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Brief report

Family environment of bipolar families: A UK study

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ABSTRACT

Background: Aspects of family environment (FE) such as family support, organisational structure and levels of conflict can increase risk of Bipolar Disorder (BD) in offspring of BD parents.
Methods: The family environment of 16 BD and 23 healthy control (HC) families was assessed using the Family Environment Scale (FES). Canonical Correspondence Analysis (CCA) was used to determine the degree of variation in scores on the FES dimensions within each family and a Generalised Linear Modelling (GLM) approach was used to investigate the extent to which scores on the different FES dimensions differed between families.
Results: On the FES, BD families experienced an environment with higher levels of conflict and lower levels of expressiveness, organisation, intellectual–cultural orientation and active–recreational orientation than healthy control families. Differences in FES scores were driven by presence of parental BD and total number of children in the family. However, socio-economic status (SES) was not found to have an effect in this study.
Limitations: As an American instrument the FES may not have been sensitive enough to the cultural context of a UK sample. The relatively small sample size used may have limited the statistical power of the study.
Conclusions: Greater numbers of children have the same effect on levels of conflict as the presence of BD, while SES does not appear to be as important a factor in FE as previously thought. Our results suggest that family based interventions focusing on psychoeducation and improved communication within these families may address issues of conflict, organisation and expressiveness.

1. Introduction

Bipolar Disorder (BD) is a mood disorder characterised by episodes of mania and depression, affecting up to 1.5% of the UK population (Jones and Bentall, 2008) and rated by the WHO in 1990 as the sixth leading cause of Disability Adjusted Life Years (Woods, 2006). Offspring of Bipolar Parents (OBP) have a greater risk of developing psychopathology (Birmaher et al., 2009; Duffy et al., 2007; Mesman et al., 2013; Vandeleur et al., 2012; Garcia-Amador et al., 2012), particularly anxiety and affective disorders (in particular BD), compared to the general population (Mesman et al., 2013; Duffy et al., 2011). Research has shown genetic factors to be key in the development of BD (Roybal et al., 2012). However, as with other neurodevelopmental disorders, development of BD is probably due to an interaction between genetic predisposition and environmental risk factors (Craddock and Sklar, 2013).

Family environment (FE) has been shown to play a role in the development of many disorders in at risk children. For example, high levels of family conflict are associated with more symptoms of depression in adolescents (Sheeber et al., 1997) and increased risk of substance use disorder (Skeer et al., 2009). High levels of expressed emotion have been linked with longer depressive episodes, greater manic and depressive symptomatology at follow up and greater risk of relapse (Belardinelli et al., 2008). For OBP, the effects of FE have been shown to include increased risk of BD with features such as family support, organisational structure and levels of conflict thought to have a significant contribution (Ostiguy et al., 2009). FE is widely examined using the Family Environment Scale (FES) – a questionnaire which assesses perceptions of family functioning and the relationship between the family and the wider social context (Moos and Moos, 1994).

Chang et al. (2001) used the FES to examine FE in families where at least one parent had BD in the USA. Lower levels of cohesion and organisation, and higher levels of conflict were reported in the BD families compared to normative data. However, by using normative data rather than matched healthy controls (HC), external mediating factors could not be ruled out in that

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study (Romero et al., 2005). In another study, Romero et al. (2005) compared FES scores of BD and HC families matched on socioeconomic status. BD families reported lower cohesion and expressiveness compared to matched HC families, however this study did not replicate the finding of higher levels of conflict in BD families as reported by Chang et al. (2001). These studies have helped considerably in understanding the FE in families with BD, however they have not studied other factors which in addition to parental BD status could have contributed to the variance of FE scores in the families such as family size and SocioEconomic Status (SES).

To our knowledge this is the first study in the UK examining the FE in families where at least one parent has BDI. Furthermore, this study addresses the issue of studying the FES profile of these families as a function of family related and FES covariates, such as SES and number of children in the family.

2. Method

The study took place at Newcastle University in the North East of England and received funding from the Research & Clinical Effectiveness Department of Northumberland, Tyne and Wear NHS Foundation Trust. Ethical approval was obtained from Northumberland NHS Research Ethics Committee (ref 08/40902/12).

2.1. Participants

2.1.1. Test group

The test group consisted of 16 families with one parent who had a DSM IV diagnosis of Bipolar I Disorder (BDI). Consultant Psychiatrists working within Adult Mental Health Teams in the North East of England were approached to help identify adults with BDI who had biological offspring living with them in the age range of 6–14. The Consultant Psychiatrists briefly discussed the project with the parent with BDI. Written information sheets (adult version for parent with BDI and child version for their OBP) and an 'Expression of Interest Form' were given at this meeting. Families contacted the research team using contact details (telephone, email, post) provided on the Expression of Interest Form.

2.1.2. Control group

The control group consisted of 23 families who had no personal or family history of psychiatric disorder. The research team advertised the study through various primary and secondary schools in the North East of England to get a representative matched sample. All families received information sheets (adult version and child version) and an 'Expression of Interest Form'. Families contacted the research team using contact details (telephone, email, post) provided on the Expression of Interest Form.

Once the test/control families contacted the research team to express an interest to participate in the study they were screened them to make sure they fulfilled the inclusion/exclusion criteria. Written informed consent from the parent and assent from any child 10 years or older participating in the study was taken.

Inclusion criteria common to both groups were no current substance abuse by the respondent and fluency in English. Demographic data are shown in Table 1. Groups were matched on socioeconomic class (Hollingshead scale) (Hollingshead and Redlich, 2007) and total number of children in the family. The parent with BD was female in 15 of the 16 families.

2.2. Assessment

Parents with BDI were screened using the Structured Clinical Interview for DSM-IV Disorders (SCID) (First et al., 2002) to confirm diagnosis of BD. Control participants were interviewed to exclude family and personal history of psychiatric disorders. Participants completed Form R of the FES (Moos and Moos, 1994) which examines the current FE in a 90 item true/false self report questionnaire. The FES has 10 sub-scales measuring 3 underlying dimensions of the family environment: Family Relationship, Personal Growth, System Maintenance and Change. The 10 sub-scales include cohesion, expressiveness, conflict, independence, achievement orientation, intellectual–cultural orientation, active–recreational orientation, moral–religious emphasis, organisation and control. The R form took each parent approximately fifteen to twenty minutes to complete. Normative, validity and reliability data are reported elsewhere (Moos and Moos, 1994).

Table 1
Demographic characteristics of BD and HC families.

	BD families ($n=16$)	HC families ($n=23$)
Mean no. of children (SD)	2.25 (1.2)	2.39 (0.9)
No. of children with psychopathology	4[a]	0
Socioeconomic status (1=highest earning, 4=lowest earning)		
1	0 (0%)	1 (4.35%)
2	5 (31.25%)	8 (34.78%)
3	9 (56.25%)	11 (47.82%)
4	2 (12.5%)	3 (13.05%)
Marital status		
Never married	1 (6.25%)	0 (0%)
Married/cohabiting	9 (56.25%)	20 (87%)
Divorced/separated	6 (37.5%)	3 (13%)
Educational level		
GCSE	3 (18.75%)	1 (4.3%)
A level	4 (25%)	3 (13%)
Foundation degree or equivalent	4 (25%)	6 (26.1%)
Undergraduate degree	3 (18.75%)	6 (26.1%)
Graduate degree	2 (12.5%)	7 (30.5%)

[a] 1 child=BDII and PDD, 1=Depression, 1=ADHD and ASD, 1=Asperger's.

3. Data analysis

Exploratory data analysis was conducted using Canonical Correspondence Analysis (CCA) in R2.8 to examine variation in FES scores for each family. CCA is a form of multivariate data analysis which does not require normally distributed data and takes a reductionist approach toward complex data in order to distinguish patterns and structures that might be missed using more common analytical methods. CCA was used here to determine the degree of variation in scores on the FES dimensions within each family as a function of SES, bipolarity, and total number of children. Confirmatory data analysis was undertaken using a Generalised Linear Modelling (GLM) approach incorporating a Poisson error structure to investigate the extent to which scores on the different FES dimensions differed between families. SES, presence of BD, and total number of children in the family were included in the model as covariates.

4. Results

Table 2 represents the differences between mean standard scores on the 10 FES dimensions between the BD and HC groups.

The proportion of the variation explained in the CCAs by SES, presence of bipolar and total number of children in the family equated to 0.1538. A permutation test was used to explore the significance of each covariate within the model. Presence of BD in the parent ($F=7.62$, $p=0.01$) and total number of children in the family ($F=4.18$, $p=0.01$) were found to be significant covariates.