

## Original Research Article

# A study to assess the magnitude of various minor physical anomalies in bipolar disorders and to compare them between bipolar disorder patients and their first degree relatives

Abhinav Pandey<sup>1</sup>, Haseeb Khan<sup>1\*</sup>, Dinesh M. S. Rathore<sup>2</sup>

<sup>1</sup>Department of Psychiatry, Hind Institute of Medical Sciences, Safedabad, Barabanki, Uttar Pradesh, India

<sup>2</sup>Department of Psychiatry, Institute of Mental Health and Hospital, Agra, Uttar Pradesh, India

**Received:** 21 August 2019

**Revised:** 01 September 2019

**Accepted:** 27 September 2019

### \*Correspondence:

Dr. Haseeb Khan,

E-mail: [khanhaseeb85@gmail.com](mailto:khanhaseeb85@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Bipolar disorder appears to be related to anatomic abnormalities in medial temporal lobe, in particular amygdala, prefrontal cortex and cerebellum. Two recent MRI findings have supported a neuro developmental etiology of bipolar disorders.

**Methods:** It was a cross-sectional comparative hospital based study. The subjects were recruited for the study by the purposive sampling technique. The study was conducted at the Institute of Mental Health and Hospital Mathura Road Agra. The study sample consisted of 20 bipolar disorder patients diagnosed as per ICD-10 DCR (WHO, 1992) criteria, 20 first degree relatives, one for each patient. Total sample size is 40.

**Results:** It was observed that in bipolar patients' maximum anomalies were seen in Mouth ( $0.35 \pm 0.48$ ) head ( $0.30 \pm 0.57$ ) followed by anomalies of eyes ( $0.25 \pm 0.55$ ) hand ( $0.20 \pm 0.41$ ) and ear ( $0.05 \pm 0.22$ ). It was observed that in Bipolar FDRs maximum anomalies were seen in mouth ( $0.20 \pm 0.04$ ) ear ( $0.15 \pm 0.45$ ) head ( $0.1 \pm 0.3$ ) and then anomalies of eye and hand in equal propensity ( $0.05 \pm 0.22$ ) and least anomalies in feet ( $0.00 \pm 0.00$ ).

**Conclusions:** The rate of MPAs in bipolar patients was more than their FDRs but not statically significant. Both sibling groups had fewer MPAs than the patients. When viewed within a vulnerability-stress model, the results are consistent with the theory that MPAs may reflect early, largely extra-genetic, stressful events.

**Keywords:** Bipolar disorder, Minor physical anomalies, Positive and negative syndrome scale, Waldrop scale

## INTRODUCTION

A Minor Physical Anomaly (MPA) is a slight physical defect, a deviation in appearance from essential physical characteristics.<sup>1</sup> Many different terms have been used in literature to describe MPA e.g. minor congenital anomalies, minor malformations.<sup>2</sup> Pinsky (1985) proposed the collective term Informative Morphogenetic Variant, but in psychiatric literature MPA is generally accepted.<sup>3</sup>

The abnormalities include "Electric hair", abnormal-sized head, epicanthus, hypertelorism, low-seated ear, adherent ear lobes, malformed or asymmetrical ears, furrowed tongue, single transverse palmer crease, syndactyly of the toes, gap between first and second toes etc. Most of these have been used in Waldrop scale for assessing minor physical anomalies.

Bipolar disorder appears to be related to anatomic abnormalities in medial temporal lobe, in particular amygdala, prefrontal cortex and cerebellum. Two recent

MRI findings have supported a neuro developmental etiology of bipolar disorders.

The bipolar disorder group had one anomaly: i.e. furrowed tongue that was found to be increased in relation to the controls. However, most of the other studies did not find any significant difference in MPAs in the bipolar and control groups.<sup>4,5</sup>

Though there have been a large number of studies on occurrence of minor physical anomalies in schizophrenia, supporting the neuro developmental hypothesis, there are only few studies regarding MPAs in affective illness particularly bipolar disorder.

The present study aims at evaluating the comparison between prevalence of minor physical anomalies in patients diagnosed with bipolar disorder and their first degree relatives thus attempting to explore the relevance of neurodevelopmental hypothesis regarding bipolar disorder.

## METHODS

Study design was a cross-sectional comparative hospital based study. The subjects were recruited for the study by the purposive sampling technique.

Study place and population was conducted at the Institute of mental health and hospital Mathura Road Agra. It is a tertiary referral center with bed strength of 800, and a postgraduate teaching hospital, which imparts training in psychiatry, clinical psychology, psychiatric social work and psychiatric nursing. The hospital has a wide catchments area which includes the states of Uttar Pradesh, Madhya Pradesh, Rajasthan, Haryana and Uttarakhand admitted as inpatients and diagnosed with schizophrenia. Study period was collected over a period of 12 months from 15<sup>th</sup> March 2009-14<sup>th</sup> March 2010. Sample size was 20 bipolar disorder patients diagnosed as per ICD-10 DCR (WHO, 1992) 6 criteria, 20 first degree relatives, one for each patient. Total sample size is 40.

### Inclusion criteria

#### Patients

- Inpatients/ Outpatients, male, 18-50 years of age.
- Diagnosis of Bipolar disorder according to WHO ICD-10 classification.<sup>6</sup>
- At least two episodes of illness including the present episode.
- Patients accompanied by first degree relatives.
- Informed consent.

#### First Degree Relatives

- If more than one FDR are available, then the one nearer to patient by age would be taken up for study. Preference - sibling > son > father.

### Exclusion criteria

#### Patients

- History of head trauma, major neurological disorder, or seizure disorder.
- Psychoactive substance dependence (except nicotine).
- Mental retardation.

#### First Degree Relatives

- Psychotic or affective disorder,
- Head trauma,
- Major neurological disorder or
- Seizure disorder.

### Procedure

Adult patients, their First Degree Relatives (FDRs) meeting their respective exclusion and inclusion criteria were taken up for the study. Detailed data was collected on the socio demographic and clinical data sheet designed for the purpose. All patients and their respective FDRs were assessed for minor physical anomalies with Waldrop scale and for bipolar disorder Young Mania Rating Scale (YMRS) were used.

#### Waldrop Physical Anomaly Scale (WPAS)<sup>7</sup>

It is a widely used standardized scoring system for the assessment of MPAs. The WPAS is a simple 5 to 10 minute examination for the assessment of 17 anomalous features of the head, eyes, ears, mouth, hands, and feet. It has a high inter rater reliability.

#### Young Mania Rating scale (YMRS)<sup>8</sup>

The YMRS is a widely used instrument to rate manic symptoms. It takes about 10-15 minutes to complete. Each of the 11 items in this scale is a key symptom of manic behavior. There are five severity steps for each item. The YMRS has three factors 1) thought disturbance, 2) aggressiveness over-activity and 3) elevated energy and mood. The scale appears to function over wide range of severity and is sensitive to differences in sample size similar to those found in treatment or biological studies. The scale is not intended to be used as a diagnostic instrument. The scale used to assess minor physical anomalies is the Waldrop scale used in majority of the earlier studies as it contains 18 items and therefore provides an opportunity for much more extensive assessment of minor physical anomalies.

### Analysis of data

Data was analyzed using standard statistical software package, SPSS 10.1. Descriptive statistics and inferential statistics, such as students t' test, independent t test was used. The level of significance (alpha) of 0.05 and 0.01

were adopted in the study. Chi-square test was used to ascertain group difference between categorical variables, students t' test was used in case of determining group difference of dimensional variables.

## RESULTS

Present study includes 20 bipolar disorder patients and 20 their first degree relatives. Bipolar disorder patients had a mean age of  $29.65 \pm 1.94$ , their first degree relatives had a mean age of 32.67 years ( $\pm 10.92$ ). Mean duration of illness of bipolar disorder patients was  $8.30 \pm 6.73$  years. Table 1 depicts the mean scores of various MPAs in patients of Bipolar disorder patients and their FDRs. It was observed that in bipolar patients' maximum anomalies were seen in Mouth ( $0.35 \pm 0.48$ ) head ( $0.30 \pm 0.57$ ) followed by anomalies of eyes ( $0.25 \pm 0.55$ ) hand ( $0.20 \pm 0.41$ ) and ear ( $0.05 \pm 0.22$ ). It was observed that in Bipolar FDRs maximum anomalies were

seen in mouth ( $0.20 \pm 0.04$ ) ear ( $0.15 \pm 0.45$ ) head ( $0.1 \pm 0.3$ ) and then anomalies of eye and hand in equal propensity ( $0.05 \pm 0.22$ ) and least anomalies in feet ( $0.00 \pm 0.00$ ).

**Table 1: Mean and S.D of various minor physical anomalies (MPA) across group.**

Mean and S.D of various minor physical anomalies (MPA) across group		
	Bipolar affective disorder	Bipolar FDR
MPA head	$0.30 \pm 0.57$	$0.10 \pm 0.30$
MPA eye	$0.25 \pm 0.55$	$0.05 \pm 0.22$
MPA ear	$0.05 \pm 0.22$	$0.15 \pm 0.48$
MPA mouth	$0.35 \pm 0.48$	$0.20 \pm 0.41$
MPA hand	$0.20 \pm 0.41$	$0.05 \pm 0.22$
MPA feet	$0.00 \pm 0.00$	$0.00 \pm 0.00$
Total	$1.00 \pm 0.72$	$0.55 \pm 0.60$

**Table 2: Comparison of MPA in bipolar disorder patients and their FDRs.**

Comparison of MPAs in bipolar disorder patients and their FDRs					
MPA	Patients and controls	N	Mean	Std. deviation	t value
Minor physical anomalies of head Waldrop score	bipolar patient	20	0.3000	0.57124	0.17
	bipolar control	20	0.1000	0.30779	
Minor physical anomalies of eye Waldrop score	bipolar patient	20	0.2500	0.55012	0.14
	bipolar control	20	0.0500	0.22361	
Minor physical anomalies of ear Waldrop score	bipolar patient	20	0.0500	0.22361	0.4
	bipolar control	20	0.1500	0.48936	
Minor physical anomalies of mouth Waldrop score	bipolar patient	20	0.3500	0.48936	0.13
	bipolar control	20	0.2000	0.41039	
Minor physical anomalies of hand Waldrop score	bipolar patient	20	0.2000	0.41039	0.15
	bipolar control	20	0.0500	0.22361	
Minor physical anomalies of feet Waldrop score	bipolar patient	20	0.0000	0.00000	--
	bipolar control	20	0.0000	0.00000	
Minor physical anomalies total Waldrop score	bipolar patient	20	1.0000	0.72548	0.40
	bipolar control	20	0.5500	0.60481	

Table 2 shows mean, standard deviation and t values of MPA in bipolar disorder patients and their FDRs, mean Waldrop score of head region in bipolar patients (0.30) which is more than their respective FDRs (0.10), high mean score of ear region in bipolar patients (0.25) compared to their FDRs (0.05) though not statistically significant, mean Waldrop ear score (0.05) less than their FDRs (0.15), mean Waldrop score of bipolar patients in mouth region (0.35) more than their FDRs (0.20), equal Waldrop score in bipolar patients hand region with their FDRs (0.05), equal score in feet region in both bipolar patients and their FDRs (0.00), total Waldrop score of bipolar patients (1.00) greater than their FDRs (0.55) which is not statically significant.

## DISCUSSION

The main objective of this study was to determine the prevalence of minor physical anomalies in bipolar disorder patients and compare the same with prevalence in first degree relatives of the patients in order to explore whether the neuro developmental hypothesis holds true for schizophrenia. First degree relatives were included in the study to see if there is any genetic explanation of occurrence of minor physical anomalies as has been suggested by earlier studies Ismail et al, Gourion et al.<sup>9,10</sup> In bipolar patients maximum anomalies were found in mouth region followed by head and eye region, this is similar to trixlers study which showed one anomaly, namely furrowed tongue was significantly higher in bipolar group than controls.<sup>11</sup>

The bipolar patient group contained more Minor Physical Anomalies (MPA) than FDRs though the result of our study was not statically significant. Very few studies have been conducted in this regard. Some like Lohr and Flynn, and Green et al, did not find any significant difference in the rate of MPAs in bipolar group from controls.<sup>12,13</sup> However the major difficulty in generalizing the findings however are the few number of studies done, including this study and small sample size in most of them. In spite of methodological limitations, the evidence for a higher rate of minor physical anomalies in bipolar disorder remains consistent and compelling, emphasizing the neuro developmental hypothesis to be true.

Authors results also show more anomalies in mouth region in FDRs of bipolar disorder as compared to schizophrenia FDRs and the result is statically significant though this is not supported by any studies in the past.

The difference between bipolar patients and their siblings did not reach significance (0.41), perhaps due to the limited power of the analyses or perhaps because the bipolar patients did not have extremely high rates of MPAs to begin with.

## CONCLUSION

The rate of MPAs in bipolar patients was more than their FDRs but not statically significant. Both sibling groups had fewer MPAs than the patients. When viewed within a vulnerability-stress model, the results are consistent with the theory that MPAs may reflect early, largely extra-genetic, stressful events.

## ACKNOWLEDGEMENTS

Authors would like to acknowledge Proffessor Sudhir Kumar, Dr. J.R. Kalra, Dr. Dinesh M.S. Rathore and Dr. Rakesh Jain for encouraging and guiding him in every step.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by Ethics Committee of Institute of Mental Health and Hospital, Agra*

## REFERENCES

1. Firestone P, Peters S, Rivier M, Knights RM. Minor physical anomalies in hyperactive, retarded and normal children and their families. J Child Psychol Psychiatr. 1978 Apr;19(2):155-60.
2. Pasamanick, B. and Rogers, M.E Lilienfeld AM. Pregnancy experiences in the development of behaviour disorders in children. Am J Psychiatr. 1956; 112:613-7.
3. Pinsky L. Informative morphogenetic variants. Minor congenital anomalies revisited. Is Rev Teratol. 1985;(3):135-70.
4. Firestone P, Peters S. Minor physical anomalies and behavior in children: a review. J Autism Development Disorders. 1983 Dec 1;13(4):411-25.
5. Firestone P, Prabhu AN. Minor physical anomalies and obstetrical complications: their relationship to hyperactive, psychoneurotic, and normal children and their families. J Abnormal Child Psychol. 1983 Jun 1;11(2):207-16.
6. World Health Organization: The ICD-10 classification of mental and behavioural disorders: diagnostic criteria for research. World Health Organization, Geneva, 1992 Available at: <https://www.who.int/classifications/icd/en/GRNBOOK.pdf>. Assessed on 31 August 2019.
7. Waldrop MF, Pedersen FA, Bell RQ. Minor physical anomalies and behaviour in preschool children. Child Develop. 1968 Jun 1:391-400.
8. Young RC, Biggs JT, Ziegler VE, Meyer DA. A rating scale for mania: reliability, validity and sensitivity. British J Psychiatr. 1978 Nov;133(5):429-35.
9. Ismail B, Cantor-Graae E, McNeil TF. Minor physical anomalies in schizophrenic patients and their siblings. Am J Psychiatr. 1998 Dec 1;155(12):1695-702.
10. Gourion D, Goldberger C, Bourdel MC, Bayle FJ, L  o H, Krebs MO. Minor physical anomalies in patients with schizophrenia and their parents: prevalence and pattern of craniofacial abnormalities. Psychiatry Resea. 2004 Jan 30;125(1):21-8.
11. Trixler M, Tenyi T, Cs  bi G, Szabo R. Minor physical anomalies in schizophrenia and bipolar affective disorder. Schizophr Resea. 2001 Dec 1;52(3):195-201.
12. Lohr JB, Flynn K. Minor physical anomalies in schizophrenia and mood disorders. Schizophr Bull. 1993;19:551-6.
13. Green MF, Satz P, Christenson C. Minor physical anomalies in schizophrenia patients, bipolar patients, and their siblings. Schizophr Bull. 1994 Jan 1;20(3):433-40.

**Cite this article as:** Pandey A, Khan H, Rathore DMS. A study to assess the magnitude of various minor physical anomalies in bipolar disorders and to compare them between bipolar disorder patients and their first degree relatives. Int J Adv Med 2019;6:1826-9.