

# **The Importance Behind Prenatal Nutrition in Relation to Neurological Child Development**

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## **Introduction**

Autism Spectrum Disorder (ASD) is defined as a condition developed during childhood that hinders developmental milestones that are vital for social interaction. As a result of this, pragmatic skills in children with ASD are delayed. Children with ASD have impaired nonverbal communication skills such as eye contact and failure to read body language, as well as lack of empathy for others. ASD diagnoses in the United States have skyrocketed in recent years, going from an ASD diagnosis in 1 in every 1000 children several decades ago, to 1 out of every 33 children receiving this diagnosis in 2024. Why are ASD diagnoses rising, and what specifically causes ASD? When researching potential causes of ASD and what parents can do to prevent diagnoses, one thing stood out: prenatal nutrition. Having good prenatal nutrition is essential for optimal child development, including being a protective factor for neurodevelopmental disorders such as ASD. Not all expectant mothers are properly educated on the importance behind prenatal nutrition, which inspired the topic of this needs assessment. This needs assessment will address risk and protective factors in relation to prenatal nutrition and ASD, introduce expectant mothers to the importance of prenatal nutrition in relation to child development, and give them practical ways to improve their nutrition and health while carrying their child.

## **Risk Factors**

Any woman who has a BMI of  $\geq 30$  kg/m<sup>2</sup> before pregnancy is classified as having maternal obesity. Maternal obesity affects 29% of pregnant women in America. Kids who are born to mothers who have maternal obesity have an increased risk of neurodevelopmental disorders, including ASD. Maternal obesity specifically affects the baby's brain, which leads to altered white matter in the brain as well as a smaller hippocampus in boys (Maitin-Shepard et al.,

2024). It is important for women looking to grow a family to have this information so they are able to adjust their diet and lifestyle habits if needed to prevent maternal obesity.

Exposure to the chemicals and heavy metals in the environment during pregnancy and childhood development also has the ability to increase a child's risk for ASD. Examples of these types of substances that can greatly affect a child's prenatal development include arsenic, lead, and mercury (Deitert, 2010). Parents have to be very aware of the quality of the air where they live, specifically pertaining to the amount of heavy metals that may be present. Research that was conducted by Matelski and Van de Water in 2016 talks about residential proximity to freeways, and heavy exposure to diesel gas and ozone is correlated to a potential diagnosis of ASD (Matelski & Van de Water, 2016). One mother who participated in a 2021 study about ASD in children spoke up about her story, which revolved around her neighborhood that was polluted with arsenic. She shared that they moved into the house when she was 8 months pregnant with her son, and he spent a majority of his childhood living in this neighborhood with arsenic pollution. When she took her son to the pediatric neurologist when he was in the fifth grade, he expressed that the condition her son was presenting was aligned with heavy metal poisoning, which is linked to his ASD (Chen et al., 2021) This story shows the importance of parents being aware of their environmental surroundings, and how those surroundings will affect the development of their child.

Pharmaceutical drugs ingested by pregnant and breastfeeding women, as well as young children, can have very negative effects on fetal and childhood development. Drugs such as valproic acid (drug to treat seizures and bipolar disorder), thalidomide (drug to treat myeloma and Hansen's disease), and antidepressants have been associated with increased risk for your child developing ASD, especially if these drugs are consumed during the first trimester of

pregnancy (Matelski & Van de Water, 2016). Additionally, fever suppression drugs, specifically acetaminophen (Tylenol) given to children is also linked to increased link for autism as well as other neurodevelopmental disorders (Deitert, 2010). These research studies and articles show the importance of being aware in regards to what types of medications someone would be consuming as a pregnant mother, as well as being aware of what medications are safe to give their growing child.

### **Protective Factors**

One of the most important things to look out for during the prenatal period is the diet of the expectant mother. Anything consumed by mom also is consumed by baby, so it is important that expectant mothers are getting all the nutrients needed to keep them and their baby healthy. Some nutrients that should be consumed regularly during pregnancy include folic acid, fatty acids, vitamin D, and iron. These elements can be found in foods as well as in supplements. Any woman who plans to have a child during her life should be consuming vast amounts of folic acid, as taking folic acid decreases the likelihood of your offspring having any sort of birth defect. Folic acid even helps fight off environmental toxins or heavy metals that may enter your body during the periconceptual or prenatal periods, which in turn also lowers the chances of your child developing ASD. Folic acid can be found in foods we consume on a daily basis, such as bread, cereal, fruits, and vegetables (Bragg et al., 2022). Taking around  $\geq 600$   $\mu\text{g}$  of fatty acids per day, especially during the first trimester, is associated with a 40% decrease of risk of a child getting ASD. Taking vitamin D supplements throughout pregnancy reduces the risk of the child developing ASD. A lack of vitamin D can cause DNA methylation, which alters genetics. The altering of the genetics can cause ASD, which is why expectant mothers need to keep a close eye on their vitamin D levels. Vitamin D is a vital part of fighting disease within the body, which is

good for pregnant mothers to have plenty of so they don't get sick (Bragg et al., 2022). Assuring iron is also consumed regularly during pregnancy is also important, as iron deficiency is common during pregnancy. Additionally, increased iron consumption during the third trimester might further protect a growing child from developing ASD. Women can get iron in their body through multiple means, such as taking supplements or eating red meat (Gialloreti et al., 2019). Parents should do their proper research on prenatal care, including taking the necessary supplements and watching the pregnant woman's diet to assure that her offspring will receive all necessary nutrients to try and protect them from developing ASD.

There are also environmental protective factors that contribute to a child's likelihood to develop ASD. These include maternal age and a favorable environment. The optimum maternal age for preventing ASD is having a child while the parents are between the ages of 20 and 32, which is the low-risk prenatal age period. A favorable environment for a pregnant woman is somewhere that does not expose the child or mother to unhealthy toxins in the air. An example of an unsafe environment for pregnant women and children is a house with lead paint in it (Joon et al., 2021). Assuring that mom and baby are in a healthy environment during the prenatal period is an essential for optimal prenatal nutrition, as well as ASD prevention in the child.

After the child is born, the parents have options for how they are going to feed their child. Research recommends that parents opt to breastfeed their children. In addition to having many health benefits, it is also a protective factor for ASD. Breast milk contains lots of nutrients that contribute to healthy childhood development, such as bifidobacteria, lysozyme, lipoxins, glutathione, and anti-inflammatory cytokines. These nutrients not only boost the child's immune system, they also have the ability to protect the child from developing ASD. Children with ASD have lower levels of bifidobacteria and lysozyme in their bodies. If children obtain these

nutrients through breast milk, then their risk for developing ASD will decrease (Gialloreti et al., 2019). Many other studies and resources for new parents promote breastfeeding and discuss its importance. Nonetheless, it is important for parents to seek out these types of resources in order to be knowledgeable about optimal child development.

## **Conclusion**

Prenatal nutrition is essential for having a healthy child and preventing neurodevelopmental disorders such as ASD. The issue of prenatal nutrition being linked to ASD needs to be addressed with expecting mothers everywhere so they can be educated on how they should take care of their bodies during this time so their child is as healthy as possible. Expectant mothers should be educated about how to care for themselves during the prenatal period through taking supplements and vitamins, eliminating chemicals from their environment and diet, as well as watching out for signs of maternal obesity and having children during the preferred age period of 20 to 32. They also should learn the benefits of breastfeeding, so they can continue to give their baby all the nutrients they need in the beginning of their life. Hopefully, as a result of further parent education, the rate of ASD and other neurodevelopmental disorders in young children will decrease significantly.

## **Goals and Objectives for my Parenting Lesson**

**Goal #1: Participants will grasp the significance of how prenatal nutrition has the ability to either positively or negatively impact child development.**

**Objective 1:** Each parent will make a list of three supplements or diet changes that should be made during pregnancy, as well as a list of three drugs or medications that should be avoided during pregnancy.

**Objective 2:** Parents will discuss with one another the do's and don'ts of prenatal nutrition in relation to child development.

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