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Investigation of the Relationship between Parental Mental Disorders and Autism among the Children of West Azerbaijan -Iran

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Abstract

Background: Autism disorders have increased over the last years. Autism is a neurological growth disorder associated with social communication disorders, growth retardation, and repetitive behaviors, along with serious consequences for children and families. The purpose of this research was to evaluate the relationship between parental mental disorders and autism among the children of West Azerbaijan Province.

Methods: This research was a case-control study in which the case group subjects were selected among the parents with autistic children and control group subjects were selected among the relative parents with healthy children and non-relative parents with healthy children. Both case and control groups were matched in terms of gender, living place, and age of children. Finally, the data were analyzed using SPSS-16 (Chicago, IL, USA) software.

Results: The current research results revealed that the frequency of mental diseases, including obsessive-compulsive, inter personality sensitivity, depression, anxiety, hostility, phobia, paranoid ideation, and psychotic disorder are different in fathers and mothers of the case and control groups. As Pvalue was lower than 0.05 in all scales, there was a significant relationship between the mental diseases of parents and the history of mental disorders in relatives and autism.

Conclusion: The prevalence of mental disorders in relatives and having a medical history can be a warning sign of autism in children.

Keywords: Autism, Parental Psychiatric Disorders, Case-Control, Scl-90-R, Mental Disorder

1. Introduction

Autism disorders have increased over the last years. Autism spectrum disorders with delayed or abnormal functioning occur at least in one of the areas of social interaction, the language used in social imaginative or symbolic communication (Yazdani et al., 2017). Autism is a neurological growth disorder associated with social communication disorders, growth retardation, and repetitive behaviors, along with serious consequences for children and the families (Ha et al., 2015; Lei et al., 2018). It has been investigated in various studies (MAKHADIYEVA, 2018). Based on the findings of the studies conducted over the last years, the root of more than 90% of brain function abnormalities and autistic behaviors is genetic. However, genetic is not the only factor involved in the development of all cases of autism, environmental factors are also involved in the development of autistic behaviors (Karimi et al., 2017; Yuen et al., 2019). Various studies have indicated that genetic factors play a major role in autism disorders, but the impact of these symptoms has not been well understood concerning environmental risk factors. Recent research suggests that environmental factors have had an effective role in about 40 to 50% of patients with autism (Deng et al., 2015; Gaugler et al., 2014; Kim & Leventhal, 2015; Yuen et al., 2019). Some experts reported that a wide range of parental mental disorders is associated with an autism spectrum disorder (ASD) (Bölte et al., 2007; Daniels et al., 2008; Jokiranta et al., 2013; Larsson et al., 2005). The results of the study conducted by Jokiranta et al. showed a significant relationship between parental emotional disorders and the incidence of autism in their children so that the possibility of having ASD children in the fathers with the emotional disorder is two times more than that of other fathers (Jokiranta et al., 2013). Based on the results of the study conducted by Sullivan et al., families whose first-degree relatives suffer from schizophrenia and bipolar

disorder are at a greater risk of autism for their children (Sullivan et al., 2012). The brain growing and developing in the uterus is sensitive to environmental factors from the beginning and evaluating the non-genetic factors affecting autism is critical for identifying potential risk factors and can help to reduce the risk of this disease (Modabbernia et al., 2017). It is estimated that approximately 1.7% of the world's population has autism, which almost 25% to 30% of children with this disease suffer from verbal problems and cannot speak. As the ability to communicate effectively is a vital skill, the inability to communicate effectively will cause many problems such as poor academic achievement, behavioral problems, and poor quality of life (Brignell et al., 2018). Due to the lack of an analytical study to evaluate the mental disorders of parents and relatives in the incidence of autism in children and as the studies conducted in this regard have been often cross-sectional and descriptive, this case-control research was carried out to evaluate the effects of parental mental disorders on autism, and accordingly, a major step was taken towards controlling and reducing the rate of these diseases, imposing high costs to the health system of the country.

2. Materials & Methods

This case-control study received its permission (No. IR.umsu.rec.1395.333-95/8/5) from the Ethics Committee of Urmia Medical Sciences University. It also secured letters of consent from the study parents. This research is a case-control study in which the case group subjects were selected among the parents with autism children (76 mothers and 76 fathers) and control group subjects were selected among the relative parents with healthy children (149 fathers and 149 mothers) and non-relative parents with healthy children (77 fathers and 77 mothers) and the groups were compared in terms of the study variables. The research population used in this research included all children who were diagnostic to be autistic in health care centers of West Azerbaijan province. In this research, 76 autistic children (with a 1% prevalence in the community) admitted to the centers providing pediatric services for autism children in Urmia city were selected and reevaluated by the psychiatrist. After meeting the research inclusion criteria, they were included in the research. Three children were considered in the control group per one child in the case group and for each child in the case group, two healthy children of first-degree relatives and one healthy child of non relatives were considered. Subjects were matched to control the potential confounding factors. Accordingly, both groups were matched in terms of gender, living place and age, and a total of 226 participants (149 relatives and 77 non-relatives) were selected for the control group. The method of selecting the case group was as follows: by referring to the centers providing service for autistic children in Urmia, those who were diagnosed with autism were included in the research. Selection of the samples was in this way: a list of all cases was obtained in each center. Then, they were selected based on weight ratio from each center using convenient sampling method. All of the selected children whose parents were willing to participate in the research were selected as the case group. The control group for this study included 3 children versus per child in the case group. The control group also included 2 children of the relatives` selected groups due to neutralizing the confounding factors which might be created due to different ethnicities and lifestyle and cultural factors, and so on and one child was selected from non-relatives to examine the possible family and genetic factors. The relative control group included first-degree families, including uncle and aunt and non-relative control group subjects were selected from the same living place. The samples were examined by the pediatric psychiatric specialist to approve the autism of children. The SCI-90_R questionnaire was used for a parental psychiatric disorder. The initial form of this questionnaire was designed by Liminen and Curie in 1973 to show the psychological aspects of patients with somatic and mental diseases (Leathem & Babbage 2000).The Scl-90-R checklist is the symptoms of mental disorders in the self-reporting questionnaire for screening and measuring the symptoms of mental disorders. This test was revised by Derogatis et al. based on clinical experiences and psychometric analyses. Its final form was prepared in 1976 and the internal validity of this test was reported by using alpha coefficient at the acceptable level (Derogatis et al., 1976). The reliability of this test was calculated by Cronbach's alpha method (94%). The correlation coefficient was estimated at 88% using the test-retest method with the time interval of one year, so its validity is at a high level (Simonds et al., 2008). The criterion validity coefficients of the nine dimensions of this test with the Minnesota multidimensional questionnaire, except for obsessive-compulsivescales, was reported between 36% and 73%, all of which were at the significant ($p < 0.05$) (Christensen et al., 2018). The data were analyzed based on descriptive methods such as statistical tables, calculation of central indices and distribution and percentage for qualitative variables. Analytical statistical methods were also used. All analyses were performed using SPSS-16 (Chicago, IL, USA) and the significance level was considered ($p < 0.05$).

3. Results

Table 1. Comparing the mean psychopathologic dimensions among the mothers of three studied groups a: Significant different with control1 (relative mothers with healthy children) group, b: Significant different with control2 (non-relative mothers with healthy children) group

		N	Mean±SD	95% Confidence Interval for Mean		P-Value[c]
				Lower Bound	Upper Bound	
Somatization	case	76	1.11±.60[b]	.97	1.25	F(2,299)=15.78 p<0.001
	control1	149	1.03±.45[b]	.96	1.11	
	control2	77	.71±.35	.63	.79	
Obsessive-Compulsive	case	76	1.30±.65[ab]	1.15	1.45	F(2,299)=33.63 p<0.001
	control1	149	1.22±.53[b]	1.13	1.30	
	control2	77	.68±.34	.60	.76	
Inter Personality Sensitivity	case	76	1.02±.57[ab]	.89	1.15	F(2,299)=38.14 p<0.001
	control1	149	1.06±.47[b]	.98	1.13	
	control2	77	.51±.30	.44	.58	
Depression	case	76	1.19±.66[ab]	1.04	1.34	F(2,299)=31.43 p<0.001
	control1	149	1.18±.53	1.09	1.26	
	control2	77	.64±.30	.57	.71	
Anxiety	case	76	1.10±.64[ab]	.95	1.24	F(2,299)=40.33 p<0.001
	control1	149	1.19±.59[b]	1.09	1.28	
	control2	77	.52±.26	.47	.58	
Hostility	case	76	1.14±.59[ab]	1.01	1.28	F(2,299)=51.86 p<0.001
	control1	149	1.09±.56[b]	1.00	1.18	
	control2	77	.42±.28	.35	.48	
Paranoid Ideation	case	76	1.53±.56[ab]	1.33	1.73	F(2,299)=39.70 p<0.001
	control1	149	1.28±.54[b]	1.19	1.36	
	control2	77	.69±.39	.60	.78	
Psychotic	case	76	.81±.54[ab]	.69	.93	F(2,299)=43.94 p<0.001
	control1	149	.87±.49[b]	.79	.95	
	control2	77	.29±.26	.23	.34	
Phobic	case	76	.90±.61[ab]	.76	1.04	F(2,299)=34.22 p<0.001
	control1	149	.99±.58[b]	.89	1.08	
	control2	77	.39±.27	.33	.45	
Global Severity Index	case	76	1.14±.50[ab]	1.02	1.25	F(2,299)=59.73 p<0.001
	control1	149	1.12±.40[b]	1.06	1.19	
	control2	77	.56±.21	.52	.61	

c: oneway ANOVA test

Table 2. Comparing the frequency of psychopathologic problems in the mothers of three studied groups

		Autism group		Control1[a]		Control2[b]		Odds ratio2[c] (CI 95%)	Odds ratio1[d] (CI 95%)	P-Value[e]
		n	%	n	%	n	%			
Global Severity Index	Normal	31	40.8	46	30.9	76	98.7	110.32 (14.56-835.95)	0.65 (0.37-1.15)	χ^2 (2,97.40) <0.001
	Psychopathologic	45	59.2	103	69.1	1	1.3			
Somatization	Normal	36	47.4	68	45.6	62	80.5	4.59 (2.23-9.45)	0.93 (0.54-1.62)	χ^2 (2,27.32) <0.001
	Psychopathologic	40	52.6	81	54.4	15	19.5			
Obsessive-Compulsive	Normal	28	36.8	48	32.2	64	83.1	8.44 (3.96-17.99)	0.82 (0.46-1.45)	χ^2 (2,56.59) <0.001
	Psychopathologic	48	63.2	101	67.8	13	16.9			
Inter Personality Sensitivity	Normal	35	46.1	63	42.3	68	88.3	8.85 (3.86-20.27)	0.86 (0.49-1.50)	χ^2 (2,46.71) <0.001
	Psychopathologic	41	53.9	86	57.7	9	11.7			
Depression	Normal	28	36.8	47	31.5	65	84.4	9.29 (4.29-20.10)	0.79 (0.44-1.41)	χ^2 (2,60.77) <0.001
	Psychopathologic	48	63.2	102	68.5	12	15.6			
Anxiety	Normal	34	44.7	47	31.5	73	94.8	22.54 (7.48-67.96)	0.57 (0.32-1.01)	χ^2 (2,82.89) <0.001
	Psychopathologic	42	55.3	102	68.5	4	5.2			
Hostility	Normal	28	36.8	57	38.3	74	96.1	42.29 (12.18-146.83)	1.06 (0.60-1.88)	χ^2 (2,78.32) <0.001
	Psychopathologic	48	63.2	92	61.7	3	3.9			
Paranoid Ideation	Normal	11	14.5	37	24.8	59	76.6	19.37 (8.46-44.36)	1.95 (0.93-4.09)	χ^2 (2,79.02) <0.001
	Psychopathologic	65	85.5	112	75.2	18	23.4			
Psychotic	Normal	50	65.8	80	53.7	75	97.4	19.5 (4.43-85.84)	0.6 (0.34-1.07)	χ^2 (2,44.69) <0.001
	Psychopathologic	26	34.2	69	46.3	2	2.6			
Phobic	Normal	42	55.3	64	43	74	96.1	19.97 (5.78-68.98)	0.61 (0.35-1.06)	χ^2 (2,60.36) <0.001
	Psychopathologic	34	44.7	85	57	3	3.9			

In the present study, the mental disorders of the parents of autistic children were investigated as the case group (76 mothers and 76 fathers) and relative parents with healthy children (149 fathers and 149 mothers) and non-relative parents with healthy children (77 fathers and 77 mothers) were regarded as the control groups. Comparing the means of psychopathological dimensions showed significant difference among mothers of case and control groups in all mental dimensions (somatization, obsessive-compulsive, inter personality sensitivity, depression, anxiety, hostility, paranoid ideation, psychotic disorder, phobia) (Tables 1&2). Comparing the mean psychopathologic dimensions of the fathers studied in three groups showed a significant difference between the fathers of the case and control groups in all psychological dimensions (somatization, obsessive-compulsive, inter personality sensitivity, depression, anxiety, hostility, paranoid ideation, psychotic disorder, and phobia) (Tables 3&4). As shown in Table 4, comparing the frequency of psychopathologic problems among the fathers studied in the three groups showed a significant difference between the fathers of case and control groups in all mental dimensions, so that the odds of autism in the case group was more than that in the relative control group. However, in the non-relative control group, except for somatization, obsessive-compulsive, inter personality sensitivity and rest of the dimensions showed higher odds of autism. 180.

4. Discussion

The prevalence of ASD has increased remarkably over the last two decades. The Autism Diseases Control Center announced that the incidence of ASD in 2000 was 1 per 150 children (Christensen et al., 2019), while National Health Center reported it I child per 36 children in 2006, which is considered high rate (Zablotsky et al., 2017). In this research, the mental disorders were examined in parents of children with autism (case group), relative parents with healthy children, and non relative parents with healthy children (control groups). The results of this research showed that there was a significant relationship between mental disorders in the parents of children with autism (case group) and those of control group so that the odds of autism in the case group is higher than that in the relative control group. In a research conducted by Larson et al. (2005) and Jokiranta et al. (2013), in line with this study, parents' mental problems were associated with the incidence of autism in children. In a research carried out by Boukhris et al, it was reported that depression during pregnancy and the use of antidepressants during the second and third trimester of pregnancy increased the risk of ASD in children (Boukhris et al., 2016). In another study conducted by Khaiman et al, it was reported that mental disorders of parents, family history of psychiatric disorders, and high age of the father were among the most important environmental risk factors for ASD (Khaiman et al., 2015). Based on the results of this research, the odds of autism in children of fathers of case group was higher than that of non-relative and relative control groups with the dimension of obsessive compulsive disorder. Consistent with this research, Bolt et al. (2007) showed that obsessive compulsive disorder and schizophrenia are associated with autism (Bölte et al., 2007). Also, there PeerJ reviewing PDF | (2019:07:39830:0:1:NEW 10 Aug 2019) Manuscript to be reviewed is much other evidence suggesting that autism spectrum disorders, schizophrenia, bipolar disorder, and obsessive-compulsive disorder have a common molecular cause (O'Connell et al., 2018). The results of this research at the dimension of depression disorder revealed high odds of autism in relative mothers and relative and non-relative fathers in case group compared to that of the control group, but the odds of autism was low in non-relative mothers. In a study conducted by Hu et al, it was reported that the parents of children with ASD, experience more depressive disorder (Hu et al., 2018), compared to the parents of normal children. The results of this research also showed that the parents of children with autism will more likely have anxiety disorders. In another research conducted by Daniels et al, the findings revealed that depressive disorders are more common in mothers, but not common in fathers (Daniels et al., 2008). The results of this research revealed that mental disorder, hostility, phobia, paranoid ideation, and psychotic disorder have a significant difference between the groups of autism and their relatives and the control group. Thus, the frequency of mental disorders in relatives and having a medical history can be the risk factors of autism in children. The highest correlation was found between schizophrenic spectrum disorders in parents and non-classified pervasive developmental disorder. The results of several studies showed that there is a significant relationship between the emotional disorders of parents and the incidence of autism in their children. In the studies conducted in Sweden and Denmark, the results showed that there is a high correlation between emotional disorders and schizophrenia and ASD, and genetic studies have also proved that there is a high genetic association between these disorders (Daniels et al., 2008; Larsson et al., 2005). Families whose first-degree relatives have schizophrenia and bipolar disorder are at greater risk of autism in their children. Based on the results, these disorders have a high genetic association (Ghaziuddin, 2005).

Table 3. Comparing the mean psychopathologic dimensions of the fathers of three studied groups

		N	Mean±SD	95% Confidence Interval for Mean		P-Value[c]
				Lower Bound	Upper Bound	
Somatization	case	76	1.56±.88[ab]	1.36	1.76	F(2,299)=37.99 p<0.001
	control1	149	1.29±.52[b]	1.21	1.38	
	control2	77	.75±.31	.68	.82	
Obsessive-Compulsive	case	76	1.53±.71[ab]	1.36	1.69	F(2,299)=39.93 p<0.001
	control1	149	1.31±.57[b]	1.22	1.41	
	control2	77	.76±.32	.68	.83	
Inter Personality Sensitivity	case	76	1.36±.68[b]	1.21	1.52	F(2,299)=38.87 p<0.001
	control1	149	1.26±.53[b]	1.17	1.34	
	control2	77	.68±.32	.61	.76	
Depression	case	76	1.55±.72[ab]	1.38	1.71	F(2,299)=41.22 p<0.001
	control1	149	1.24±.56[b]	1.15	1.33	
	control2	77	.74±.30	.67	.81	
Anxiety	case	76	1.48±.87[ab]	1.28	1.68	F(2,299)=43.52 p<0.001
	control1	149	1.19±.53[b]	1.11	1.28	
	control2	77	.61±.30	.54	.68	
Hostility	case	76	1.14±.59[b]	1.01	1.28	F(2,299)=51.86 p<0.001
	control1	149	1.09±.56[b]	1.00	1.18	
	control2	77	.42±.28	.35	.48	
Paranoid Ideation	case	76	1.55±.68[ab]	1.39	1.70	F(2,299)=28.85 p<0.001
	control1	149	1.29±.74[b]	1.17	1.40	
	control2	77	.78±.33	.70	.85	
Psychotic	case	76	.81±.54[b]	.69	.93	F(2,299)=56.29 p<0.001
	control1	149	.87±.49[b]	.79	.95	
	control2	77	.29±.26	.23	.34	
Phobic	case	76	.98±.61[b]	.84	1.12	F(2,299)=20.26 p<0.001
	control1	149	.90±.45[b]	.83	.97	
	control2	77	.30±.18	.26	.34	
Global Severity Index	case	76	1.39±.56[ab]	1.27	1.52	F(2,299)=47.81 p<0.001
	control1	149	1.18±.39[b]	1.12	1.24	
	control2	77	.64±.18	.60	.68	

Table 4. Comparing the frequency of psychopathologic problems of fathers in three studied groups

		Autism group		Control1[a]		Control2[b]		Odds ratio2[c] (CI 95%)	Odds ratio1[d] (CI 95%)	P-Value[e]
		n	%	n	%	n	%			
Global Severity Index	Normal	21	27.6	37	24.8	76	98.7	199.05 (25.99-1524.49)	0.87 (0.46-1.62)	χ^2 (2,123.76) <0.001
	Psychopathologic	55	72.4	112	75.2	1	1.3			
Somatization	Normal	24	31.6	37	24.8	57	74	6.18 (3.06-12.47)	0.72 (0.39-1.32)	χ^2 (2,54) <0.001
	Psychopathologic	52	68.4	112	75.2	20	26			
Obsessive-Compulsive	Normal	18	23.7	36	24.2	57	74	9.18 (4.41-19.14)	1.03 (0.54-1.96)	χ^2 (2,61.77) <0.001
	Psychopathologic	58	76.3	113	75.8	20	26			
Inter Personality Sensitivity	Normal	22	28.9	40	26.8	62	80.5	10.45 (4.79-21.50)	0.90 (0.49-1.66)	χ^2 (2,66.59) <0.001
	Psychopathologic	54	71.1	109	73.2	15	19.5			
Depression	Normal	19	25	40	26.8	63	81.8	13.5 (6.20-29.39)	1.10 (0.59-2.07)	χ^2 (2,73.72) <0.001
	Psychopathologic	57	75	109	73.2	14	18.2			
Anxiety	Normal	23	30.3	47	31.5	70	90.9	23.04 (9.20-57.72)	1.06 (0.58-1.93)	χ^2 (2,82.53) <0.001
	Psychopathologic	53	69.7	102	68.5	7	9.1			
Hostility	Normal	28	36.8	57	38.3	74	96.1	42.29 (12.18-146.83)	1.06 (0.60-1.88)	χ^2 (2,78.32) <0.001
	Psychopathologic	48	63.2	92	61.7	3	3.9			
Paranoid Ideation	Normal	15	19.7	41	27.5	58	75.3	12.41 (5.77-26.72)	1.54 (0.79-3.02)	χ^2 (2,63.4) <0.001
	Psychopathologic	61	80.3	108	72.5	19	24.7			
Psychotic	Normal	39	51.3	77	51.7	77	100	-	1.02 (0.58-1.76)	χ^2 (2,58.37) <0.001
	Psychopathologic	37	48.7	72	48.3	0	0			
Phobic	Normal	34	44.7	74	49.7	71	92.2	14.62 (5.66-37.72)	1.22 (0.70-2.12)	χ^2 (2,46.95) <0.001
	Psychopathologic	42	55.3	75	50.3	6	7.8			

a: control1: relative fathers with healthy children group, b: control2:non-relative fathers with healthy children group, c: odds ratio (abnormal/normal) ASD children fathers with relative fathers with healthy children group, d: odds ratio (abnormal/normal) ASD children fathers with non-relative fathers with healthy children group, e: chi-square test between three groups

5. Conclusions

As all mental disorders have a genetic history, and autism also has a high genetic history, exposure to mental risk factors can cause mutations in the genes and cause different genetic-related problems. This research suggests that autism can be a strong genetic potential, that mental factors can activate it.

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Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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