ETIOLOGY OF LANGUAGE DISORDERS – EARLY PREDICTORS FOR LANGUAGE IMPAIREMENT

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Abstract: The etiology of the language disorders is a widely discussed topic not only by speech therapists, who work directly with communication disorders, but also by doctors, psychologists, psycholinguists, teachers. They all are interested in the origin of language disorders and their related factors - biological, psychological or due to environmental factors.
This article will present some of the most commonly discussed hypotheses, described in the world literature, related to the present topic. Knowledge of the etiology is the basis that enables clinicians to perform quality assessment, prevention and treatment in children in early childhood. In-depth attention to the predictors of language disorders makes it possible to identify children at potential risk of language developmental disorders.
Early detection of children at risk of language impairment is the key to appropriate therapy, but the risk factors described in the article are the critical point in the prevention of language impairments.
The study of the literature resources emphasizes the special interest and attention to the genetic and neurobiological factors, as well as to the prenatal features, socioeconomic status of parents of children with language impairment.
1.Purpose - this report aims to examine the world scientific literature, which describes the possible risk factors, associated with language developmental disorders.
2.Methodology - the purpose of the present report is to study the newest articles, published in Web of Science, Scopus, EBSCOhost, and Science Direct.
3.Results - several possible hypotheses were clearly identified. The disturbed language system is in most cases a consequence of several factors - biological, prenatal and socioeconomical.
4.Conclusions - knowledge of risk factors is crucial for the early identification of children at risk of language disorders. Early assessment and treatment are extremely important for the overall development of the child - not only linguistically, but cognitively, behaviourally and emotionally.
5.Recommendations - we recommend publicity on topics related to the etiology and early risk factors for parents or people caring for children.
Keywords: Public health, Assessment, Etiology, Language development

1. INTRODUCTION

Language is a means of communication and human ability and can be described as a process that represents conventional symbolic system combined systematically and serves for understanding and sending information (Passaglio et al, 2015). Researchers of children's development show interest and examine extensively the language ontogeny due to the fact that the language disorders are the most common pathology in childhood (Deldago, Vagi, & Scott, 2005). According to Ramsden and Durkin (2015) children with language disorders show deficits in their ability to learn and use language in all its forms despite of their normal development. According to Finestack (2018) children with language disorders show substantial language disabilities although they do not meet the criteria for intellectual incapacity. About 7% of children in preschool age have language disorders (Tomblin et al, 1997).

2. PURPOSE

This report aims to examine the world scientific literature, which describes the possible risk factors, associated with language developmental disorders.

3. METHODOLOGY

For the purpose of the present report were examined articles, published in the world-famous websites and scientific databases - Web of Science, Scopus, EBSCOhost, and Science Direct.

4. RESULTS

According to the review of the identified literature on the issue connected with the risk factors causing language developmental disorders, a few possible hypotheses were clearly outlined, which interact to a great extent. The

impaired language system commonly is a consequence of a few possible factors - biological, prenatal and socioeconomical.

Biological factors

Grigorenco (2009) notes that there are essential proofs, which confirm language disorders found in whole families. The proofs from these researches clearly demonstrate the importance of the genetic factors for the development of different forms of language disorders. The average morbidity rate for language disorders in families of children with language disorders is 35% compared to the average morbidity rate of 11% in the control families.

Ramsden and Durkin (2015) pay attention to the fact that a major part of children with language disorders have family history of language impairment in their close relatives.

The studies of twins that prove the genetic predisposition for occurrence of language disorders represent interest. For example, Grigorenko (2009) notes that the factor inheritance for these disorders is high and informs about a study involving twins that shows the existence of genetic influences on the language development. According to Ramsden and Durkin (2015) the participation of genetic factors is clearly outlined in the studies of twins and monozygotic twins are more likely to have language developmental disorders compared to dizygotic twins. They show that the brothers and sisters of the affected children are exposed at a higher risk - on average 30% of them are exposed to a risk of language disorder.

Brookman (2016) describes the results of 5 studies of twins and four of the studies show that the monozygotic twins are riskier for language disorders compared to dizygotic twins. In difference to the first four studies, the author of the fifth study doesn't find any significant difference between monozygotic and dizygotic twins with regard to language disorders and determines the factor "inheritance" as negligible. The said differences give us ground to pay attention to the fact that the genetic factors cannot be accepted as fundamental upon clarification of the etiology of language disorders.

Another type of biological factors are presented by Krishnan, Watkins and Bishop (2016). They note that there are data about subcortical anomalies in individuals with language disorders especially in the striatum (the subcortical brain structure, a part of the basal ganglia). Studies are combined to confirm that the volume of caudate nucleus in children with language disorders is modified compared to their typically developing peers. The existing literature that they describe also shows that differences in the volume of this structure depend on the age. Early differences observed in striate volumes between children with language disorders and typically developing children seem to normalize until late adolescence.

In his article, Brookman (2016) describes data about interesting family cases, where family members suffer from severe language and speech disorders and the results from their tests show mutation of FOXP2 gene and the consequences thereof result in severe communicative disorders. It also describes another language related gene – CNTNAP2, which is important for the language development of children at the age of two years. Brookman (2016) describes a few genetic syndromes, which are connected with the atypical language development - the Down Syndrome, the Williams Syndrome and the Klinefelter Syndrome.

Graham and Fisher (2013) claim that the FOXP2 mutations are rare and do not explain common language disorders but however FOXP2 probably is a centre associated with the phenotypes of speech and language while the CNTNAP2 gene contributes to the typical forms of specific language disorders.

In a cohort study of more than 180 families with language disorders, a cluster of single nucleotide polymorphisms (SNPs) in CNTNAP2 is associated with the language incapacity (Graham and Fisher, 2013). The same cluster SNP is associated with the autistic spectrum disorder and with the early language learning.

The efforts for identification of genes regulated by FOXP2, influence CNTNAP2, which are associated with language disorders, are confirmed also by Kang and Drayna (2011).

Watkins, K. (2011) gives the results from its own studies connected with FOXP2 gene mutation and its impact on neuronal mechanisms, which are responsible for speech, orofacial praxis and areas of language competence.

Newbury and Monaco (2010) identify three main areas associated with language disorders - these are chromosomes 13, 16 and 19. Chromosome 16 is subject of a profound study, considerable association was found with two individual clusters of common genetic variants located in the ATP2C2 gene and the CMIP gene. The variety in both genes is associated mainly with the performance of the task for phonological short-term memory. The regression modelling shows that ATP2C2 and CMIP have effect on the capacity of the phonological memory.

Kang and Drayna (2011) state that CMIP and ATP2C2 are associated with the language disorders and especially with non-word repetitions and presume well characterized phenotype criteria within the language disorders.

Paquette et al (2015) study early electrophysiological markers for atypical language functioning of premature children. The purpose of this study is to establish whether these disorders may be identified in the early phase of life with the help of electrophysiological auditory event-related potentials (AERPs) and mismatch negativity (MMN). Their study has established delayed answers for (AERPs) and mismatch negativity (MMN), studying the speech

sounds in premature children. These answers correlate with the poorer language results from their language developmental test, which presumes that AERPs and MMN may be used for early identification of children at risk for language disorder at the age of 3 years.

Prenatal factors

The results from the study of Delgado et al (2005) show that the multiple deliveries, the condition of the newly born, the existence of congenital anomaly, the mother's age (above 35 years) and the availability of medical history of the mother are associated with increased risk of speech and language disorders. They state as most evident the differences between the groups of factors - prematurity and low weight at birth. Babies born before 37th gestation week or with weight less than 2500 g have been at increased risk for language disorder. Very low weight at birth i.e. weight <1500 g is among the most obvious risk factors for language developmental disorders in their study.

Stanton-Chapman, Chapman, Bainbridge and Scott (2002) analyse the risk factors for language disorders and report the risk associated with low weight at birth as well as low 5-minute Apgar. They prove that these are among the most obvious predictors for identification of children with language disorders. Other risk factors connected with considerable increase of risk are the condition of the newly born, the mother's age, the gestation week and the availability of congenital anomaly.

Parental Education and Socioeconomic Status

There are studies regarding the education of mothers, which show that children born from mothers without high school education are exposed to a risk for both cognitive and behaviouristic problems and the cause about that can be sought also in the deficit of the mother's knowledge about the child's development and the parental abilities (Stanton-Chapman et al, 2002). It has been found that the parents of children in preschool age with language disorders communicate less with their children, lose patience faster, scold them, threaten them, do not communicate with them sufficiently, use a limited vocabulary compared to mothers of typically developing children. The results from their study correspond to previous studies, which have identified the single parenthood, late or missing prenatal care as well as the low weight at birth as factors associated with language disorders (Stanton-Chapman et al, 2002).

Ramsden and Durkin (2015) summarize that the number of children with language disorders, living in unequal position is enormous and the children living in conditions of poverty show two or more years of language development delay when they start school. They also conclude that children of educated parents with occupation hear approximately 3 times more verbal language compared to children of parents with lower level of education. The results from the study of Delgado et al (2005) do not show increased risk of language and/ or speech disorder among children whose mothers have high education or lower education as at the moment of birth of the child and this is also confirmed by the studies of Tomblin (1996) and Tomblin, Hardy and Hein (1991). However, they inform about many other studies proving that the low level of education of the mother is a risk factor for language disorders. Delgado et al (2005) state that the mother's education is connected with the environment and the experience of children including with the variety of the books and toys at home, which create a stimulating environment for the children and the mother's education is also connected with knowledge about the development of children, the parental practices and the quality of the language environment. Rudolph (2017) present results from meta-analysis whose results show that at least four factors - level of mother's education, order of birth, biological gender of child and the 5-minute Apgar are outlined upon identification of small children who are at an increased risk of language development disorder.

According to Fisher, Lai, and Monaco (2003) there are few proofs that the factors of the environment are often reasons for development of language disorders. It has been established that speech and language disorders are prone to accumulate in families. The family dependence is compatible with the role of the genetic risk factors but may be influenced also by the environment. This issue can be solved by studying twins of which at least one has language and speech disorder. Fisher et al (2003) inform about one of the largest studies involving 90 twin couples and report 70% concordance among dizygotic twin couples compared to 46% among monozygotic twin couples. Gender ratio associated with language disorders is also interesting. According to Ramsden and Durkin (2015) language disorders are more common among boys compared to girls with approximate rate of 2:1. Tomblin et al (1997) communicate that the gender ratio of male to female is 2:1 for language disorders among the 3-year children subject to the study and describe also other tests that establish higher percentage of risk among men compared to women. Similar conclusions can be made with regard to racial differences among children with language disorders. In some of the mentioned studies is reported higher percentage of language incapacities among the members of minority groups from the studied population. In another study they note that to a greater extent the evaluation for language difficulties refers to black children and this can be a result of cultural or socioeconomic factors and race. Tomblin et al (1997) report that it is not possible to determine the connection between the race and the increased rate of language disorders due to the fact that epidemiological studies require highly standardized methods, which essentially are not sensitive to cultural differences. Nozadi et al (2013) have found the relation between the

sensitivity of the mother and the language ability of children and explain it by encouraging the competence and the independence of children. Nozadi et al (2013) report that sensitive mothers are more likely to create stimulating environment for their children, pay attention and use more appropriate language while creating an environment which promotes the use of language and the cognitive stimulation. They note that the mother's sensitivity is a positive predictor of the family socioeconomic status. These outcomes correspond to previous studies showing that the mothers in families with higher annual income and higher education show higher sensitivity to their children compared to mothers in families with lower socioeconomic status.

5. CONCLUSION

The review of the world literature has proven that multiple factors influence the occurrence of language disorders in childhood and these factors can have both single and complex etiological impact. The knowledge about the risk factors is of great significance for early identification of children at risk. Early assessment and treatment are extremely important about the overall development of the child - not only language development but also cognitive, behaviouristic and emotional development.

The parents' role in identification of the early symptoms and their prompt response are of great importance about the assessment of young children at potential risk for language developmental disorders.

6. RECOMMENDATIONS

We recommend that the topics related to etiology and early risk factors are made public not only for the specialists who work in the sphere of communicative disorders but also to parents or people who take care of children. Attention, prevention and prompt assessment, adequate and consistent treatment will save precious time for the life and development of children.

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