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The frequency of minor physical abnormalities in patients with obsessive-compulsive disorders compared to other psychiatric disorders; a multi-center study

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Abstract

Introduction: Minor physical anomalies are slight anatomical variations or deviations from typical physical characteristics that do not have a major cosmetic or functional impact on the individual.
Objectives: This study aimed to assess the frequency of minor physical abnormalities (MPAs) in patients with OCD compared to individuals with other psychiatric disorders, such as schizophrenia, and healthy controls.
Patients and Methods: This descriptive-analytical study was conducted from May 2007 to June 2008 and included 64 patients with OCD, 66 patients with schizophrenia, and 64 healthy controls. Demographic data was collected using a checklist. Psychiatrists diagnosed OCD and schizophrenia patients, while healthy individuals were screened using the general health questionnaire-28. The Waldrop questionnaire was conducted to assess MPAs in all participants.
Results: The results demonstrated that schizophrenia patients exhibited the highest prevalence of minor physical anomalies compared to OCD patients and healthy controls. The difference in MPAs frequency distribution was statistically significant between schizophrenia patients with both OCD patients and healthy individuals. However, the difference in MPAs frequency between OCD patients and healthy controls was not statistically significant.
Conclusion: The significantly higher prevalence of MPAs in schizophrenia patients compared to OCD patients and healthy individuals indicates that the presence of these disorders could serve as a useful biomarker for schizophrenia.

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Introduction

Obsessive-compulsive disorder (OCD) is a chronic psychiatric condition characterized by intrusive thoughts, repetitive behaviors, and impaired functioning. This debilitating disorder can significantly impact an individual's quality of life, social functioning, and overall well-being, with patients experiencing a range of symptoms and comorbidities (1-4). Research has shown that OCD is associated with neurocognitive deficits, including impairments in attention, memory, and executive functions; additionally, studies have found a relationship between OCD severity and oxidative stress, with patients exhibiting higher levels of oxidants and lower levels of antioxidants compared to healthy controls (5).

Minor physical abnormalities (MPAs) are subtle anatomical variations or deviations from normal physical features that do not have a significant cosmetic or functional impact on the individual; they are believed to reflect abnormalities in fetal neurodevelopment and may serve as a biological marker for certain neuropsychiatric disorders (6). These disorders are considered to be external markers of potential underlying neurodevelopmental abnormalities (7-9).

Studies have shown that MPAs, which are subtle morphological deviations may be associated with various psychiatric

Key point

In a descriptive-analytical study, we found that a higher prevalence of MPAs in schizophrenia patients compared to obsessive-compulsive disorder (OCD) patients and healthy individuals indicates that the presence of these disorders could serve as a useful biomarker for schizophrenia. Further studies should investigate the specificity and sensitivity of MPAs as a potential diagnostic tool for schizophrenia. Additionally, exploring the underlying biological mechanisms that link these abnormalities to schizophrenia could offer valuable insights into the etiology of the disorder. Understanding the relationship between MPAs and schizophrenia may contribute to the development of more targeted and personalized treatment approaches for individuals with this debilitating condition.

conditions; a study has found that patients with schizophrenia spectrum disorders exhibit a higher rate of MPAs compared to healthy controls, with a correlation between MPAs and positive symptom severity. However, the increased rate of MPAs appears to be specific to schizophrenia and not associated with psychosis in general, as bipolar manic patients did not show a significantly higher rate of MPAs compared to normal controls (10). Another study found that MPAs have been linked to unipolar depression, with higher MPA scores observed in depressed patients compared to controls (11). However, the relationship between MPAs and OCD is less clear. Examining the frequency of MPAs in OCD patients compared to those with other psychiatric disorders could provide insights into the potential neurodevelopmental underpinnings of OCD and help elucidate shared or distinct pathophysiological mechanisms across different mental health conditions; also, understanding these associations may have important implications for early identification, prevention, and targeted treatment approaches.

Objectives

The objective of this multi-center study was to investigate the frequency of MPAs in patients with OCD compared to individuals with other psychiatric disorders, such as schizophrenia, and healthy controls. The study aimed to determine if the presence of MPAs, which are subtle anatomical variations, could serve as a potential biomarker for OCD, reflecting underlying neurodevelopmental abnormalities.

Patients and Methods

Study design and participants

This descriptive-analytical study was conducted over 13 months, from May 22, 2007, to June 19, 2008, and involved 64 patients with OCD, 66 patients with schizophrenia, and 64 healthy individuals. The patient participants were recruited from Imam Hossein and Taleghani Hospitals, which are affiliated with Shahid Beheshti University of Medical Sciences, while the healthy control group was selected from among the employees of Tejarat Bank in Tehran.

Inclusion and exclusion criteria

To be eligible for participation in the study, individuals were required to meet several criteria. First, participants had to demonstrate the ability to read and write proficiently, ensuring their comprehension of the study materials and their capacity to provide accurate responses. Secondly, potential participants were screened for a history of other psychological disorders, as the presence of such conditions could confound the results or pose ethical concerns. Finally, informed consent was obtained from all participants, indicating their willingness to take part in the study and their understanding of the potential risks and benefits associated with their involvement. Conversely, participants who failed to complete the questionnaires in their entirety or expressed unwillingness to continue their participation at any stage of the study were excluded from the final analysis. This decision was made to maintain the integrity of the data and to respect the autonomy of the participants, who had the right to withdraw from the study without penalty.

Data collection

Demographic characteristics including age, gender, marital status, residence place, education level, and job were collected using a demographic checklist. The diagnosis of OCD and schizophrenia was conducted by a psychiatrist, while the General Health Questionnaire-28 (GHQ-28) was conducted to screen for mental health issues in the healthy control group, with individuals scoring more than six were excluded. The Waldrop questionnaire was administered to diagnose individuals with MPAs in all participants.

General health questionnaire-28

The GHQ-28 is a self-report screening tool used to detect possible psychological disorders and assess general psychological well-being. This 28-item version was derived from the original 60-item General Health Questionnaire developed by Goldberg in 1978 (12). It assesses four main areas, including somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression, and is designed to identify whether an individual's current mental state differs from their usual state, by asking about recent experiences and feelings. It is a widely used screening instrument for identifying minor psychiatric disorders in community and non-psychiatric clinical settings. The GHQ-28 has been translated into multiple languages and its factor structure has been evaluated across different cultures, generally confirming its validity and reliability. Studies have found the GHQ-28 to have good internal consistency, concurrent validity, and the ability to distinguish between depressed and non-depressed stroke patients (13).

Waldrop questionnaire

The Waldrop questionnaire refers to the Waldrop physical anomaly scale, which is a standardized assessment used to measure MPAs, particularly in the context of psychiatric conditions. This tool evaluates the presence and severity of minor physical anomalies, which are subtle structural deviations from normal physical appearance and involves a physical examination to identify the presence and degree of various physical features, such as unusual head, unusual facial features, including characteristics of the eyes, ears, nose, and mouth, and limb characteristics, including fingers, palms, and toes (14,15). Studies have found the Waldrop scale to have good internal consistency and reliability when used to assess physical abnormalities in

psychiatric patients such as schizophrenics (16).

Statistical analysis

Data was analyzed by the Statistical Package for the Social Sciences (SPSS) software version 27. Quantitative and qualitative data were presented as mean ± standard deviation (SD) and frequency (percentage). The normalcy of the data distribution was evaluated through the Kolmogorov-Smirnov test, while the homogeneity of variances was examined using Levene's test. To analyze the quantitative variables, such as gender, education level, marital status, place of residence, and the frequency of MPAs between three groups the chi-square and Fishers' exact test were conducted. To compare the mean age between the groups the one-way ANOVA was conducted. A significance level of $P < 0.05$ was considered statistically significant for all analyses.

Results

Demographic analysis of included participants showed that the frequency distribution of variables such as gender, residence place, marital status, job, and education level between three groups of OCD patients, schizophrenia patients, and healthy individuals was not statistically significant. These findings suggest that the study participants' demographic characteristics were similar across the three groups, indicating that any observed differences in clinical symptoms or outcomes may be more closely linked to the specific psychiatric disorder such as MPAs rather than demographic factors (Table 1). Table 2 compares the frequency distribution of MPAs between three groups of OCD patients, schizophrenia patients, and healthy individuals. The results demonstrated that 21.9% of OCD patients had MPAs, compared to 42.2% of schizophrenia patients and 10.9% of healthy individuals, and the chi-square test indicated that the overall difference in MPA frequency distribution between the three groups was statistically significant ($P<0.001$). In the comparative analysis by groups, the results demonstrated that the difference in MPA frequency distribution was statistically significant between the schizophrenia patients with both OCD patients and healthy individuals ($P<0.05$); however, this difference between the OCD patients and healthy individuals was not statistically significant ($P=0.075$). In summary, schizophrenia patients had the highest rate of MPAs, followed by OCD patients and then healthy controls. The frequency distribution difference of MPAs between schizophrenia patients with OCD patients and healthy individuals was significant, while the difference between OCD and healthy individuals was not significant.

Discussion

MPAs are subtle anatomical variations that are present at birth and are thought to reflect early disruptions in embryonic development (17). The presence of MPAs has been associated with various psychiatric disorders, including schizophrenia, where a higher frequency of these anomalies has been consistently reported (18). However, the relationship between MPAs and OCD is less well-established.

Our results demonstrated that the presence of MPAs is more prevalent in patients with schizophrenia compared to those with OCD and healthy controls. These findings are in line with previous studies; a study by Bora stated that patients with schizophrenia had a higher prevalence of MPAs compared to healthy individuals (19). Trixler et al in a study found that patients with schizophrenia exhibited significantly more MPAs compared to individuals without

Table 1. Comparative analysis of demographic characteristics between three groups

Variable	Sub-variable	Group						*P* value
		OCD (n = 64)		Schizophrenia (n = 66)		Health individual (n = 64)		
		No.	%	No.	%	No.	%	
Gender	Male	26	40.6	33	50	26	40.6	0.488*
	Female	38	59.4	33	50	38	59.4	
Marital status	Married	52	81.3	47	71.2	50	78.1	0.406*
	Single	12	18.7	19	28.8	14	21.9	
Reside place	Urban	29	45.3	42	63.6	40	62.5	0.065*
	Rural	35	54.7	24	36.4	24	37.5	
Job	Employee	25	39.1	31	47	30	46.9	0.466**
	Self-employment	36	56.3	35	53	34	53.1	
	Housewife	1	1.5	0	0	0	0	
	Retired	2	3.1	0	0	0	0	
Education levels	Sub-diploma	28	43.8	28	42.4	29	45.3	0.571**
	Diploma	11	17.2	5	7.6	7	10.9	
	Bachelor	22	34.3	26	39.4	25	39.1	
	Master & higher	3	4.7	7	10.6	3	4.7	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	
Age (y)		34.92	11.67	31.95	9.30	33.10	10.43	0.265***

OCD, Obsessive-compulsive disorder; SD, standard deviation.
*Chi-square, **Fisher's exact test, *** One-way ANOVA.

Table 2. Comparative analysis of psychiatric disorders such as MPAs between three groups

Variable	Sub-variable	Group						*P* value
		OCD (n = 64)		Schizophrenia (n = 66)		Health individual (n = 64)		
		No.	%	No.	%	No.	%	
MPAs	No	50	78.1	38	57.6	57	89.1	<0.001*
	Yes	14	21.9	28	42.2	7	10.9	
	Groups	OCD		Schizophrenia				0.015*
		OCD				Health individual		0.075*
				Schizophrenia		Health individual		<0.001*

OCD, Obsessive-compulsive disorder; SD, Standard deviation; MPAs; Minor physical anomalies. *Chi-square.

the disorder (20). A study by Soni et al indicated that MPAs are more prevalent in patients with depressive disorder compared to healthy (21). Bayar Kapici et al stated that congenital brain anomaly was detected more frequently in first-episode psychosis and schizophrenia groups compared to healthy individuals (22). These findings support the neurodevelopmental model of schizophrenia, suggesting that disruptions in early brain development manifest as physical anomalies that can serve as potential markers for the disorder. In contrast, the lack of statistically significant differences in MPA frequency between OCD patients and healthy controls implies that neurodevelopmental factors may be less relevant to the etiology of OCD compared to schizophrenia (23). The higher frequency of MPAs observed in schizophrenia patients compared to OCD patients and healthy controls indicates that the neurodevelopmental processes involved in schizophrenia may be more severe or occur at an earlier stage of development (20,23).

Overall, the evidence indicates that the assessment of MPAs could provide valuable insights into the underlying neurodevelopmental processes involved in schizophrenia, with potential clinical applications for early identification and monitoring of the disorder. Further research in this area is key to better understanding the relationship between MPAs and schizophrenia, as well as potentially identifying new treatment targets. By utilizing advanced imaging techniques and studying large cohorts, we can continue to uncover the complexities of this connection and its implications for early intervention and personalized medicine in the mental health field.

Conclusion

The results demonstrated that schizophrenia patients exhibited the highest prevalence of MPAs compared to OCD patients and healthy controls. The difference in MPA frequency distribution was statistically significant between schizophrenia patients and both OCD patients and healthy individuals. However, the difference in MPA frequency between OCD patients and healthy controls was not statistically significant. These findings suggest that MPAs may represent a potential endophenotype for schizophrenia. The significantly higher prevalence of MPAs in schizophrenia patients compared to OCD patients and healthy individuals indicates that the presence of these disorders could serve as a useful biomarker for schizophrenia. Further research is warranted to better understand the relationship between MPAs and the etiology of schizophrenia.

Limitations of the study

The study has several notable limitations. First, the cross-sectional design limits the ability to infer causal relationships between MPAs and the different psychiatric disorders, as a longitudinal design would have provided more insights into the temporal relationship. Second, the convenience sampling approach of recruiting patients from two specific hospitals and healthy controls from bank employees may have introduced selection bias, potentially limiting the generalizability of the findings. Third, the lack of data on the clinical characteristics of the patient groups, such as symptom severity and treatment history, precluded examining how these factors may have influenced MPA prevalence. Finally, the study did not account for potential confounding variables, such as socioeconomic status and medical comorbidities, which could have impacted the observed MPA frequencies.

Authors' contribution

Conceptualization: Yousef Semnani.
Data curation: Maryam Badiezadegan.
Formal analysis: Yousef Semnani.
Investigation: Roya Vaziri Harami.
Methodology: Yousef Semnani and Maryam Badiezadegan.
Project management: Roya Vaziri Harami.
Resources: All authors.
Supervision: Yousef Semnani.
Validation: Roya Vaziri Harami.
Writing–original draft: All authors.
Writing–reviewing and editing: All authors.

Conflicts of interest

The authors declare no conflict of interest.

Ethical issues

The research was conducted following the tenets of the Declaration of Helsinki. This study resulted from the thesis project of the psychiatry resident named Maryam Badiezadegan (Thesis #75), approved by the ethics committee of Shahid Beheshti University of Medical Sciences, Tehran, Iran. The study protocol was also registered on the Research Registry website (Unique Identifying Number (UIN) of researchregistry10421). Additionally, written informed consent was taken from all participants before any intervention.

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