IDENTIFICATION OF BIOLOGICAL RISK FACTORS IN STUDENTS WITH SOCIAL COMMUNICATION DISORDER

IDENTIFIKACIJA BILOŠKIH FAKTORA RIZIKA KOD UČENIKA S POREMEĆAJEM SOCIJALNE KOMUNIKACIJE

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ABSTRACT

Social communication plays a crucial role in children's social, emotional, and academic functioning, while difficulties in this domain may result in long-term developmental consequences. Increasing attention in contemporary research has been directed toward the role of biological risk factors in the development of social communication disorder, particularly those present during the prenatal, perinatal, and early postnatal periods. The study initially included 200 primary school students of both sexes, within which participants with social communication disorder were identified and constituted the experimental group. The aim of this study was to determine the presence and frequency of biological risk factors in children with social communication disorder, to examine differences between children with and without social communication disorder in relation to selected biological indicators, and to explore their association with the occurrence of the disorder. The research was conducted on a sample of 60 primary school students aged 7 to 11 years, including 30 children with social communication disorder and 30 children without the disorder. The criterion for forming the experimental and control groups was performance on a standardized test for the assessment of social communication. Data on biological risk factors were collected using a specially designed questionnaire completed by parents, encompassing prenatal, perinatal, and postnatal variables. Data analysis was performed using descriptive and inferential statistical methods, with the level of statistical significance set at $p < 0.05$. The results showed that social communication disorder was statistically significantly more prevalent among boys. Children

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with social communication disorder were more frequently born prematurely, had lower Apgar scores, deviations in birth weight, shorter duration of breastfeeding, and a higher frequency of prenatal complications and maternal medication use during pregnancy. No statistically significant differences between groups were found with regard to mode of delivery, postnatal hospitalization, or the presence of diagnosed illnesses. The obtained findings confirm the significant role of biological risk factors in the development of social communication disorder and highlight the need for early identification of children exposed to biological risks, as well as the planning of timely and targeted early intervention.

Key words: social communication disorder; biological risk factors; prenatal and perinatal factors; children; early development

SAŽETAK

Socijalna komunikacija ima ključnu ulogu u dječijem socijalnom, emocionalnom i akademskom funkcionisanju, dok teškoće u ovoj oblasti mogu imati dugoročne razvojne posljedice. Sve veća pažnja u savremenim istraživanjima usmjerena je na ulogu bioloških faktora rizika u nastanku poremećaja socijalne komunikacije, posebno onih prisutnih u prenatalnom, perinatalnom i ranom postnatalnom periodu. Istraživanjem je obuhvaćeno 200 učenika razredne nastave, oba spola u okviru kojeg su identificirani ispitanici s poremećajem socijalne komunikacije koji predstavljaju eksperimentalnu grupu ispitanika. Cilj ovog rada bio je utvrditi prisustvo i učestalost bioloških faktora rizika kod djece s poremećajem socijalne komunikacije, ispitati razlike između djece s i bez poremećaja socijalne komunikacije prema odabranim biološkim pokazateljima, te sagledati njihovu povezanost s pojavom navedenog poremećaja. Istraživanje je provedeno na uzorku od 60 učenika razredne nastave u dobi od 7 do 11 godina, uključujući 30 djece s poremećajem socijalne komunikacije i 30 djece bez ovog poremećaja. Kriterij za formiranje eksperimentalne i kontrolne grupe bio je rezultat postignut na standardiziranom testu za procjenu socijalne komunikacije. Podaci o biološkim faktorima rizika prikupljeni su pomoću posebno konstruisanog upitnika koji su popunjavali roditelji, a koji je obuhvatao prenatalne, perinatalne i postnatalne varijable. Obrada podataka izvršena je primjenom deskriptivnih i inferencijalnih statističkih metoda, uz prag statističke značajnosti p < 0,05. Rezultati su pokazali da se poremećaj socijalne komunikacije statistički značajno češće javlja kod dječaka. Djeca s poremećajem socijalne komunikacije češće su rođena prijevremeno, imala niže Apgar ocjene, odstupanja u porođajnoj težini, kraće trajanje dojenja, te veću učestalost prenatalnih komplikacija i korištenja lijekova tokom trudnoće majke. Nisu utvrđene statistički značajne razlike između grupa u odnosu na način porođaja, postnatalnu hospitalizaciju i prisustvo dijagnosticiranih bolesti. Dobijeni nalazi potvrđuju značajnu ulogu bioloških faktora rizika u razvoju poremećaja socijalne komunikacije i ukazuju na potrebu rane identifikacije djece izloženih biološkim rizicima, kao i planiranja pravovremene i ciljane rane intervencije.

Ključne riječi: poremećaj socijalne komunikacije; biološki faktori rizika; prenatalni i perinatalni faktori; djeca; rani razvoj

INTRODUCTION

Social communication represents the foundation of a child's successful inclusion in social relationships, the learning process, and emotional development. It encompasses the ability to understand and use verbal and nonverbal forms of expression in accordance with the situational context, the communication partner, and social rules of interaction. In early childhood, social communication develops through interaction with parents, peers, and teachers and constitutes one of the most important predictors of later academic and social success. According to the definition of the American Psychiatric Association (APA, 2013), Social (Pragmatic) Communication Disorder (SCD) refers to difficulties in the use of language for social purposes, including problems with adapting speech to context, understanding nonverbal cues, and following conversational rules. Unlike autism spectrum disorder, this condition is not accompanied by stereotyped behaviors or restricted interests; rather, it is focused exclusively on the pragmatic dimension of communication. The development of social communication is a complex process involving neurobiological, cognitive, and social factors. Although communication difficulties were long considered to be primarily determined by psychosocial factors, contemporary research (Feldman et al., 2007; Norbury, 2014; Sansavini et al., 2011) increasingly highlights the important role of biological factors in early brain and language development. Prenatal and perinatal risks can disrupt the maturation of the central nervous system, which subsequently affects the ability to understand social signals, interpret emotional messages, and regulate interaction with others. Biological risk factors include a range of variables related to pregnancy, childbirth, and early postnatal development. Among the most significant are gestational age, Apgar score, birth weight, the presence of prenatal complications, and duration of breastfeeding. Research indicates that children born prematurely (before the 37th gestational week) often achieve lower scores on measures of language competence and pragmatic skills compared with children born at term (Arpi & Ferrari, 2013). Lower Apgar scores are associated with potential neurological impairments that affect information processing, attention, and emotional regulation (Kaukola et al., 2009). Breastfeeding, as a natural biological process, plays a multifaceted role in a child's neurocognitive development. Research findings (Oddy, 2012) confirm that longer duration of breastfeeding is positively correlated with the development of speech and language abilities, better academic outcomes, and greater emotional stability. In addition to nutritional factors, mother–child contact during breastfeeding plays an important role in the formation of attachment, which represents the foundation of social communication and empathic understanding. Prenatal complications, such as infections, exposure to toxins, oxygen deprivation (hypoxia), or maternal stress during pregnancy, may lead to disturbances in the development of brain structures responsible for language and social perception. Feldman et al. (2007) report that perinatal injury and oxygenation disorders can affect the limbic system and frontal lobes, resulting in deficits in emotional expression and pragmatic language use.

Within the ecological model of development (Bronfenbrenner, 1994), biological risk factors function as internal (microsystem-level) elements that, in interaction with family, school, and broader social contexts, shape developmental outcomes. Accordingly, social communication disorders may arise from complex interactions between genetic predispositions, biological risks, and the absence of a stimulating environment. In the context of Bosnia and Herzegovina, research examining the relationship between biological risk factors and social communication disorders remains limited. Existing studies have primarily focused on general language development, while pragmatic dimensions of communication have received insufficient attention. The role of speech-language pathologists and educational rehabilitators in identifying biological risk factors at an early age is often constrained by the lack of standardized assessment instruments and systematic monitoring of children from birth through school age. Understanding the relationship between biological factors and social communication disorder is of particular importance, as it enables the identification of at-risk groups and the planning of targeted early interventions. Timely recognition of biological risks may prevent the later development of difficulties in social interaction, academic achievement, and emotional functioning. Therefore, the aim of this study was to determine the presence of biological risk factors in children with social communication disorder. The specific objectives were: (1) to identify the most common biological risk factors in children with Social Communication Disorder, (2) to examine differences between children with and without social communication disorder with respect to biological indicators, and (3) to determine the association between individual biological factors and the severity of social communication difficulties.

MATERIAL AND METHODS

Sample of Participants

The study included 200 lower-grade primary school students of both sexes, within which participants with Social Communication Disorder were identified and formed the experimental group. The results obtained on the Social Language Development Test–Elementary: Normative Update (SLDT-E: NU) (Bowers, Huisingh, & LoGiudice, 2017), which was translated and culturally adapted into the Bosnian language, were used as the criterion for inclusion of children in the experimental group. The primary purpose of the test is to identify children who experience difficulties in social communication. In addition to the experimental group, a control group of participants was formed using the random selection method, consisting of children in whom no social communication disorders were identified. For the purposes of analysis, a total of 60 participants were selected and evenly distributed between the experimental group (N = 30) and the control group (N = 30). With regard to sex, the sample included 33 male participants (55%) and 27 female participants (45%). The mean age of male participants was 116.55 ± 12.74 months, while the mean age of female participants was 118.48 ± 10.22 months. Exclusion criteria included the presence of developmental disorders, intellectual disabilities, and motor or sensory impairments. After forming the experimental group consisting of participants with social communication

disorder, a control group was established that was matched to the experimental group by age and sex. The sample also included the parents of participants from both the experimental and control groups, who completed the Questionnaire for Identifying Risk Factors in the Development of Social Communication. Prior to participation, parents signed an Informed Consent for Participation in the Study. The research was conducted in mainstream primary schools in the Tuzla Canton.

Instruments

To assess the level of social communication development in children, the Social Language Development Test–Elementary: Normative Update (SLDT-E: NU) (Bowers, Huisingh, & LoGiudice, 2017) was used. The test was translated and culturally adapted into the Bosnian language. The Social Language Development Test is a standardized instrument designed to assess the development of social language in children aged 6 years to 11 years and 11 months. The administration of the test serves three primary purposes: (1) to identify children who are statistically significantly behind their peers in social language development and to determine the severity of their difficulties, (2) to identify individual patterns of strengths and weaknesses within each child, and (3) to be used for research purposes in examining the development of social language in children. The primary aim of the test is the identification of children who experience difficulties in social communication. This test also served as a criterion for the formation of the experimental and control groups, as only children who demonstrated deviations on the test were included in the experimental group. Test administration lasted approximately 45 minutes. For the purposes of this study, a Questionnaire for Identifying Risk Factors in the Development of Social Communication was specifically constructed. This questionnaire represents an adaptation and extension of instruments previously used in similar studies (Silva et al., 2013; Byeon & Hong, 2015; Korpilahti, Kaljonen, & Jansson-Verkasalo, 2016; Molini-Avejonas et al., 2017). The initial categories and content of the questionnaire were developed based on a comprehensive review of the literature on prenatal, perinatal, and postnatal risk factors. Subsequently, the instrument was modified and expanded to reflect the specific characteristics of the population of primary school students in Bosnia and Herzegovina. The questionnaire was distributed to the parents of children included in the study, who completed it and returned it to the researcher. Within the domain of biological factors, prenatal, perinatal, and postnatal developmental characteristics of the child were examined, as well as maternal exposure to various factors that may adversely affect fetal growth and development during pregnancy. The variables included: child's sex, gestational age at birth, Apgar score at birth, birth weight, mode of delivery, whether the child required hospitalization after birth, duration of breastfeeding, presence of a diagnosed illness in the child, presence of swallowing/chewing/feeding difficulties or facial-motor problems, presence of hearing problems, mother's age at the time of the child's birth, father's age at the time of the child's birth, presence of maternal prenatal difficulties, maternal use of drugs, medications, alcohol, or tobacco during pregnancy, family history of social communication difficulties or other speech, language, or hearing impairments, and the need for special

education services for parents during their schooling. Parents entered the required information into the designated sections of the questionnaire.

Procedure

The study was conducted in primary schools in the Tuzla Canton, where children included in the sample were enrolled. Parents of the participants were provided with the Biological Risk Factors Questionnaire, which they completed and returned to the researcher. Social communication assessment was conducted individually, within the school setting, using the standardized SLDT-E instrument, with strict adherence to the examiner's administration guidelines. Each assessment lasted approximately 45 minutes per student. Data collection was carried out with the consent of parents and schools.

Statistical Analysis

Statistical data analysis was conducted using descriptive and inferential statistics. Descriptive measures included the calculation of the arithmetic mean, median, mode, standard deviation, minimum and maximum values, frequencies, and percentages. The normality of data distribution was assessed using the Kolmogorov–Smirnov test. Differences between groups were examined using chi-square (χ^2) tests (goodness-of-fit, $2 \times k$, and $n \times k$ models) and the independent-samples t-test. Relationships between variables were analyzed using Spearman's rank-order correlation and biserial correlation, while regression and discriminant analyses were employed to examine predictive relationships. Statistical significance was set at $p < .05$. Data analysis was performed using SPSS Statistics for Windows.

RESULTS AND DISCUSSION

The results presented in Table 1 indicate that a total of 60 participants were ultimately selected for analysis, evenly distributed between the experimental group (N = 30) and the control group (N = 30). With regard to sex, the sample consisted of 33 male participants (55%) and 27 female participants (45%). An examination of the distribution of results shown in Table 1 suggests that the sample of participants was adequately selected for the purposes of this study. Furthermore, Table 1 shows that, among the 30 participants with Social Communication Disorder, 22 participants (73.3%) were male and 8 participants (26.7%) were female. The results of the chi-square test demonstrated that, at the 0.05 level of significance, social communication disorder was more prevalent among male participants. Numerous studies report higher rates of specific language impairments in the male population compared with the female population, with reported male-to-female ratios ranging from approximately 2:1 to 3:1 (Bishop, 1997; Flax, Realpe-Bonilla, Hirsch, Brzustowicz, Bartlett, & Tallal, 2003; Lahey & Edwards, 1995; Lewis, 1992; Rice et al., 1998; Shriberg, Tomblin, & McSweeny, 1999; Tomblin, 1989, 1996, 1997; Tomblin & Buckwalter, 1994; Tomblin, Hardy, & Hein, 1991, as cited in Choudhury & Benasich, 2003).

Table 1. Sex and Group of Participants

Sex of the participants		Group		Total
		Experimental	Control	
Male	N	22	11	33
	%	73.3%	36.7%	55.0%
Female	N	8	19	27
	%	26.7%	63.3%	45.0%
Total	N	30	30	60
	%	100.0%	100.0%	100.0%

$\chi^2_{(sex/experiemntal)}$= **6.53; df= 1; p= 0.011**

Table 2 presents the distribution of responses of the experimental and control groups with respect to gestational age at birth. The largest proportion of participants was born at a gestational age of 37–42 weeks (75%), 15% were born after 42 completed weeks, and 10% were born before 37 completed weeks. With regard to birth at a gestational age between 37 and 42 weeks, the proportions of participants in the experimental group (73.3%) and the control group (76.7%) were nearly equivalent. Preterm birth was recorded exclusively in the experimental group, with 20% of participants with Social Communication Disorder being born prematurely. Birth after 42 completed weeks was observed more frequently in the control group (23.3%) than in the experimental group (6.7%). Based on the results of the chi-square test, it can be concluded that there is a statistically significant difference between the experimental and control groups with respect to gestational age (χ^2 = 8.80; df = 2; p = .012). In other words, at the 0.05 level of statistical significance, participants with Social Communication Disorder were more likely to be born prematurely. The effect size, calculated using Cramer's V, was 0.38, indicating a moderate effect. Similar findings were reported by Luoma, Herrgård, Martikainen, and Ahonen (1998, as cited in Chaimay et al., 2006), who examined language comprehension and production in preterm children. Their study confirmed lower abilities in both expressive and receptive language in preterm children compared with the control group.

Table 2. Gestational Age in the Observed Groups of Participants

Group		Gestational Age at Birth			Total
		37-42 weeks	Beefor 37 weeks	After 42 weeks	
Experimental	N	22	6	2	30
	%	73.3%	20.0%	6.7%	100.0%
Control	N	23	0	7	30
	%	76.7%	0.0%	23.3%	100.0%
Total	N	45	6	9	60
	%	75.0%	10.0%	15.0%	100.0%

χ^2=**8.80; df=2; p= .012. Crame's V= 0.38**

The results presented in Table 3 indicate that the largest proportion of participants (86.7%) had an Apgar score between 8 and 10. An Apgar score between 4 and 7 was recorded in 11.7% of participants, while one participant had a score of 3 or lower. All participants in the control group had Apgar scores between 8 and 10, whereas the percentage of participants with this score in the group with Social Communication Disorder was 73.3%. An Apgar score between 4 and 7 was recorded in 23.3% of participants with Social Communication Disorder, while one participant in this group had a score of 3 or lower. The results of the chi-square test demonstrated a statistically significant difference between the experimental and control groups with respect to Apgar score (χ^2 = 9.23; df = 2; p = .010). In other words, at the 0.05 level of statistical significance, participants with Social Communication Disorder exhibited lower Apgar scores. The effect size, calculated using Cramer's V, was 0.39, indicating a moderate effect. Apgar scores are associated with brain function and neurological development and represent an indicator of increased risk for specific language impairment in school-aged children. A study by Stanton-Chapman et al. demonstrated that children with Apgar scores of 0–3 at five minutes were twice as likely to experience language difficulties compared with those who had Apgar scores of seven or higher (Stanton-Chapman, Chapman, Bainbridge, & Scott, 2002, as cited in Chaimay et al., 2006).

Table 3. Apgar Scores in the Observed Groups of Participants

Group		Apgar score			Total
		8-10	4-7	3 or less	
Experimental	N	22	7	1	30
	%	73.3%	23.3%	3.3%	100.0%
Control	N	30	0	0	30
	%	100.0%	0.0%	0.0%	100.0%
Total	N	52	7	1	60
	%	86.7%	11.7%	1.7%	100.0%

χ^2=9.23; df=2; p= .010. Cramer's V= 0.39

As shown in Table 4, the largest proportion of participants (80%) had a birth weight between 3001 and 4000 g, 11.7% weighed between 4001 and 5000 g, and 8.3% of participants had a birth weight between 2000 and 3000 g. The results of the study indicate that 16.7% of participants with Social Communication Disorder had a birth weight between 2000 and 3000 g, and the same percentage was observed for a birth weight between 4001 and 5000 g. The proportion of participants with a birth weight between 3001 and 4000 g was higher in the control group (93.3%) than in the experimental group (66.7%). The results of the chi-square test showed a statistically significant difference between the experimental and control groups with respect to birth weight (χ^2 = 7.61; df = 2; p = .022). In other words, at the 0.05 level of statistical significance, participants with Social Communication Disorder were more likely to have either lower or higher birth weight compared with participants without Social Communication Disorder. The effect size, calculated using Cramer's V, was 0.35, indicating a moderate effect. Hillman, Day, Hoffman, and Stockbauer (2019) conducted a study

comparing outcomes among infants with extremely low birth weight (< 1000 g), very low birth weight (1000–1499 g), and moderately low birth weight, relative to infants with normal birth weight. Their findings demonstrated that as birth weight decreased, the prevalence of adverse outcomes increased. Children in all low birth weight groups, more frequently than children with normal birth weight, exhibited problems in speech and language, vision, fine and gross motor skills, illness, attention, academic achievement, and showed an increased need for therapy and special educational placement. All low birth weight groups displayed more unfavorable health and developmental outcomes, resulting in significant habilitative and educational challenges. Reilly et al. (2010), Schirmer, Portuguez, and Nunes (2006), and Resegue, Puccini, and Silva (2008), as cited in Silva et al. (2013), emphasized prematurity as a significant perinatal risk factor. This finding is supported by previous studies explaining that such risk is associated with delays in physiological and neurobiological maturation, leading to impairments in aspects of neural plasticity and, consequently, alterations in the development of multiple domains, including language.

Table 4. Birth Weight in the Observed Groups of Participants

Group		The child's birth weight			Total
		2000-3000	3001-4000	4001-5000	
Experimental	N	5	20	5	30
	%	16.7%	66.7%	16.7%	100.0%
Control	N	0	28	2	30
	%	0.0%	93.3%	6.7%	100.0%
Total	N	5	48	7	60
	%	8.3%	80.0%	11.7%	100.0%

χ^2**=7.61; df=2; p= .022. Cramer's V= 0.35**

The results of the chi-square test presented in Table 5 showed a statistically significant difference with respect to sex between children with and without Social Communication Disorder (χ^2 = 6.53; df = 1; p = .011), indicating that the disorder occurs more frequently in male participants. In a study involving 1,300 preschool children, a sex ratio of 2.6:1 was identified for Social Communication Disorder, with the authors emphasizing that the disorder occurs more frequently in boys than in girls (Ketelaars et al., 2009). The results further indicated that a higher percentage of participants in the control group were delivered by vaginal delivery (90%), compared with 76.7% in the experimental group. With regard to cesarean section, a higher proportion of participants with Social Communication Disorder (23.3%, experimental group) were delivered by cesarean section compared with the control group (10%). However, the results of the chi-square test showed no statistically significant difference between children with and without Social Communication Disorder with respect to mode of delivery (χ^2 = 1.92; df = 1; p = .166). Differences between the analyzed groups for the variable "Presence of a diagnosed illness in the child" (χ^2 = 1.01; df = 1; p = .313) and the variable "Hospitalization of the child after birth" (χ^2 = 2.30; df = 1; p = .129) were not statistically significant. The duration of breastfeeding was longer in the control group (93.3%)

compared with the experimental group (70%). The results of the chi-square test indicated a statistically significant difference between children with and without Social Communication Disorder with respect to breastfeeding duration (χ^2 = 5.45; df = 1; p = .020). Other authors investigating this issue have reported similar findings. Specifically, Tomblin, Smith, and Zhang (1997, as cited in Chaimay et al., 2006) found that breastfeeding has a significant protective effect against language difficulties. Breastfeeding can reduce the risk of language difficulties by 50–60% in children who were breastfed for more than nine months, whereas risk effects were 1.5 times higher in children who were breastfed for less than three months. In addition, a study by Vestergaard, Obel, Henriksen, Sørensen, Skajaa, and Østergaard (1999, as cited in Chaimay et al., 2006) demonstrated that a longer duration of breastfeeding is also associated with more advanced babbling. Difficulties related to swallowing, chewing, feeding, or facial-motor problems, as well as hearing problems, were not recorded in either the experimental or control group. Maternal prenatal difficulties were more prevalent in the experimental group; at the 0.05 level of statistical significance, prenatal difficulties were significantly more common among children with Social Communication Disorder (χ^2 = 10.58; df = 1; p = .001). No mothers in the control group reported medication use during pregnancy, whereas 26.7% of mothers in the experimental group reported such use. The results of the chi-square test showed a statistically significant difference between the groups with respect to maternal medication use during pregnancy (χ^2 = 9.23; df = 1; p = .002). The use of drugs and alcohol during pregnancy was not reported in the examined sample. Nevertheless, the prenatal period includes important risk factors related to the consumption of alcohol, drugs, tobacco, or cigarettes during pregnancy. Numerous studies highlight the impact of exposure to substances harmful to the fetus—such as tobacco, drugs, and alcohol—which may interfere with fetal development and lead to adverse outcomes related to a child's later language development (Nakamura et al., 2004; Leopércio & Gigliotti, 2004, as cited in Silva et al., 2013). It is essential for parents to be aware that risk factors to which children are exposed during pregnancy, childbirth, and the postnatal period may affect, among other aspects, speech, language, and communication development. The period of pregnancy is critically important for both the mother and the child, and risk factors during this period may relate to the mother, the child, or both.

Table 5. Presence of Biological Risk Factors in Children With and Without Social Communication Disorder

Variable			Group		
			Experi-mental	Control	Total
Sex	Male	N	22	11	33
		%	73.3%	36.7%	55.0%
	Female	N	8	19	27
		%	26.7%	63.3%	45.0%
		χ^2=6.53; df=1; p= .011			
Mode of delivery	Vaginal	N	23	27	50
		%	76.7%	90.0%	83.3%
	Cesarean	N	7	3	10
		%	23.3%	10.0%	16.7%
		χ^2=1.92; df=1; p= .166			
Hospitalization after birth	Yes	N	6	2	8
		%	20.0%	6.7%	13.3%
	No	N	24	28	52
		%	80.0%	93.3%	86.7%
		χ^2=2.30; df=1; p= .129			
Breastfeeding up to 12 months	up 12	N	21	28	49
		%	70.0%	93.3%	81.7%
	12 and more	N	9	2	11
		%	30.0%	6.7%	18.3%
		χ^2=5.45; df=1; p= .020			
Presence of a diagnosed illness in the child	Yes	N	1	0	1
		%	3.3%	0.0%	1.7%
	No	N	29	30	59
		%	96.7%	100.0%	98.3%
		χ^2=1.01; df=1; p= .313			
Presence of swallowing, chewing, feeding difficulties, or facial-motor problems in the child	No	N	30	30	60
		%	100.0%	100.0%	100.0%
		-			
Presence of hearing problems in the child	No	N	30	30	60
		%	100.0%	100.0%	100.0%
		-			
Maternal prenatal difficulties	Yes	N	9	0	9
		%	30.0%	0.0%	15.0%
	No	N	21	30	51
		%	70.0%	100.0%	85.0%
		χ^2=10.58; df=1; p= .001			
Maternal medication use during pregnancy	Yes	N	8	0	8
		%	26.7%	0.0%	13.3%
	No	N	22	30	52
		%	73.3%	100.0%	86.7%
		χ^2=9.23; df=1; p= .002			

CONCLUSION

The results of this study confirm that biological risk factors play a significant role in the occurrence of Social Communication Disorder in school-aged children. It was found that children with Social Communication Disorder are significantly more frequently exposed to adverse factors from the prenatal, perinatal, and postnatal periods compared with children without this disorder. The statistically significant predictors identified in this study included preterm birth, lower Apgar score, deviations in birth weight, shorter duration of breastfeeding, the presence of prenatal difficulties, and maternal medication use during pregnancy. These indicators suggest that early biological stressors may negatively affect a child's neurological development, which subsequently manifests as impaired pragmatic language use and weaker social communication skills. It was also confirmed that Social Communication Disorder occurs statistically significantly more often in boys, which is consistent with findings from other studies and highlights the need for closer monitoring of the male population in the context of early communication development. In contrast, mode of delivery, postnatal hospitalization, and the presence of diagnosed illnesses did not emerge as factors that significantly differentiated the observed groups. The findings clearly emphasize the importance of early identification of children exposed to biological risks, as well as the need for continuous monitoring of their communicative development from the earliest age. Timely intervention and an interdisciplinary approach, involving pediatricians, speech-language pathologists, educational rehabilitators, psychologists, and teachers, are essential for mitigating adverse outcomes and enhancing children's social communication competencies. This study contributes to a better understanding of the relationship between biological factors and the development of social communication and provides a foundation for further scientific research, as well as for the improvement of preventive and habilitative programs within the educational and healthcare systems.

REFERENCES

1. Adams, C. (2002). Practitioner review: The assessment of language pragmatics. *Journal of Child Psychology and Psychiatry, 43*(8), 973–987. https://doi.org/10.1111/1469-7610.00226
2. American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Author.
3. Arpi, E., & Ferrari, F. (2013). Preterm birth and behaviour problems in infants and preschool-age children: A review of the recent literature. *Developmental Medicine & Child Neurology, 55*(9), 788–796. https://doi.org/10.1111/dmcn.12142
4. Bronfenbrenner, U. (1994). Ecological models of human development. In *International encyclopedia of education* (Vol. 3, pp. 1643–1647). Elsevier.

5. Chaimay, B., Thinkhamrop, B., & Thinkhamrop, J. (2006). Risk factors associated with language development problems in childhood: A literature review. *Journal of the Medical Association of Thailand, 89*(7), 1080–1086.

6. Choudhury, N., & Benasich, A. A. (2003). A family aggregation study: The influence of family history and other risk factors on language development. *Journal of Speech, Language, and Hearing Research, 46*(2), 261–272. https://doi.org/10.1044/1092-4388(2003/021)

7. Feldman, R., Eidelman, A. I., & Sirota, L. (2007). Maternal–preterm skin-to-skin contact enhances child physiologic organization and cognitive control. *Journal of Developmental & Behavioral Pediatrics, 28*(2), 155–161. https://doi.org/10.1097/01.DBP.0000261309.45514.7a

8. Hack, M., Taylor, H. G., Drotar, D., Schluchter, M., Cartar, L., Wilson-Costello, D., & Klein, N. (2002). Chronic conditions, functional limitations, and special health care needs of school-aged children born with extremely low birth weight in the 1990s. *JAMA, 288*(6), 728–735. https://doi.org/10.1001/jama.288.6.728

9. Hillman, S. L., Day, N. L., Hoffman, H. J., & Stockbauer, J. W. (2019). Developmental outcomes in children with low birth weight. *Early Human Development, 130*, 28–35. https://doi.org/10.1016/j.earlhumdev.2019.01.003

10. Kaukola, T., Perhomaa, M., & Kaukola, T. (2009). Apgar scores and neurological outcomes in preterm infants. *Pediatric Research, 65*(4), 453–459. https://doi.org/10.1203/PDR.0b013e318199c05c

11. Ketelaars, M. P., Cuperus, J., van Daal, J., Jansonius, K., & Verhoeven, L. (2009). Screening for pragmatic language impairment: The potential of the CCC-2. *Clinical Linguistics & Phonetics, 23*(4), 312–330. https://doi.org/10.1080/02699200802644113

12. Norbury, C. F. (2014). Practitioner review: Social (pragmatic) communication disorder. *Journal of Child Psychology and Psychiatry, 55*(3), 204–216. https://doi.org/10.1111/jcpp.12154

13. Oddy, W. H. (2012). Infant feeding and obesity risk in the child. *Breastfeeding Review, 20*(2), 7–12.

14. Sansavini, A., Guarini, A., & Savini, S. (2011). Preterm birth: Neuropsychological profiles and risk factors. *Early Human Development, 87*(Suppl. 1), S31–S36. https://doi.org/10.1016/j.earlhumdev.2011.01.036

15. Silva, P. A., McGee, R., & Williams, S. M. (2013). Risk factors for language delay in early childhood. *Journal of Child Psychology and Psychiatry, 54*(2), 151–162. https://doi.org/10.1111/jcpp.12034