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Original Article

Comparative Study of Minor Physical Anomalies in Schizophrenia

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Abstract

Background: Minor physical anomalies (MPAs) are mild clinically and cosmetically insignificant errors of morphogenesis which have a prenatal origin. The presence of MPAs in schizophrenia supports the neurodevelopmental hypothesis of schizophrenia.

Aim: The aim of this study is to find the prevalence of MPAs in patients with schizophrenia, to compare it with their first-degree relatives and general population as well as to assess its association with illness characteristics.

Materials and Methods: In total, 50 patients of schizophrenia diagnosed as per ICD-10 diagnostic criteria for research along with 50 unaffected first-degree relatives and 50 normal controls were selected. The Waldrop scale was used for assessment of MPAs.

Results: The Waldrop scores were higher in patients (48%) followed by relatives (28%) and controls (10%), with more anomalies in the head, eyes, ears, and feet.

Conclusion: MPAs can be considered as an endophenotype for schizophrenia which may be used for screening vulnerable individuals.

Key words: Minor physical anomalies, Schizophrenia, Waldrop

INTRODUCTION

Minor physical anomalies (MPAs) represent dysmorphic features reflecting subtle deviations in the early development of individual structures in the head, eyes, ears, mouth, hands, and feet.[1] They are morphological variants appearing during the first or second trimester of gestation without presenting a significant functional or cosmetic impact.[2,3] Once formed, these anomalies persist into adulthood and can be evaluated reliably through visual examination of the particular region of the body.[1]

MPAs involving the eyes, ears, mouth/palate/tongue, and limbs have been found to be consistently higher in patients with schizophrenia than in healthy individuals.[4] Increased frequency of these anomalies in patients with schizophrenia denotes a strong prenatal component in the development of the illness, thereby supporting the neurodevelopmental hypothesis of schizophrenia.[5] These anomalies also signify the neurodevelopmental vulnerability these individuals carry long before the onset of illness.

MPAs are suggested as an endophenotype on account of the findings that MPAs present more in patients than healthy controls and are state independent.

The more common appearance of these signs among the relatives of schizophrenia patients can confirm MPAs as intermediate phenotypes.[6] Very few studies in the Indian context have compared the presence of MPAs in schizophrenia patients, their first-degree relatives (FDRs) and controls.

Aim

This study aims to find the prevalence of MPAs in patients with schizophrenia, to compare it with their FDRs and

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general population as well as to assess its association with illness characteristics.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in Institute of Mental Health, Madras Medical College. A total of 50 patients who met the ICD-10 criteria for schizophrenia were selected. 50 FDRs of the patients selected were included in the study, and 50 age and sex-matched controls were selected randomly from the community as the participants of this current study. Patients were included in the study after obtaining Institutional Ethics Committee approval and informed consent from the patient's attender.

The participants in the schizophrenia group (Group 1) were in the age group 18-45 years. Patients with a history of substance use disorders, mood disorders, head injury, neurological disorders such as seizures and tics, those with IQ <90 and those belonging to the Mongoloid race were excluded from the study. Furthermore, patients with severe cognitive impairment and those uncooperative due to severe psychosis were excluded from the study.

Group 2 comprised FDRs of the patients with schizophrenia, belonging to the age group 18-45 years and who had given written informed consent. Relatives with a history of any prior psychiatric or major medical illness were excluded from the study.

The participants in the control group were in age group of 18-45 years; given written informed consent. People with a history of any psychiatric or major medical illness were excluded from the study.

The diagnosis of schizophrenia is ascertained on detailed clinical examination using ICD-10 diagnostic criteria for research. Schedules clinical assessment neuropsychiatry was administered to all the participants of the study to include only patients with schizophrenia and to rule out other comorbid mental disorders.

Semi-structured pro forma was used to collect information regarding sociodemographic characteristics and other related clinical information. Positive and negative syndrome scale was employed for assessing the severity of psychopathology symptoms in schizophrenia. The Waldrop scale was used for assessing the MPAs of all the participants. General health questionnaire-12 was used to screen the FDRs and controls for psychiatric disorder.

RESULTS

A total of 50 patients' data taken from three groups were analyzed. Mean ages of Group 1, 2 and 3 were 30.56+6.69 years, 31.18+7.70 years and 30.84+7.28 years respectively. No significant difference was found in the age distribution of the three groups. Other demographic profiles are provided in Table 1.

Among the patients, 74% were diagnosed as paranoid schizophrenia, 14% as disorganized, and 12% as undifferentiated schizophrenia. The prevalence of MPAs in schizophrenia patients was found to be around 48%, whereas it was 28% and 10% in the FDR and control group, respectively (Figure 1).

In schizophrenia patients with MPAs, 40% of patients had intercanthal distance greater than normal and 36% patients had fine electric hair (Table 2).

The comparison of the total Waldrop scores among the three groups showed a significant difference with the

Table 1: Sociodemographic profile of the study patients

Demographic characteristics	Group 1 (schizophrenia patients)	Group 2 (FDRs)	Control
Age (mean±SD)	30.56±6.69	31.18±7.70	30.84±7.28
Gender			
Male	24	26	25
Female	26	24	25
Marital status			
Married	30	27	25
Divorced	7	3	6
Unmarried	13	20	19
Employment			
Employed	33	42	44
Unemployed	17	8	6

SD: Standard deviation, FDRs: First-degree relatives

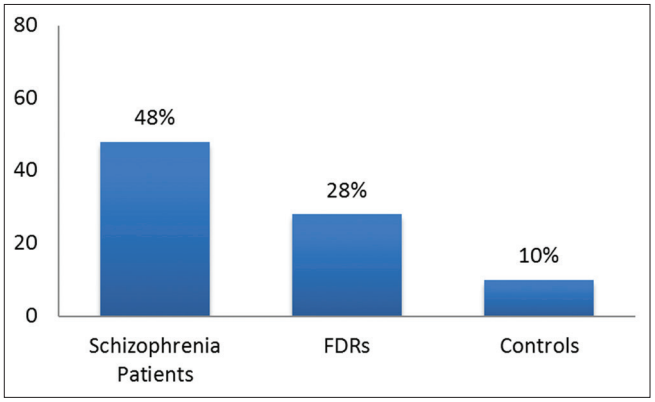

Figure 1: Prevalence of minor physical anomalies among the three groups

scores for the patient group being significantly higher followed by the FDR group and then the control group. The individual scores showed significant differences for the head, eyes, ears, and feet among the three groups whereas no difference was found with regard to MPAs in the hands and mouth (Table 3).

The patient group was further divided into two groups - one comprising patients with MPAs and another without MPAs. The two groups were then compared with regard to their illness characteristics. There was no significant difference between the two groups except for the age of onset (Table 4).

DISCUSSION

The prevalence of MPAs in the current study was found to be 48%, 28%, and 10% in patients, their FDRs, and controls, respectively. Prevalence as low as 15% to as high as 62.7-90% was found in literature.[7-9] A similar study done by Ismail *et al.* found higher rates in patients (60%) and their relatives (38%) while the prevalence in the control group was only around 5%.[5] Comparing previous studies, the prevalence in this study can be considered to be slightly on the higher side.

Table 2: Prevalence of few individual anomalies in Group 1 (schizophrenia patients)

Minor physical anomaly	Prevalence (%)
Intercanthal distance	40
Fine electric hair	36
Sandal gap	32
High-arched palate	28
Clinodactyly	20

Table 3: Comparison of individual set of MPAs among the three groups

Waldrop scores	Mean±SD			*P* value
	Group 1 (schizophrenia patients)	Group 2 (FDRs)	Control	
Head	1.19±1.2	0.46±0.83	0.24±0.62	<0.0001
Eye	1.54±1.7	0.66±1.2	0.32±0.81	<0.0001
Ears	0.7±0.6	0.5±0.38	0.28±0.42	0.312
Mouth	0.84±1.03	0.26±0.52	0.08±0.27	<0.0001
Hands	0.36±0.48	0.10±0.3	0.04±0.06	0.235
Feet	1.08±1.27	0.34±0.68	0.22±0.58	<0.0001
Total	6.2±7.12	2.22±4.01	1.02±2.56	<0.0001

MPAs: Minor physical anomalies, FDRs: First-degree relatives, SD: Standard deviation. Significance level *P*<0.05

Table 4: Comparison of MPAs with illness characteristics

Characteristics	Patients with MPAs	Patients without MPAs	*P* value
Age	29.55±5.46	31.36±7.52	0.34
Age of onset	20.27±3.36	26.68±5.57	0.03*
DOI (in months)	64.09±36.63	55.82±41.03	0.46
DOT (in months)	30.0±15.26	26.89±15.17	0.47
DUP (in months)	15.55±19.82	14.79±18.58	0.89

DOI: Duration of illness, DOT: Duration of treatment, DUP: Duration of untreated psychosis, MPAs: Minor physical anomalies, *: Significance level *P*<0.05

The mean Waldrop score for the patient group was 6.2. Scores lower (0.74, 4.8)[5,7] as well as higher (5.8, 6.8)[10,11] than in the present study have been reported. Scores were found to be more frequent in participants with schizophrenia and their siblings as compared to healthy controls. Furthermore, siblings had significantly higher score than the healthy controls. These findings are in accordance with prior studies.[12] Probably, it indicates a group of patients with schizophrenia who are having the genotype of MPAs interacting with favorable environmental variables and finally expressing as an endophenotype, which indicates the heterogenic nature of the illness.

The most common MPAs in patients were intercanthal distance (40%), fine electric hair (36%), sandal gap (32%), high-arched palate (30%), and clinodactyly (25%). Certain prior studies have shown similar findings.[5,10]

With regard to the illness characteristics, the age of onset was found to be of significance in patients with MPAs, with early age of onset having a greater association. There is a wide variation regarding this topic with some studies showing that early-onset schizophrenia had a greater association with MPAs[11,12] while other studies showing no significant association.[7]

The major limitation of our study was that only one FDR was included. Moreover, we used a cross-sectional study design with a smaller sample size. Results of the study should be interpreted with these limitations in the background.

CONCLUSION

The prevalence of MPAs is significantly higher in schizophrenia patients followed by relatives and then controls. MPAs can be considered as one of the endophenotypes for schizophrenia. These anomalies can be a useful tool for screening individuals who are vulnerable for the future onset of schizophrenia.

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