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The effect of prenatal alcohol exposure (PAE) on the onset of speech disorders and communication problems in children and adolescents

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Abstract

Alcohol consumption has many negative effects on the human body, and has been proven to have teratogenic effects on fetal development. Prenatal alcohol exposure (PAE) is associated with growth deficits and neurodevelopmental disorders, including fetal alcohol spectrum disorder (FASD). Despite such effects, there are still many women who do not give up the consumption of alcoholic beverages during pregnancy. This article, based on a review of available studies on PubMed, examines whether prenatal alcohol exposure can cause problems in children's speech development and promote communication problems in children, as well as in adolescents.

Longitudinal observations on prenatal alcohol exposure (PAE) have shown that children up to the age of 3 after PAE have difficulties in receptive or expressive communication compared to a group not prenatally exposed to alcohol. Alcohol has been shown to be the overriding factor causing disorders in the development of the brain and nervous system, which are the main structures responsible for the process of speech development and also the formation of communication skills.

Studies among adolescents with PAE have shown that they have weaker spoken and written language skills than those without PAE or with low PAE. This also translates into difficulties in developing their communication skills, which can make it much more difficult for them to become independent and move smoothly through the difficult period of adolescence.

Keywords: PAE; speech development; communication problems; FASD; children; adolescents

Introduction.

Alcohol consumption can cause many negative effects. The most commonly mentioned is alcoholism. Addiction poses a serious threat to the addict and those around him. However, in addition to such disorders, there are a number of other problems associated with alcohol consumption that are equally important and certainly worth addressing.

Ethyl alcohol has been proven to have a teratogenic effect on fetal development, and numerous existing guidelines recommend that women abstain from alcohol both during pregnancy and lactation [1 , 2]. However, despite this, many expectant women do not give up consuming alcoholic beverages. Worldwide, about 10% of women in the general population consume alcohol during pregnancy, and the European region has the highest rate of consumption (25%) [3].

Alcohol consumption during pregnancy can be associated with many problems, including the onset of Fetal Alcohol Syndrome (FAS) [4]. What other effects can it cause? In this article, based on a review of publications, we will prove the negative effects of alcohol consumption by pregnant women on problems with speech development delay in children, as well as the occurrence of communication difficulties in children and adolescents.

Development of speech.

In the first months of life, the infant learns to use the speech apparatus. Speech development is inseparable from normal hearing, although some early stages of it (e.g., babbling) can occur even in deaf children. [5]

Speech transmission and reception depend on the activities of many organs, primarily the brain, the most important of which are phenomena arising in cortical structures, but phenomena occurring in the extrapyramidal system and neural pathways are also important; Speech organs also play an important role; they are directed by cortical structures and also depend on the action of peripheral nerves and on the anatomical structure of the aforementioned organs;

The organ of hearing is also essential for the proper development of speech. It is it that, thanks to its properties, determines the hearing and understanding of the speech of others, as well as controls the process of formation of one's own speech. The organ of sight, which makes it possible to read speech from the movements of the mouth, also participates to some extent in the perception of speech.

We divide the development of a child's speech from birth to the age of 7 into four periods: the period of melody, the period of expression, the period of sentence and the period of peculiar child speech. [6]

The ability to speak, like most human abilities, is determined both genetically and environmentally. Each of us has certain innate predispositions that allow us, under the influence of external factors, to go through successive stages of speech development.

A properly formed speech organ is an important prerequisite for speech development, but this process depends primarily on properly functioning brain structures. [7]

Many factors can be responsible for abnormalities in the development of the nervous system in the fetus, but a particularly widespread substance with confirmed harmfulness is alcohol. As early as the 18th century because in 1725, alcohol consumption by pregnant women began to be associated with fetal growth retardation and neurological abnormalities in the child. Starting in 1809, scientists followed Lamarck's theory, which stated that disorders acquired by parents during life are passed on to their offspring. It was believed that most traits are inherited mainly from the father. In the 19th century, parental alcoholism was linked to developmental defects in the child . Fetal alcohol syndrome was first characterized by Rouquette in 1957 and Lemoine et al. in 1968 as a syndrome consisting of 4 features: facial anomalies, specifically a narrow forehead, receded upper lip and characteristic ears ; severe growth retardation, both prenatal and postnatal ; developmental defects and central nervous system anomalies manifested mainly in hyperactivity or mental retardation. [8].

The impact of PAE on the onset of speech disorders and communication problems in children.

Today, scientific developments have made it possible to take a closer look at PAE. A number of scientific studies have been conducted to see how prenatal alcohol exposure affected the development of children. One of them looked at whether alcohol was a factor in damaging a child's nervous system. To do this, children with PAE and their healthy peers were examined using magnetic resonance imaging (MRI). Data from this MRI study were used to analyze the proportion of variance in structural and functional brain abnormalities. The results of this study showed that PAE was the dominant factor responsible for changes in brain size and structure, as well as brain functions such as intellect, memory, speech development, executive function, motor function, and susceptibility to psychiatric disorders [9].

A systematic review of available longitudinal studies on the effects of PAE on language, speech and communication development, as well as related potential environmental disruptors in the preschool period, was also conducted. Two themes were identified from the selected literature: (1) the impact of PAE on receptive, expressive and speech delay; (2) contextual risk factors associated with PAE in early receptive, expressive communication and speech acquisition.

This study showed that severe PAE was significantly associated with speech development disorders in children, and that the alcohol-exposed group had lower scores than the unexposed group. There were significant associations between severe PAE, vocalization and the appearance of words in the first period, that is, until the child reached 12 months. In children beyond 24 months of age, it was also shown that severe PAE was significantly associated with expressive abilities, with lower scores occurring in the group exposed to alcohol during pregnancy compared to the control group. The study data confirms that, worldwide, young children face severe language challenges in the early stages of life as a result of PAE. Longitudinal studies show a negative impact on the trajectory of language development during the first 3 years of life. These studies revealed that after adjusting for a number of sociodemographic, physiological and environmental variables, there was a delay in receptive and expressive communication among children exposed to alcohol in fetal life compared to unexposed children. [10]

The impact of PAE on the onset of speech disorders and communication problems in adolescents.

Difficulties with oral and written communication skills are common among children with PAE; however, less is known about how the communication skills of adolescents with PAE compare to their peers without PAE.

Adolescence is a time of development of neurocognitive skills that enable a young person's independence and also influence social, educational, health and economic trajectories. This difficult time of transition into adulthood, is also considered a high-risk period for individuals with fetal alcohol spectrum disorder (FASD).

A systematic review was conducted to gather evidence on the oral and written communication skills of adolescents with PAE or FASD and how they compare to those without PAE. The studies included in this review found that participants with PAE had poorer vocabulary and weaker skills in semantic knowledge, semantic processing, verbal learning and memory, as well as reading and spelling compared to those without PAE or with low PAE. They also found that expressive vocabulary skills were generally weaker among adolescents with PAE compared to adolescents without PAE or with low PAE.

Few studies in this review looked at reading and spelling skills. However, those that did, indicated that adolescents with PAE perform worse. Since reading requires the ability to decode graphemes as well as receptive language, weaknesses in one or both can compromise reading ability. Several studies included in this review looked at means of communication that rely on grammatical comprehension and expression. However, none of the studies used grammatical measures or directly described grammatical skills. As a result, it is unclear how the grammatical skills of adolescents with PAE compare to those of those without PAE or with low PAE, and what the implications are for their communication skills. [11]

The issue is still not fully explored.

Conclusions.

Based on systematic reviews, the following conclusions can be made. Longitudinal observations of prenatal alcohol exposure (PAE) among children under the age of 3 have shown that children in this group have considerable problems in receptive or expressive communication compared to the non-exposed group, even after accounting for many other environmental factors. Also, adolescents with PAE compared to adolescents without PAE or with low PAE will show weaker skills in some areas of oral and written communication, as well as verbal processing skills that underlie and support communication skills.

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