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Research Article

Relationship between Conception and Psychological Condition During Pregnancy with the Birth of a Child with Autism

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Abstract

Numerous of studies [1] have investigated the causes and associations of autism with prenatal and perinatal factors, such as preterm birth, low birth weight and gestational diabetes, and parental characteristics such as higher socioeconomic status and education, older parents, white race, and history of psychiatric conditions associated with autism. In addition, there is a large and complex genetic background with a subset of familial autism cases, as well as an important role for rare and common variations in copy numbers.

In this paper, the goal is to examine the relationship between conception and psychological condition during pregnancy with the birth of a child with autism.

After studying the theoretical background of the topic, we proceed to the research. It is a study in which a population is surveyed, at a specific point in time, and the prevalence is usually determined. The quantitative approach was used to investigate the research questions, which concerns the collection, analysis and interpretation of quantitative, numerical data. The reason for the use of this method is that it is the most appropriate to control the specific questions for the phenomenon under study.

The study took place between October 2019 and March 2020 and 200 women participated. Three closed questionnaires with three sections were used in this research. Descriptive and inductive statistics were used to analyze the questionnaires. Mann Whitney and Spearman's rho non-parametric tests were used in inductive statistics. The analysis was performed using the statistical program SPSS22.0.

The results show that there is no significant correlation between *In vitro* fertilization (IVF) and autism spectrum disorder (ASD).

Keywords: *Autism; IVF; In Vitro Fertilization; Pregnancy; Anxiety Disorders; Children*

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by disturbances in social interaction and communication, combined with limited and repetitive behavior [2]. Despite the great effort made to treat it, ASD remains a major public health problem worldwide. Moreover, ASD risk assessments have increased dramatically in recent decades [2].

Although the etiology of ASD remains uncertain, it is considered multifactorial and includes both genetic and environmental factors. Recently, several studies have attempted to investigate the modifiable environmental factors that increase the risk of ASD [2]. Among these risk factors, assisted reproduction technology (ART) has been widely studied due to its popularity [2].

In vitro fertilization and intracellular sperm injection (ICSI) are standard ART treatments and over 5 million children have been born with these procedures worldwide [2]. As ART has been increased, the developmental effects of these pregnancies have been of simultaneous concern. ART use has been reported to increase the overall risk of congenital malformations by about one-third, with approximately twice the risk of developing nervous system disorders [2].

Aggregate data have shown that the use of ART may lead to an increased risk of genetic mutations, preterm birth, low birth weight and genetic mapping disorders, which could lead to the development of ASD. Numerous epidemiological and observational studies have investigated the relationship between ART risk and ADR risk in offspring, but the results were inconsistent [2].

Autism occurs in 34 out of 10,000 children. In terms of gender, the prevalence in boys is higher than in girls (4 boys per 1 girl), while it occurs equally in all socio-economic classes. In families that already have a child with autism there is a 5% -10% chance of giving birth to a second child with autism. This means that there is a frequency 50 times higher than that of the general population [8].

People with autism have extreme difficulty learning languages and developing social skills and interpersonal relationships with others. However, some of these children are particularly talented in a particular field, e.g., they have an amazing memory, they learn poems, they solve arithmetic problems, and they are very good at music [7].

Therapeutic approaches to autism aim to conquer communication and control inappropriate behavior. They are addressed to both the child and the parents [5]. Parent counseling aims to make them understand the nature of the problem and to provide emotional support to the difficulties of everyday life with the child. The usefulness of medical treatment in autism is not proven. Special emphasis is given to the education of children with techniques based on behavioral theories [4;3].

Children are trained in self-care and how to acquire certain skills. There is, however, a problem in maintaining these abilities. The ability of verbal communication plays an important role in the development of autism. Great efforts are being made to help these children acquire communication and speech skills. When this cannot be achieved in children with low functionality, alternative forms of communication are suggested [3]. However, the sooner parents and doctors diagnose a child with autism, the better and more successfully it can be treated [6].

Aim of the research

The aim of this study is to investigate whether there is a clear relationship between conception and psychological condition during pregnancy with the birth of a child with autism.

Methodology

Study design

This is a study in which a population is surveyed at a specific period of time, and the prevalence is usually determined. The quantitative approach was used to investigate the research questions, which concerns the collection, analysis and interpretation of quantitative, numerical data. The reason for the use of this method is that it is the most appropriate in order to control the specific questions for the phenomenon under study. Quantitative methodology offers the possibility of approaching a representative sample of the population under study leading to valid and reliable scientific results.

Participants

The participants of the research came from seven prefectures of Greece: Attica, Larissa, Ioannina, Magnesia, Imathia, Trikala and Thessaloniki. The study involved 100 adult mothers with children diagnosed with autism spectrum disorder and 100 with children with normal development, a total of 200. Out of 600 questionnaires (3 in each mother), 600 were included in the study. The parental selection method was targeted and methodical. It was suggested to participate a mother who had children aged 4 to 7 years and willing to participate. In case a candidate was not in the appropriate psychological state to participate, participation in the study was not suggested. The sample was drawn from a variety of mental health organizations and hospitals with adult or child mental health departments as well as from parents who visited a psychiatrist/child psychiatrist in private or even from parents whose children participated in or are members of Greek-disabled clubs for children with autism or by parents whose children attended private schools.

The study began in October 2019 and was completed in March 2020. All the children and their families cooperated well, and no dropouts were reported throughout the research.

Procedure

Initially, the research protocol together with the necessary questionnaires and documents were submitted to the research ethics and ethics committee and the scientific/administrative councils of the Aeginite hospital in order to approve the preparation of the doctoral study. After receiving the approval from the hospital, the researcher contacted the mental health professionals in order to obtain information and ensure their cooperation in collecting the sample. The questionnaires were administered either by the lead researcher or by the key mental health professionals who monitored each parent. Some questionnaires were also given to private adult psychiatrists who distributed them to their patients. Initially, the parents were provided with the Information and Consent form which they read and signed if they agreed to participate in the research. The informed consent form included information about the research such as the purpose, the selection of participants, the participation process, the risks and benefits, the incentives to participate and disseminate the research results, confidentiality, the right to refuse or withdraw participation, conflict of interest and contact details of the researcher, while the second part was the consent form where the parents signed. Then they filled in the questionnaire with help.

The anonymity of the participants was ensured as the parents filled in only their first name and gave various demographics, while signing the consent form for formal reasons. In cases where a parent was informed about the research but did not wish or regret his/her participation, the collection process was interrupted.

Measurement tool

A closed questionnaire with three sections was used in this research. These were the following: The first section was on the Autism Behavior Checklist (ABC). This questionnaire helps to determine if the child should be referred for tests and evaluations in order to diagnose

autism. Measures the symptoms of autism in the following 5 subscales, irritability, lethargy, stereotypes, hyperactivity, and inappropriate speech. This questionnaire has five subsections: Irritability, Lethargy, Stereotypes, Hyperactivity, Inappropriate reason. The second section was on the Social Communication Questionnaire (SCQ) is widely used as a tool in autism spectrum research studies. Researchers can assess a person's "life" characteristics (which will be used to support the diagnosis) or "current" characteristics (which will be used to support the assessment of current difficulties) and the severity of autism. This section, apart from the total score, contains three subsections: Reciprocal Social interaction domain, Communication domain, Restricted, Repetitive, Stereotyped Patterns of behavior domain. In the third section, all mothers underwent the M.I.N.I. 5.0.0. Greek version/which will retrospectively record the existence of stress during pregnancy or other psychological disorders of the mother, DSM-IV.

Statistical analysis

Descriptive and inductive statistics were used to analyze the questionnaires. Mann Whitney and Spearman's rho non-parametric tests were used in inductive statistics. The analysis was performed using the statistical program SPSS22.0.

Results

According to table 1 in 8.5% of the sample embryo transfer has taken place in the blastocyst stage while in 91.5% of the sample it has not taken place.

		N	%
	No	183	91,5
	Yes	17	8,5
	Total	200	100,0

Table 1: *Embryo transfer at the blastocyst stage.*

According to table 2 in 4% of the sample assisted hatching has taken place while in 96% of the sample it has not taken place.

		N	%
	No	192	96,0
	Yes	8	4,0
	Total	200	100,0

Table 2: *Assisted hatching.*

According to table 3, in 58.0% of the sample IVF has been performed while in 42.0% of the sample it is not reported.

		N	%
	No	84	42,0
	Yes	116	58,0
	Total	200	100,0

Table 3: *IVF.*

According to table 4, 14.5% of the sample has panic disorder while 85.5% of the sample has not.

		N	%
	No	171	85,5
	Yes	29	14,5
	Total	200	100,0

Table 4: *Panic disorder.*

According to table 5, 52% of the sample has suffered a major depressive episode (present) while 48% of the sample has not suffered.

		N	%	Valid %
	No	48	24,0	48,0
	Yes	52	26,0	52,0
	Total	100	50,0	100,0
	No answer	100	50,0	
Total		200	100,0	

Table 5: *Major depressive episode (present).*

According to table 6, 23.5% of the sample has used other psychoactive substances and the remaining 76.5% of the sample has not used.

		N	%
	No	153	76,5
	Yes	47	23,5
	Total	200	100,0

Table 6: *Use of other psychoactive substances.*

The results are shown in table 7 as below:

Sample of Women	IVF or Another Method
10%	embryo transfer at the blastocyst stage.
5%	assisted hatching& testicular biopsy
85%	have IVF

Table 7

The analysis found that less than 8.5% of women had embryo transfer at the blastocyst stage. Furthermore, in about 5% of women, assisted hatching has been performed and a testicular biopsy has been reported. Also, almost 2/3 of the sample was found to have IVF and the whole sample did not give birth normally.

The results are shown in table 8 as below:

Sample	Disorders
17%	panic disorder
25%	have used other psychoactive substances
25%	other psychoactive substances
53%	major depressive episode
80%	Dyslexia

Table 8

It was also found that the whole sample (100%) did not show suicidal tendencies, nor hypomanic episode, agoraphobia, social phobia, obsessive-compulsive disorder, stress disorder after psycho-traumatic experience and have not abused and are not dependent on alcohol. About 1/6 of the female sample was found to have panic disorder and almost all of them reported that it occurred unpredictably, for no apparent reason and after the panic disorder episode, for a month or more, they had persistent fears that another episode might happen to them, or they were worried about the consequences of this episode. In fact, in all women who had suffered from panic disorder the disorder was present and had a history of seizures with limited symptoms. In addition, 25% of women were found to have used other psychoactive substances. Also, more than half of the women (out of a total of 200) reported having a major depressive episode (present/past) while none had a major depressive episode with melancholy. Also, 80% of the sample (out of a total of 55 women) showed dyslexia and in 35.5% of the women their children did not show the ability to speak (use of short phrases or sentences) based on the SCQ.

Discussion

In this research SCQ found a moderate level in all questions for children. At the individual scales a low level of mutual social interaction was found, above average communication and a moderate level of restraint, repetition and stereotypical patterns of behavior. Regarding the deviant behavior of the children, a low level of irritability, stereotypes and inappropriate speech was found, while at the same time the level of lethargy was high, and their hyperactivity was below average, which agrees with article of Zhai [8].

The correlation analysis found a statistically significant positive correlation between the overall score in the communication questionnaire with mutual social interaction, communication and hyperactivity (while with restriction, repetition, stereotypes, lethargy and stereotypes were observed, a statistically significant positive correlation was observed between the interaction of social interaction with communication while a negative correlation was found with lethargy, as in Fountain., *et al.* [1]. In addition, a statistically significant positive correlation was observed between communication with hyperactivity and between restraint, repetition, stereotypes with lethargy, stereotypes, and inappropriate speech. Also, there was a statistically significant positive correlation between irritability and hyperactivity, and lethargy and stereotypes, as well as it is stated in Wing [7].

Regarding the other two-variable analyzes, it was found that children who are able to speak compared to children who do not, had a better level of communication overall and, at the same time, they showed a lower level of stereotypes, lethargy, and inappropriate speech. In addition, women who underwent embryo transfer compared with women who did not, had a higher level of interaction with their children in terms of social interaction, stereotypical patterns of behavior, irritability and inappropriate speech, while a low level of communication was observed. Furthermore, women who had assisted hatching compared with those who did not, their children had a lower level of lethargy It was also found that women who had reported testicular biopsy versus women who had not reported testicular biopsy, their children showed a higher level of mutual social interaction. The same results are presented in Gao., *et al.* [2]. Women who reported

injecting compared to women who did not, had a lower level of overall communication, while a higher level of stereotypical patterns of behavior, lethargy, stereotypes and inappropriate speech was observed. In addition, women who performed classical IVF compared to women who did not perform IVF had a lower level of reciprocal communication, stereotypes, lethargy, stereotypes and inappropriate speech, while a higher level of communication was observed. Women with panic disorder had a lower level of hyperactivity than women without panic disorder. Also, women with the use of psychoactive substances had a lower level of lethargy for their children while at the same time a higher level of stereotypes and inappropriate speech was observed. In addition, women with a major depressive episode (present) had a higher level of overall communication while a lower level of stereotypical behavioral patterns was observed. Women with a major depressive episode (past) compared to women without a major depressive episode had a lower level of communication while at the same time a higher level of stereotypical patterns of behavior and inappropriate speech was observed. Finally, women with dysthymia compared to women without dysthymia a higher level of irritability was observed, and, at the same time, a lower level of stereotypes and inappropriate speech was observed, and they are consistent with Gao., *et al.* [2] and Wing [7].

Conclusion

The above results show that ASD and *In vitro* fertilization were not significantly correlated and are consistent with the majority of the international literature. In some cases, women who have had additional health problems (panic disorder, dysthymia, etc.) appear to be more likely to give birth to a child with ASD or mental retardation and this rate is slightly higher than that of women giving birth normally.

Regarding the limitations of the study, these are many and important. Factor analysis could not be performed due to the small sample size. Therefore, the results of these questionnaires need further investigation Another limitation of the study is the demographic data. In the course of the study and analysis, deficits were observed regarding the educational level of the parents and family conditions, factors that may have provided even more information regarding the profile of the parents who give more information to their children.

The study sample, although not small, may have hidden statistically significant correlations or differences as several of the results of the correlations discussed tended to be statistically significant. Therefore, it is hypothesized that in the future, with a larger sample of women, the hypotheses of the study may emerge to a greater degree.

Another limitation is the age of the children which is limited from 4 - 7 years. According to the above-mentioned limitations, despite the important and interesting conclusions of the study, it is recommended in future research the inclusion of the educational level in the demographic data, the extraction of data on information and psychosocial status of children from several sources (non-mentally ill parent, teacher, adolescent self-report), the separation of children into age groups such as young children to infants, children in latency and adolescents, and the possible increase of the sample number.

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