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За издавача
Микаило Кијановић
проф. др Јасмина Ковачевић

Главни и одговорни уредник
проф. др Надежда Д. Димић

Ко-уредник
проф. др Јасмина Ковачевић

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RISK FACTORS ASSOCIATED WITH DEVELOPMENTAL ARTICULATION DISORDERS

Ivana Bogavac[1,2], Ljiljana Jeličić Dobrijević[1],[2], Marina Vujović[1]

[1] Institute for Experimental Phonetics and Speech Pathology, Belgrade
[2] Life Activity Advancement Center, Belgrade
ivbogavac@gmail.com, lilijen@ymail.com, marinazlatkovic@hotmail.com

Speech and language development is influenced by multiple factors and depends on interaction between biological bases and environmental influences. Developmental process of voices pronunciation acquisition is a part of speech and language development. Various risk factors during labor and after the birth, besides risk factors present during the pregnancy, may have a negative influence on early child development including the process of speech and language acquisition. Research aim was to determine in what extend are present different perinatal and postnatal risk factors in children who have developmental articulation disorders. The research was conducted in Institute for experimental phonetics and speech pathology (IEPSP) in Belgrade. It included a group of 215 children (118 boys and 97 girls) at the age between 3 and 9 years who have diagnoses of developmental articulation disorder (Dyslalia-F80.0) according to estimation by IEPSP Test Battery. All children were on continuous audio-linguistic treatment. Methodology procedures included the elaboration of case-history files and medical reports from maternity hospital which refer to presence of risk factors before, during and after the birth. Research results showed that perinatal and postnatal risk factors may be in relation with developmental articulation disorders and were discussed according to their frequency in relation to articulation disorders.

KEYWORDS: risk factors, developmental articulation disorders.

1. INTRODUCTION

Acquiring speech and language is complex and multi-dependent process. At the one side we have biological base and at the other we have environmental influences. Biological base is insufficient for fully development of speech and language, and environmental influences are not enough without biological base.

Intrauterine development can be affected by the biological and environmental factors. Prenatal or intrauterine development is referred to fetal development from conception till birth and lasts 40 weeks. All conditions under which the fetus is developing, as well as the conditions during the delivery and after the birth have a role in creating the basic capacity of child given at birth. This is the main factor that determines development of child`s abilities for accepting and using environmental influences (Barlov et al. 2007).

If the child was exposed to one or multiple stresses in the prenatal, perinatal or postnatal period, it is usually referred as a "risk child" (Markovic, 1998).

The concept of risk is crucial for prevention programs. In terms of language impairment, to be at-risk means that "individuals with certain characteristic are more likely to have undiagnosed language impairment or will develop this condition in the future than individuals without these characteristics" (Finkelstein and Ramey, 1980).

Risk factors measurement is a valid pursuit in identifying important associations. In choosing the term "risk" those epidemiology recognize that risk variables may not serve as casual agents, at least in the sense of being necessary and sufficient conditions for the disease occurrence. Instead, risk factors are viewed as influencing liability, particularly for complex conditions that are likely to be heterogeneous with respect to cause and, furthermore, have multifactorial causal complexes associated with disease (Tomblin et al., 1997). On that basis it is necessary to provide early intervention services to those children who are at risk for developing a disorder (Stanton-Chapman et al., 2002).

Developmental articulation disorder is also known as speech sound disorder. According to 2014 ICD-19-CM it is developmental dyslalia with diagnosis code F80.0. Children with developmental articulation disorder have difficulties in correctly producing the speech sounds appropriate for their age and dialect. For a diagnosis of developmental articulation disorder, cases that arise from hearing impairment, structural abnormalities of the speech apparatus or known neurological conditions must be excluded.

Because there is no known cause for developmental articulation disorder, it is important to find associated risk factors that could lead to it.

2. RESEARCH AIM

The aim of the research was to determine in what extend are present different perinatal and postnatal risk factors in the children who have developmental articulation disorders.

3. RESEARCH METHODOLOGY

The examined group consisted of 215 children (118 boys and 97 girls) at the age between 3 and 9 years who have diagnoses of developmental articulation disorder (Dyslalia-F80.0) according to estimation by IEPSP Test Battery. All children were on continuous audio-linguistic treatment in Institute for experimental phonetics and speech pathology (IEPSP) in Belgrade where the research was conducted. Methodology procedures included the elaboration of case-history files and medical reports from maternity hospital which refer to presence of risk factors before, during and after the birth. Perinatal and postnatal risk factors which were observed referred to: type of delivery, APGAR score, asphyxia, oxygen therapy immediately after birth, being in the incubator, brain hematoma, umbilical cord wrapped around neck and hyperbilirubinemia, secretory otitis and bilingualism.

4. RESULTS AND DISCUSSION

Analyzing the group of 215 children who have diagnosis of developmental articulation disorder, it is noticed that110 children (51.2%) did not have any of the risk factors registered in perinatal or postnatal period. That is around 50% of the children included in the study.

We noticed that certain risk factors were emerged together because they are interdependent. The example for that is assessment of Apgar score: children with Apgar score 7 and less mainly had asphyxia, therapy with oxygen or were placed in the incubator.

Apgar score tells about child's vitality at birth. In our study, Apgar score 7 and less was taken as a risk factor which may have negative impact on early children psychological and physiological development. Taking into consideration the literature and researches which referred to this risk factor, it is defined that healthy newborns have APGAR score between 10 and

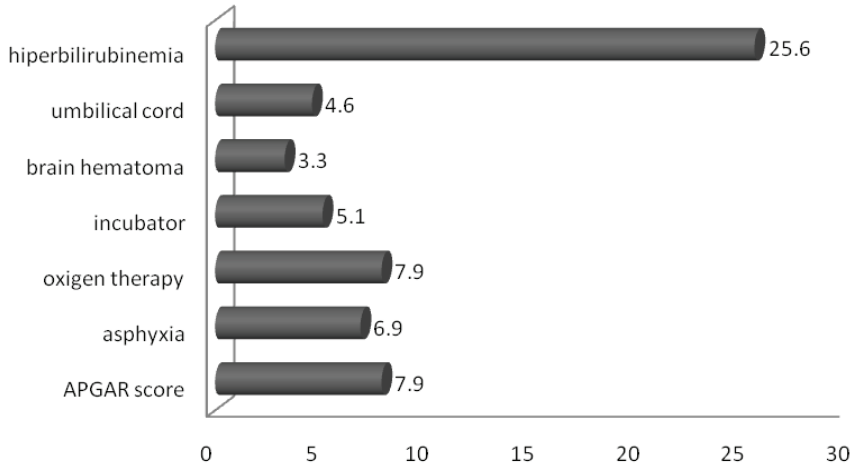
8, while hypoxic newborn is one with Apgar score between 7 and 0 (Kurjak, 1989). Children whose Apgar score was 7 and less are likely to have neurological problems (Kičić 1989, Nelson, 1981). The role of Apgar score is not absolutely clear from the literature. Andrews et al. (1995) reported that Apgar score less than 8 predict future problems in developing of language.

The analysis of the APGAR scores in our study showed that in 7.9% of children had the score 7 and less, *Graph1*.

The analysis of children who had oxygen therapy immediately after the birth showed that it was registered in the same percentage (7.9%) as scores of low apgar were, *Graph 1*.

Asphyxia as a risk factor is present in 28.2% of cases and in literature it is cited to be the leading direct cause of perinatal death or perinatal cell injury in CNS (Nelson, 1983). If the duration of asphyxia was short, neurological signs of CNS damage can fade with time, and eventually disappear, but there will always be permanent deficit in terms of functionality of higher cortical functions. Permanent neurological and psychological deficits are expressed in later period and are manifested as hyperkinetic behavior disorders, perception and attention disorders, difficulties in organization of practical activities. At the school age, the consequences of asphyxia are expressed as learning difficulties, difficulties in accepting the school discipline and poor results in acquiring the school curriculum (Gašić, 1992).

Our research study showed that asphyxia as perinatal and postnatal risk factor was registered in 6.9% of children, *Graph 1*.

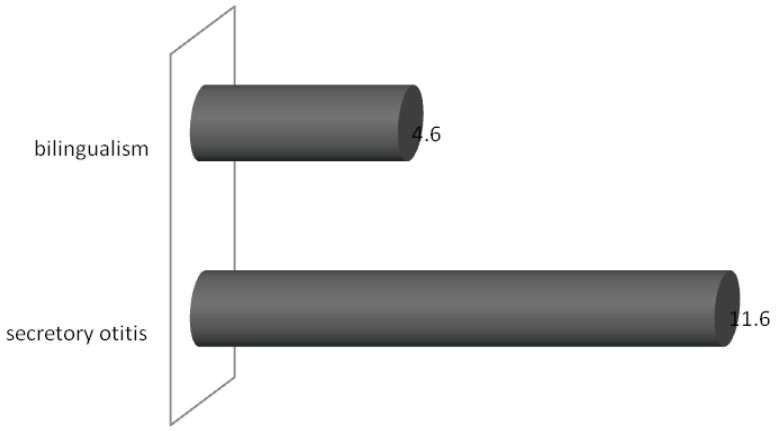


Graph 1. ***Registration of perinatal and postnatal risk factors (in %)***

When observing the umbilical cord wrapped around neck as a perinatal risk factor, it was registered in smaller percentage of children (4.6%) while when observing the brain hematoma it is noticed that it was registered in 3.3% of children, *Graph 1*.

Neonatal period, especially in group of premature born children, is often affected with hyperbilirubinemia. Hyperbilirubinemia is one of the most common risk factors during pregnancy (51.8%), beside low APGAR score (50.9%). Findings from literature indicated that hyperbilirubinemia can cause different kind of metabolic disturbances (Kicic, 1989) as well as abnormalities in auditory brain regions. These changes may have been reversible with reduction of bilirubin level and by using blood transfusion and phototherapy (Tan et all., 1992). Hiperbilirubinemia is often correlated with auditory perception disorders and hearing impairments. The basic neurotoxical effect of bilirubin can have transient character (Markovic, 1998).

Hyperbilirubinemia is the most frequent risk factor registered in group of children with developmental articulation disorders (25.6%), *Graph 1*. It is obviously that almost one quarter children had hyperbilirubinemia in some extend within first days of their life. According to that, it is assumed that hyperbilirubinemia may be in relation with articulation disorders. This is in relation with neurological findings about neurotoxicity of bilirubin which is expressed on different developmental levels (Kicic, 1989; Tan et al. 1992; Markovic, 1998; Amin et al. 2009).



Graph 2. ***Registration of secretory otitis and bilingualism (in %)***

In early child development there are some risk factors which may affect speech and language development and very often are in relation with articulation disorders. These are secretory otitis and bilingualism.

Analyzing research results it is noticed that in 11.6% of children secretory otitis was registered as postnatal risk factor, *Graph 2*. It is obviously that this risk factor is in relation with articulation disorders because it directly has an influence on auditory perception. In early childhood children adopt the voices of native language and the basic condition for regular speech acquisition is regular auditory perception. It is important to mention that even small deviations in auditory perception may be negatively reflected in process of voices articulation. That is the main reason why auditory perception should be tested in all children with articulation disorders.

When observing the bilingualism as postnatal risk factor, it is noticed that it was present in small percentage (4.6%), *Graph 2*. This means that children who grow up inside bilingual area do not consequently developed articulation disorders. When talking about articulation disorders in group of children who parallel adopt two or more languages, primarily is necessary to estimate the pathological forms of articulation which exist independently of articulation basis of these languages. After detection of pathological forms in articulation (omissions, substitutions and strong distortions) we also take into consideration the impact which these parallel languages and their articulation base may have on each other.

5. CONCLUSION

Risk factors present during prenatal period, in labor and after the birth may have a negative influence on early child development including the process of speech and language acquisition. The process of voices acquisition and voices articulation is important segment of speech and language development which can be affected by prenatal, perinatal and postnatal risk factors. Hyperbilirubinemia and secretory otitis are the most frequent risk factors related with developmental articulation disorders. In relation to that, early detection of risk factors should be followed by early speech and language treatment which would prevent the pathogenesis not only in speech and language development but also in later cognitive and emotional development, learning abilities and behavior.

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УЧЕСТАЛОСТ РИЗИКО ФАКТОРА КОД ДЕЦЕ СА ПОРЕМЕЋАЈЕМ АРТИКУЛАЦИЈЕ

ИВАНА БОГАВАЦ[1,2], ЉИЉАНА ЈЕЛИЧИЋ ДОБРИЈЕВИЋ[1,2],
МАРИНА ВУЈОВИЋ[1]

[1] Институт за експерименталну фонетику и патологију говора, Београд
[2] Центар за унапређење животних активности, Београд
ivbogavac@gmail.com, lilijen@ymail.com, marinazlatkovic@hotmail.com

РЕЗИМЕ

Развој говора и језика се одвија под дејством многобројних фактора и зависи од интеракције биолошке основе и срединских утицаја. Развојни процес усвајања гласова је важан сегмент говорно-језичког развоја. Различити ризико фактори присутни током трудноће, на самом порођају као и у периоду после рођења детета могу неповољно утицати на све сегменте раног развоја детета, укључујући и процес усвајања говора и језика. Циљ рада је утврђивање учесталости одређених перинаталних и пренаталних ризико фактора код деце са развојним поремећајима артикулације. Истраживање је спроведено у Институту за експерименталну фонтику и патологију говора (ИЕФПГ) у Београду. Испитивана група је обухватила 215 деце (118 дечака и 97 девојчица) узраста од 3 до 9 година старости, која су имала дијагнозу поремећаја артикулације (Дуслалиа – Ф80.0) према процени путем Батерије тестова ИЕФПГ-а. Сва деца су била на континуираном логопедском третману. Методолошка процедура је обухватила детаљан преглед картона деце као и отпусних листа за новорођенчад на основу којег су регистровани ризико фактори присутни пре, током и након порођаја. Резултати истраживања су показали да се перинатални и постнатални ризико фактори могу довести у везу са развојним поремећајима артикулације, а дискутују се у односу на артикулациони поремећај као и њихову учесталост појављивања.

КЉУЧНЕ РЕЧИ: ризико фактори, поремећаји артикулације