1 | 1.04 [0.69,1.55] | 0.83 [0.51,1.35] |
| **Model 5** | 1 | 0.96 [0.63,1.45] | 0.80 [0.49,1.30] |
| **Model 6** | 1 | 1.03 [0.67,1.58] | 0.78 [0.48,1.27] |

*Notes:* \* p<0.05; † reference group

Model 1 adjusted for baseline risk; Model 2+age, gender, FAS, country of birth & length of residence; Model 3+ social support domains; Model 4+family meals; Model 5+parental school support; Model 6+friendship choices.

Table 5: Differences in mean WEMWBS scores in Bangladeshi and Black African ethnic groups compared to White UK adjusted stepwise for socio-demographic factors, social support, family activity, parental support and friendship choices

|  |  |  |  |
| --- | --- | --- | --- |
|  | **White UK *(N=380)*** † | **Bangladeshi *(N=337)*** | **Black African *(N=249)*** |
| **Model 1** | 1 | 1.76\* [0.37,3.16] | 2.90\*\*\* [1.39,4.42] |
| **Model 2** | 1 | 1.27 [-0.15,2.70] | 2.25\*\* [0.58,3.93] |
| **Model 3** | 1 | 1.29 [-0.13,2.72] | 2.46\*\* [0.78,4.14] |
| **Model 4** | 1 | 1.29 [-0.13,2.72] | 2.53\*\* [0.84,4.21] |
| **Model 5** | 1 | 1.58\* [0.12,3.04] | 2.65\*\* [0.96,4.34] |
| **Model 6** | 1 | 1.60\* [0.11,3.08] | 2.66\*\* [0.96,4.35] |

*Notes:* \* p<0.05; † reference group

Model 1 adjusted for baseline score; Model 2+age, gender, FAS, country of birth & length of residence; Model 3+ social support domains; Model 4+family meals; Model 5+parental school support; Model 6+friendship choices.

**Ethical standards**

The study has approval from Queen Mary University of London Ethics Committee (QMREC2011/40), the Association of Directors of Children’s Services (RGE110927) and the London Boroughs Research Governance Framework (CERGF113). Parent/carer consent for their child’s participation was obtained passively one week prior to the survey visit. Adolescents provided their written assent immediately before completing their questionnaire and were presented with the opportunity to opt out at any time at any time.

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1. Health Select Committee (2014) Children's and adolescents' mental health and CAMHS. Stationery Office, London

2. Green H, McGinnity A, Meltzer H, Ford T, Goodman R (2005) Mental health of children and young people in Great Britain, 2004. Palgrave Macmillan Basingstoke,

3. Goodman A, Patel V, Leon DA (2008) Child mental health differences amongst ethnic groups in Britain: a systematic review. BMC Public Health 8 (1):258

4. Bhui KS, Lenguerrand E, Maynard MJ, Stansfeld SA, Harding S (2012) Does cultural integration explain a mental health advantage for adolescents? International Journal of Epidemiology

5. Khatib Y, Bhui K, Stansfeld SA (2013) Does social support protect against depression & psychological distress? Findings from the RELACHS study of East London adolescents. Journal of adolescence 36 (2):393-402

6. World Health Organisation (2014) Health for the World’s Adolescents – a second chance in the second decade. WHO, Geneva

7. Kessler RC, McLeod JD (1985) Social support and mental health in community samples. Academic Press,

8. Cohen S, Wills TA (1985) Stress, social support, and the buffering hypothesis. Psychological bulletin 98 (2):310

9. Stansfeld SA (2006) Social Support and Social Cohesion. In: Wilkinson R, Marmot M (eds). Oxford : Oxford University Press, pp 148-171

10. Brown GW, Harris TO (1979) Social origins of depression : a study of psychiatric disorder in women. Social Science paperback ; 192. London : Tavistock Publications,

11. Stice E, Ragan J, Randall P (2004) Prospective relations between social support and depression: Differential direction of effects for parent and peer support? Journal of abnormal psychology 113 (1):155

12. Stansfeld SA, Sproston K (2002) Social Support and Networks. In: Sproston K, Nazroo J (eds) Ethnic minority psychiatric illness rates in the community (EMPIRIC).

13. Klineberg E, Clark C, Bhui KS, Haines MM, Viner RM, Head J, Woodley-Jones D, Stansfeld SA (2006) Social support, ethnicity and mental health in adolescents. Social Psychiatry and Psychiatric Epidemiology 41 (9):755-760

14. Maynard M, Harding S (2010) Ethnic differences in psychological well-being in adolescence in the context of time spent in family activities. Social Psychiatry and Psychiatric Epidemiology 45 (1):115-123. doi:<http://dx.doi.org/10.1007/s00127-009-0047-z>

15. Ranganathan M, Bhopal R (2006) Exclusion and inclusion of nonwhite ethnic minority groups in 72 North American and European cardiovascular cohort studies. PLoS Medicine 3 (3):e44

16. Smith NR, Clark C, Fahy AE, Tharmaratnam V, Lewis DJ, Thompson C, Renton A, Moore DG, Bhui KS, Taylor SJC, Eldridge S, Petticrew M, Greenhalgh T, Stansfeld SA, Cummins S (2012) The Olympic Regeneration in East London (ORiEL) study: protocol for a prospective controlled quasi-experiment to evaluate the impact of urban regeneration on young people and their families. BMJ open 2 (4)

17. McLennan D, Barnes H, Noble M, Davies J, Garratt E, Dibben C (2011) The English indices of deprivation 2010. London: Department for Communities and Local Government

18. Office for National Statistics (2013) 2011 Census: QS211EW Ethnic group (detailed), local authorities in England and Wales.

19. Smith NR, Lewis DJ, Fahy A, Eldridge S, Taylor SJC, Moore DG, Clark C, Stansfeld SA, Cummins S (2015) Individual socio-demographic factors and perceptions of the environment as determinants of inequalities in adolescent physical and psychological health: the Olympic Regeneration in East London (ORiEL) study. Bmc Public Health 15. doi:<http://dx.doi.org/10.1186/s12889-015-1459-1>

20. Department for Education (2013) National Pupil Database, Key Stage 2, Tier 4, 2002-2013: Secure Access [computer file]. UK Data Archive. doi:<http://dx.doi.org/10.5255/UKDA-SN-7626-1>

21. Office for National Statistics (2011) Office for National Statistics: 2011 Census Questionnaire Content for England. <http://wwwonsgovuk/ons/guide-method/census/2011/the-2011-census/2011-census-questionnaire-content/2011-census-questionnaire-for-englandpdf>

22. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S, Parkinson J, Secker J, Stewart-Brown S (2007) The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. Health and Quality of Life Outcomes 5 (1):63

23. Clarke A, Friede T, Putz R, Ashdown J, Martin S, Blake A, Adi Y, Parkinson J, Flynn P, Platt S (2011) Warwick-Edinburgh Mental Well-being Scale (WEMWBS): Validated for teenage school students in England and Scotland. A mixed methods assessment. BMC Public Health 11:487

24. Stewart-Brown SL, Platt S, Tennant A, Maheswaran H, Parkinson J, Weich S, Tennant R, Taggart F, Clarke A (2011) The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): a valid and reliable tool for measuring mental well-being in diverse populations and projects. Journal of Epidemiology and Community Health 65 (Suppl 2):A38-A39

25. NatCen Social Research, University College London (1991-2012) Health Survey for England, 1991-2012. ESDS Government, University of Manchester,

26. Angold A, Costello EJ, Messer SC, Pickles A, Winder F, Silver D (1995) Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. International Journal of Methods in Psychiatric Research 5 (4):237-249

27. Rothon C, Stansfeld SA, Mathews C, Kleinhans A, Clark C, Lund C, Flisher AJ (2011) Reliability of self report questionnaires for epidemiological investigations of adolescent mental health in Cape Town, South Africa. Journal of Child & Adolescent Mental Health 23 (2):119-128

28. Banh M, Crane P, Rhew I, Gudmundsen G, Stoep A, Lyon A, McCauley E (2012) Measurement Equivalence Across Racial/Ethnic Groups of the Mood and Feelings Questionnaire for Childhood Depression. J Abnorm Child Psychol 40 (3):353-367. doi:10.1007/s10802-011-9569-4

29. Zimet GD, Powell SS, Farley GK, Werkman S, Berkoff KA (1990) Psychometric characteristics of the multidimensional scale of perceived social support. Journal of personality assessment 55 (3-4):610-617

30. Canty-Mitchell J, Zimet G (2000) Psychometric Properties of the Multidimensional Scale of Perceived Social Support in Urban Adolescents. Am J Community Psychol 28 (3):391-400. doi:10.1023/A:1005109522457

31. Bhui K, Lawrence A, Klineberg E, Woodley-Jones D, Taylor S, Stansfeld S, Viner R, Booy R (2005) Acculturation and health status among African-Caribbean, Bangladeshi and White British adolescents--validation and findings from the RELACHS study. SocPsychiatry Psychiatr Epidemiol 40 (4):259-266

32. Berry JW (2005) Acculturation: Living successfully in two cultures. International Journal of Intercultural Relations 29 (6):697-712

33. Boyce W, Torsheim T, Currie C, Zambon A (2006) The family affluence scale as a measure of national wealth: Validation of an adolescent self-report measure. Social Indicators Research 78 (3):473-487

34. Currie C, Molcho M, Boyce W, Holstein B, Torsheim T, Richter M (2008) Researching health inequalities in adolescents: The development of the Health Behaviour in School-Aged Children (HBSC) Family Affluence Scale. Social Science & Medicine 66 (6):1429-1436

35. Little RJ, Rubin DB (2014) Statistical analysis with missing data. John Wiley & Sons,

36. Carpenter JR, Kenward MG, White IR (2007) Sensitivity analysis after multiple imputation under missing at random: a weighting approach. Statistical Methods in Medical Research 16 (3):259-275. doi:10.1177/0962280206075303

37. Viner RM, Ross D, Hardy R, Kuh D, Power C, Johnson A, Wellings K, McCambridge J, Cole TJ, Kelly Y, Batty GD (2015) Life course epidemiology: recognising the importance of adolescence. Journal of Epidemiology and Community Health. doi:10.1136/jech-2014-205300

38. Goodman A, Patel V, Leon DA (2010) Why do British Indian children have an apparent mental health advantage? Journal of Child Psychology and Psychiatry 51 (10):1171-1183. doi:10.1111/j.1469-7610.2010.02260.x

39. Burgess S (2014) Understanding the success of London's schools <http://www.bristol.ac.uk/media-library/sites/cmpo/migrated/documents/wp333.pdf> 03/03/2015. University of Bristol, Bristol

40. Corrigall R, Bhugra D (2013) The role of ethnicity and diagnosis in rates of adolescent psychiatric admission and compulsory detention: a longitudinal case-note study. Journal of the Royal Society of Medicine 106 (5):190-195. doi:10.1177/0141076813480995

41. Messent P, Murrell M (2003) Research leading to action: a study of accessibility of a CAMH service to ethnic minority families. Child and Adolescent mental health 8 (3):118-124

42. Bhui K, Stansfeld S, Hull S, Priebe S, Mole F, Feder G (2003) Ethnic variations in pathways to and use of specialist mental health services in the UK Systematic review. The British Journal of Psychiatry 182 (2):105-116