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**Role of Preschool Education in Early  
Support of Prematurely Born Children:  
A Review**

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**Abstract**

Now you can see a general increase in the survival of prematurity, including extremely immature infants of extremely low birth-weight born very early. Follow-up studies concerned with long-term neurodevelopmental outcomes for children born preterm indicate that these children are at high risk for a range of cognitive, learning, neuromotor, and behavioral difficulties. However, to date, most of the existing literature has tended to focus on the medical and developmental impact of preterm birth, with little consideration given to the educational implications. Addressing this research gap is important since cognitive and educational difficulties represent the most commonly occurring cluster of adverse outcomes affecting children born very or extremely preterm, with up to two thirds likely to require educational assistance during their school years. In contrast, very commonly, in premature babies, having difficulty with the start of school, there were no visible problems during the preschool period. Most likely, this is because of varying requirements, and varying dominant forms of activity. Preschool age is a period in which the child's sensitivity to environmental factors can be observed. It concerns the period of its particular activity, especially physical but also intellectual and psycho-social one. It ends with an extremely important developmental goal that is the maturity of going to school. This indicates the need for a thorough diagnosis of prematurely born children in the preschool period, as well as for the development of preschool early support cognitive, motor and socio-emotional programs for premature babies.

The goal of this review is to provide an overview of existing research findings relating to the educational needs of preschool-age preterm children. Methodological issues that need to be addressed in future outcome research relating to the developmental and educational needs of very preterm children are also highlighted. Finally, implications of existing findings for teachers are discussed in terms of the roles of society, education systems, kindergarten, and teachers.

**Keywords:** preterm, low birth weight, very preterm, preschool, review

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## Introduction

In the European Union, over 500,000 children are born premature every year. The percentage of premature births in Europe is on average 7.1% and it ranges from 5.5% (Ireland) to 11.4% (Austria).<sup>1</sup> According to the definition of the World Health Organization, a pregnancy ending in a delivery between the 22nd and 37th week of pregnancy is considered preterm birth (PTB), and a newborn from such a pregnancy is called a preterm infant (WHO, 1993).<sup>2</sup> The extent of prematurity is defined on the basis of either GA or BW. Typically, a GA of less than 37 weeks is considered preterm, less than 32 weeks very preterm (VPT) and less than 28 weeks extremely preterm (EPT). Alternatively, when defined on the basis of BW, a BW of less than 2,500 g is considered a low birth weight (LBW), less than 1,500 g a very low birth weight (VLBW) and less than 1,000 g (or sometimes 750 g) an extremely low birth weight (ELBW).

For several years, the percentage of premature births has not increased. However, owing to the progress of medical technology and neonatology, the global percentage of survivability of extremely immature babies with an extremely low birth weight from very preterm births. On the basis of data from Canada, USA, Australia and Japan, we can say that 80% of children born with a body weight below 1000g survive.<sup>3</sup> There is also an increase in survival rates of newborns born between the 20th and 24th week of pregnancy with a body weight below 500g.<sup>4</sup> A spectacular achievement of perinatal care is, undoubtedly, the survival of a baby born in the 23rd week of pregnancy with the body weight of 289g.<sup>5</sup> Hence, the main problem is prevention of prematurity complications, which often have serious developmental consequences.

Neurological complications of prematurity are a significant problem. A small child's psychomotor development is conditioned by the status of their nervous system and the external environment (the influence of stimuli from the external world). From the beginning, a preterm child is exposed to early damage to the central nervous system (CNS) as well as negative stimuli from the external environment (development under hospital conditions).<sup>6</sup> If hypoxia or central nervous system bleeding occurred (the so-called intraventricular haemorrhage), such a preterm infant is at risk of incorrect psychomotor

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<sup>1</sup>Caring for tomorrow – EFCNI White Paper on Maternal and Newborn Health and Aftercare Services.

<sup>2</sup>Chrzan-Dętkoś, M. 2012, Wcześnieiki. Rozwój psychoruchowy w pierwszych latach życia. Gdańsk, *Harmonia Universalis*, 17.

<sup>3</sup>Kasuda, S, Fujimura, M., Sakuma, I., Aotani, H., Kabe, K., Itani, Y., Ichiba, H., Matsunami, K., Nishida H. 2006. Morbidity and mortality of infants with very low birth weight in Japan. Center variation. *Pediatrics*. 118, 4, 1130-1138.

<sup>4</sup>Kornacka, M.K. 2006. Noworodki płodowe. *Klinika Pediatryczna*. 5, 5095-5096.

<sup>5</sup>Hokuto, I. Ikeda, K. Tokieda, K. Kazuhiro, M., Sueoka, K. 2001. An ultra premature baby of 290g birth weight needed more than 500 mg/kg of calcium and phosphorus daily. *European Journal of Pediatrics*. 160, 7, 450-451.

<sup>6</sup>The Merck Manual. Podręcznik diagnostyki i terapii. 2008. Trzecie wydanie polskie, Wrocław.

development. The level and the location of the CNS damage is important as well as the evolution of such damage in the case of peri- or intraventricular haemorrhage. Obviously, the less the brain damage is, as in the case of 1st or 2nd degree haemorrhage, the better the prognosis is. 3<sup>rd</sup>- or 4<sup>th</sup>-degree haemorrhages usually affect the child's future development. In future, early brain damage may lead to: incorrect psychomotor development, including: inharmonious development (the child learns some skills in time and other skills at a late stage, no developmental harmony; retarded development (the child achieves important developmental stages later than provided for by standards); the development of cerebral palsy (CP) in various forms: hemiparesis, diparesis (in preterm children, it is usually diplegia), teraparesis (the most severe form of CP), visual and hearing impairment, emotional disorders (overactivity, ADHD, attention and concentration disorders); learning problems (dyslexia, dysgraphia).<sup>1</sup>

Despite numerous factors with a negative effect on the CNS (haemorrhage, hypoxia, infections), preterm children are characterised by enormous brain plasticity and compensation ability: the function of damaged cells is taken over by adjacent nervous cells.

In prematurely born children, muscle tension disorders may also occur, usually transitionally. These include: lowered muscle tension, poor muscle strength, asymmetry of body position and excessive muscle tension. What is important, however, muscle tension disorders, which are noticed early, do not have a negative influence on the child's motor development if appropriate rehabilitation is provided.

Prematurity complications in the respiratory system include, among other things, bronchopulmonary dysplasia (BPD). The frequency of BPD in the population of newborn with a very low body weight is estimated at approx. 25-40 %. Bronchopulmonary dysplasia increases the risk of infants' morbidity and mortality. Infants with dysplasia are exposed to severe infections of the respiratory tract, which often require mechanical ventilation and long hospitalisation. They also show an increased risk of recurring respiratory infections and Bronchial hyperresponsiveness, which is connected with the necessity of frequent stays at hospital. Moreover, bronchopulmonary dysplasia has a significant influence of the development of premature children, in particular, on their intellectual development and growth.<sup>2</sup>

Other health problems of preterm children include retinopathy of prematurity, which affects almost exclusively premature children with a birth weight <1500g. As in the case of bronchopulmonary dysplasia, it is caused by long-term treatment with oxygen. The younger the pregnancy age is, the higher the risk of this disease. Fortunately, retinal lesions subside spontaneously in 80% of cases. The other children are treated using laser therapy or cryotherapy.

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<sup>1</sup>Owieczko, K., Plinta R. 2005. Choose problems and threats of psychical development and motor prematurely born children. *Annales Universitatis Mariae Curie-Skłodowska*. Lublin, vol. LX, suppl. XVI, 368.

<sup>2</sup>The Merck Manual. Podręcznik diagnostyki i terapii. 2008. Trzecie wydanie polskie, Wrocław.

Preterm children are characterised by reduced immunity to infections. According to estimates, every year the RSV virus (*Respiratory Syncytial Virus*) attacks approx. 70% of 24 thousand preterm infants born in Poland. RSV is the cause of 50% of the total number of hospitalisations of infants and small children due to pneumonia and nearly 80% of hospitalisations due to bronchiolitis.<sup>1</sup> Approx. 80% of infants admitted to hospital due to RSV infections are children born before the 32nd week of pregnancy. According to Canadian statistics, 25 to 36% of hospitalised infants with RSV require intensive care and 18-25% of them must be ventilated mechanically.<sup>2</sup>

Premature birth influences not only the child's development and health, but also the parents' psychological situation, in particular, on their perception and behaviour towards the preterm child. Preterm birth leads to changes in the functioning of the family and often influences relations between its members. Parents and relatives of the preterm infant face a crisis caused by deep anxiety about the child's life and health and strong stress caused by preterm birth and the difficulty in the child's treatment and care. Such problems are as important as problems resulting directly from purely medical aspects of prematurity.<sup>3</sup> Joy, which usually accompanies a child being born, is often absent in the case of a preterm infant and it is replaced by stress, which may prevent the baby's parents and family from having the ability to communicate or even accept social and emotional support they need.<sup>4</sup> Moreover, parents of children hospitalised in preterm wards often experience the feeling of overburden and low ability to handle family and life stress. They feel helpless and the feelings, that accompany them, include anxiety connected with the fear of the child's extended stay at hospital, the occurrence of medical complications threatening the child's life and health as well as their potential effects which may cause various developmental disorders, together with permanent damage and disability.<sup>5</sup> A lot of parents of preterm infants, especially of those who were born very early and with very low birth weight and who were hospitalised for several months, have serious anxiety and fear connected with independent care of the infant, which, usually still have a low body weight even at discharge and is born a few weeks earlier than the term birth.<sup>6</sup> Research conducted in a group of parents of preterm children defined the dominant emotions experienced during this period. These include: fear, a sense of guilt, anger, anxiety,

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<sup>1</sup>Craig P. 2003. Systematic Review of the Biology and Medical Management of Respiratory Syncytial Virus Infection. *Respiratory Care*. 48, 3, 209-233.

<sup>2</sup>Stensballe, L.G., Devasundaram, J.K., Simoes, E.A. 2003. Respiratory syncytial virus epidemics: the ups and downs of a seasonal virus. *Pediatr Infect Dis J*. 22, 2, 21-32.

<sup>3</sup>Piekarska A. 2005. Szpitalna trauma wcześniactwa – charakterystyka, skutki i prewencja, *Medyczne aspekty krzywdzenia dzieci*. 3, 11, 95-107.

<sup>4</sup>Goldberg, S., Di Vitto B. 1995. Children and Parenting, w: M.H. Bornstein (red.), *Handbook of Parenting*, vol. 1, Lawrence Erlbaum Associates, Mahwah, NJ, 209–231.

<sup>5</sup>Piekarska A. 1999. The Impact of Premature Birth and Hospital Trauma, *Proceedings of VII Australasian Conference on Child Abuse and Neglect*, October, Perth, Australia, Promaco Conventions Pty Ltd., 902–908..

<sup>6</sup>Piekarska A. 2005. Szpitalna trauma wcześniactwa – charakterystyka, skutki i prewencja, *Medyczne aspekty krzywdzenia dzieci*. 3, 11, 95-107.



jealousy, helplessness, a sense of lower parental competence.<sup>1</sup> These feelings persist for many months – and sometimes even years – after the child is discharged from the hospital.<sup>2</sup> One of the factors determining the preterm child's development is the bond, which is developed between the parents and their child. Long-term hospitalisation and limited possibilities of multisensory contact may threaten the bond formation process between the preterm infant and the mother. The parents may have problems reading signals from the child as they are non-specific, subtle and require special attention on the part of the carers. Preterm children spend less time in the active wakefulness state, they can be oversensitive and restless.<sup>3</sup>

The advancement level of intrauterine maturation is treated as a factor determining the state of health and proper development during further postnatal stages of ontogenesis. Healthy, properly nourished children born at term are characterised by optimal development. Prematurity, on the other hand, is not only the most frequent cause of mortality among newborn children, but, due to the immaturity of life systems, it is connected with long-term health and developmental problems in the child during the neonatal period, in infancy as well as in early and late childhood and even over the whole life.

The existing research on individual areas of the development of individual developmental areas in preterm children during the subsequent stages of ontogenesis suggests that preterm children show developmental idiosyncracies during childhood and also have learning problems. Hence, support should be provided to prematurely born children, especially during the preschool period. Levelling out developmental retardation at this stage of ontogenetic development ensures a better start at school and prevents school failure.

The goal of this review is to provide an overview of existing research findings relating to the educational needs of preschool-age preterm children. Methodological issues that need to be addressed in future outcome research relating to the developmental and educational needs of very preterm children are also highlighted. Finally, implications of existing findings for teachers are discussed in terms of the roles of society, education systems, kindergarten, and teachers.

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<sup>1</sup>Łuczak-Wawrzyniak J. 2009. Matka wcześniaka – sytuacja psychologiczna i społeczna w trakcie pobytu dziecka w szpitalu i po opuszczeniu oddziału noworodkowego. *Ginekologia Praktyczna*, 1, 7-8.

<sup>2</sup>Miles, M.S., Holditch-Davis, D. 1995. Compensatory parenting: how mothers describe parenting their 3-years-old prematurely born child: pathways of influence. *Journal of Pediatric Nursing*. 10, 4, 243-253.

<sup>3</sup>Field T.M. 1979. Interaction patterns of preterm and term infants, w: T.M. Field, A.M. Sostek, S. Goldberg, H.H. Sherman (red.), *Infants born at risk*, Spectrum Books, New York, 333–356.

## **Developmental and Functioning Disorders of Preterm Children at Preschool Age and their Conditioning. Practical Implications for Preschool Education**

The results of research on physical and psychomotor development of premature children are mostly targeted at physicians and rehabilitation experts. Such information is more rarely provided to psychologists and especially teachers. Increasing the awareness of education workers, especially of preschool teachers, is particularly important to help them prepare better for specific developmental problems and educational difficulties of preterm children.

Research also shows that the child's development - at its later stages - is influenced by a range of variables. Medical and biological factors have the greatest influence on the child's functioning during the first years of their life, while environmental factors and differences between children become decisive for the child's functioning during the preschool children.<sup>1</sup>

Research results show that not all developmental and functioning difficulties of preterm children are revealed or can be diagnosed during the first three years of the child's life. In one out of four cases, developmental irregularities can be diagnosed only after the 10th and before the 36th month of the child's life. In the remaining cases, such problems were revealed - in a mild or moderate form - at preschool or early school age.<sup>2</sup>

In the research by Hoff et al., five-year-old children born premature achieved lower results on the cognitive development stage.<sup>3</sup> Similarly, in the research by Wolke et al., children with extremely low birth weight obtained poorer results on tasks connected with phonemic hearing and rhyming – results below the 5th centile were observed in 30% of children born with extremely low birth weight and only in 4 % of children born at term.<sup>4</sup> Similarly, Wintgens et al., observed that in the 6th year of children's life, preterm children's intellectual development was significantly lower than in their siblings born at term. However, in the group of preterm children, the results differed depending on the child's self-esteem - the lower the self-esteem was, the lower results the

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<sup>1</sup>Saigal, S., Feeny, D., Rosenbaum, P., Furlong, W., Burrows, E., Stoskopf, B. 1996. Self-perceived health status and health-related quality of life of extremely low-birth-weight infants at adolescence. *Journal of the American Medical Association*. 276, 6, 453-459; Laucht, M., Esser, G., Schmidt, M.H. 1997. Developmental outcome of infants born with biological and psychosocial risk. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. 38, 843-853.

<sup>2</sup>Holditch – Davis, D. H. Brandon, D. 1993. High risk preterm infants at 3 years of age: parental response to the presence of developmental problems. *Children's Health Care*. 22, 2, 107-124.

<sup>3</sup>Hoff, B., Munck, H., Greisen, G. 2004. Assessment of parental sensitivity towards pre-school children born with very low birth weight. *Scandinavian Journal of Psychology*, 45, 1, 85-89.

<sup>4</sup>Wolke, D., Schulz, J. Meyer, J. 2001. Entwicklungslangzeitfolgen bei ehemaligen, sehr unreifen Frühgeborenen, Bayerische Entwicklungsstudie, *Monatsschrift Kinderheilkunde*. 149, 53-61.

child obtained on the intelligence test.<sup>1</sup> In the research by Laucht's team (1997), prematurity combined with the parents' shorter period of education turned out to be a risk factor for the child's poorer adaptation. Research conducted by the "EIPAGE study group" on a group of 1503 five-year-old preterm children born before the 33rd week of pregnancy showed that factors, such as early brain damage, the parents' low social and economic status and no breastfeeding, were significantly related to mild (intelligence quotient ranging from 70 to 84) and severe (intelligence quotient below 70) cognitive difficulties.<sup>2</sup> Brain damage and hypotrophy in numerous siblings were related to severe cognitive disorders. Other reports (including Hunt et al.) show that 81.5% of preterm babies are intellectually normal at early school age.<sup>3</sup> According to Wolke et al., despite the fact that a large percentage of premature children are intellectually normal, they, however, show certain deficits in both cognitive and perception and motor functions. Hence, despite the average intelligence quotient, preterm children more often have school problems than children both at term.<sup>4</sup>

Research shows that CNS haemorrhages may influence individual cognitive functions with normal mental development and correct motor skills (risk). Early brain damage is also connected with visual and motor skills - it particularly applies to intraventricular haemorrhages and post-haemorrhagic hydrocephalus.<sup>5</sup> For this reason, despite similar results on intelligence tests, differences between preterm babies and children born at term may apply to skills connected with visual perception. Similar results were observed for memory: long-term episodic and operative memory deficits are often observed in children, who had an intraventricular or intracranial haemorrhage.<sup>6</sup>

Comparative studies, which analyse the percentage of problems among preterm children and children born at term, show that preterm children are in a risk group as regards problems with internalisation of emotional states, behaviours, withdrawal-anxiety behaviours and low social competences.<sup>7</sup>

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<sup>1</sup>Wintgens, A., Lepine, S., Lefebvre, F., Glorieux, J., Gauthier, Y., Robaey, P. 1998. Attachment, self-esteem and psychomotor development in extremely premature children at preschool age. *Infant Mental Health Journal*. 19,4, 394-408.

<sup>2</sup>Beaino, G., Khoshnood, B., Kamiński, M., Marret, S., Pierrat, V., Vieux, R.I., Thiriez, G., Matis, J., Picaud, J. Ch., Rozé, J., Alberge, C., Larroque, B., Bréart, G., Ancel, P. EIPAGE Study Group. 2011. Predictors of the risk of cognitive deficiency in very preterm infants: The Epage prospective cohort. *Acta Paediatrica*. 100, 3, 370-378.

<sup>3</sup>Hunt, J.V., Cooper, B.A.B., Tooley, W.H. 1988. Outcome of very low birth weight infants at 8 to 11 years. Role of neonatal illness and family status. *Pediatrics*. 82, 596-603.

<sup>4</sup>Wolke, D., Schulz, J. Meyer, J. 2001. Entwicklungslangzeitfolgen bei ehemaligen, sehr unreifen Frühgeborenen, Bayerische Entwicklungsstudie. *Monatsschrift Kinderheilkunde*. 149, 53-61.

<sup>5</sup>Taylor, H.G., Klein, N., Minich, N., Hack, M. 2000. Middle- school- age outcomes in children with very long birthweight. *Child Development*. 71, 6, 1495-1511.

<sup>6</sup>Vicari, S., Caravale, B., Carlesimo, G.A., Casadei, A.M., Allemand, F. 2004. Spatial working memory deficits in children at ages 3-4 who were low birth weight, preterm infants. *Neuropsychology*. 18,4, 673-678.

<sup>7</sup>Hoff, B., Munck, H., Greisen, G. 2004. Assessment of parental sensitivity towards pre-school children born with very low birth weight. *Scandinavian Journal of Psychology*. 45, 1, 85-89.

Attention deficit hyperactivity disorder is one of the best researched problems connected with preterm children's behaviour. Research results show that in the group of children with diagnosed ADHD, one in three children had low birth weight.<sup>1</sup> In a Whitaker study (1997) 15.6% children who had a hypoxic-ischaemic episode were diagnosed with ADHD. In a study conducted on two groups of preterm children, differentiated according to perinatal risk, it was proven that greater immaturity and lower birth weight, the male gender, abnormal medical and neurological development in the 18th and 30th month of life and the family's low social and economic status are related to attention problems in the 4th year of life.<sup>2</sup>

In research of morphofunctional development and, in particular, fitness, according to the Health Related Fitness (H-RF) criteria, too little attention is devoted to preterm children at preschool age.<sup>3</sup> The few available studies devoted to this issue show, however, that preterm children are characterised by lower physical fitness as compared to their peers.<sup>4</sup> Low motor skills in preterm children at preschool age can have a negative influence on their current, and in particular, future health<sup>5</sup> and their functioning at school.<sup>6</sup>

Researchers unanimously emphasise that environmental factors connected with the child's family situation significantly increase the biological risk: parents from families with a low social and economic status require additional support and stimulation of development. Therefore, early intervention and programmes supporting the child's comprehensive development are so important and their effectiveness has been confirmed in numerous studies. Research on the effectiveness of early intervention programmes show that preterm children with low birth weight and who were included in such programmes were characterised by much better intellectual development than preterm children, who did not participate in such programmes. For example, intelligence quotient in children with a weight below 2000 grams was on average higher by 6.6 points and in the group of children with a weight of 2001-2500 grams - by as many as 13.2 points (Infant Health and Development Programme, 1990). It turned out that early intervention aimed at work on both

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<sup>1</sup>Deutscher, B., Fewell, R.R. 2005. Early predictors of attention – deficit/hyperactivity disorder and school difficulties in low- birthweight, premature children. *Topics in Early Childhood Special Education*. 25, 2, 71-79; McGrath, M., et al. 2005. Early precursors of low attention and hyperactivity in a preterm sample at age four. *Issues in Comprehensive Pediatric Nursing*. 28, 1-15.

<sup>2</sup>McGrath, M., et al. 2005. Early precursors of low attention and hyperactivity in a preterm sample at age four. *Issues in Comprehensive Pediatric Nursing*. 28, 1-15.

<sup>3</sup>Keller, H., Ayub, B., Saigal, S., et al. 1998. Neuromotor ability in 5- to 7-year-old children with very low or extremely low birthweight. *Developmental Medicine and Child Neurology*. 40, 661-666.

<sup>4</sup>Suder, A., Sobiecki, J., Kościuk, T., Pałosz, J. 2002. Motor efficiency and body posture pre-school children. *Nowiny Lekarskie*. 4-5, 230-238.

<sup>5</sup>Ligenza, L., Chlebna-Sokół, D., Olszowiec, M. 2005. Somatic development and health condition of premature children at 4-7 years of age. *Przegląd Pediatryczny*. 35, 2, 66-70.

<sup>6</sup>Hadders-Algra, M., Touwen, B.C. 1990. Body measurements, neurological and behavioural development in six-year-old children born preterm and/or small-for-gestational-age. *Early Human Development*. 22, 1-13.

biological and environmental risk factors contributed to improved functioning of children to a greater extent than intervention focusing only on improving individual functions (Infant Health and Development Program, 1990). Positive effects of early intervention were more distinctly noticeable when children were included in a care programme before the 6th month of life and early support was aimed at prevention of future disorders. Early intervention also proved more effective when it followed a structured programme and when it required a lot of parental involvement - in particular, by focusing on activities, which they can undertake together with children (Shonkoff and Hauser-Cram, 1987).<sup>1</sup>

It should be emphasised that very often, no noticeable preschool difficulties were observed in preterm children having difficulties at the beginning of school education. This probably results from other requirements and different dominant forms of activity. This shows the need for detailed diagnostics of preschool preterm children as well as for therapeutic activities supporting their comprehensive development. It is, therefore, important that education professionals, such as psychologists, counselors, and teachers, are well informed about, and able to identify, the specific difficulties that these children may exhibit. Teachers also need to be provided with training and support in order to adapt their teaching methods and curriculum goals to respond to individual children's needs, to liaise with parents and other professional groups involved with the child, and to implement effective remediation programs.

### **Supporting the Development of Preterm Children in Preschool Education. Role of Education Systems**

It results from the research results that preterm children face a greater risk of developmental difficulties and health problems, which may cause various problems at schools. To be able to prepare support adequate to the child's needs, an accurate diagnosis of the development of individual functions and competences, which are important from the point of view of handling school tasks that must be performed.<sup>2</sup> Hence, preterm children should be diagnosed during the early preschool period at the latest. A therapy implemented during this period allows for eliminating the majority of disorders before starting school education. The knowledge of the extent and the number of areas, where more and less intensive developmental changes take place, allow for determining the child's developmental potential as well as to determine areas requiring special stimulation and to select appropriate support methods. Competences and skills that pertain to the closest development are available to

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<sup>1</sup>Huber, C., Holditch – Davis, D. Brandon, D. 1993. High risk preterm infants at 3 years of age: parental response to the presence of developmental problems. *Children's Health Care*. 22, 2, 107-124.

<sup>2</sup>Jabłoński, S. 2009. Poziom umiejętności czytania i pisanie jako wskaźnik zdrowia społecznego. *Edukacja*. 2,106, 65-77.

the child only to a certain degree and they require assistance, support from other people, tips from an important adult - depending on the degree of development of a given function, the desirable or necessary support from a more competent person (an adult, a peer) will be greater or smaller. Competences, that pertain to the closest development, can be included in the performance of preschool tasks only with appropriate exchange with an adult. Contact with an adult and appropriate stimulation allows for including some competences in the area of current development and also open up new areas of development. It should be emphasised that developing areas are to be treated as potentially requiring appropriate support and not a deficit showing, for example, the fact that the child is not ready for school. Preterm children will differ in size not only in the area of current development (differences in the level of knowledge and skills), but also the size of the nearest development zone.<sup>1</sup>

Considering specific possibilities of supporting the development of preterm children, one should include the following areas: the child's qualities (the specificity of the child's development, the maturation process, natural changes appearing together with the development, processes of the child's interaction with people around them, the level and type of own activity), the qualities of people around the child (possibility of support on the part of the kindergarten, teachers, peers, family) as well as objectives connected with preschool education.

Among the aforementioned areas, the possibility of supporting the child in the family circle. The research conducted shows that parents of preterm children experience a lot of crises, uncertainty and helplessness in undertaking the parental role, which may lead to a distorted perception of the child, inadequate parent-child relations and parental attitudes.<sup>2</sup>

In a study conducted by Singer et al. (1996), it was found that mothers of VLBW children experienced significantly higher levels of psychological distress than mothers of full-term children. Stress levels were reduced when fathers were involved in child care, but for the majority of families, child care responsibilities fell mainly on mothers. Although this study focused on the neonatal period, it is likely that mothers of VLBW children will continue to experience higher levels of stress and anxiety as children develop and progress through the school system. So, it is important for governments to ensure that social services make support available for parents and families of preterm children from birth, during the early years, and throughout their time in formal schooling.<sup>3</sup>

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<sup>1</sup>Wygotski, L. 1971. Nauczanie a rozwój w wieku przedszkolnym. W: L. S. Wygotski. *Wybrane prace psychologiczne*. Warszawa, PWN, 517-530.

<sup>2</sup>Watson, G. 2011. Parental liminality: A way of understanding the early experiences of Parents who have a very preterm infant. *Journal of Clinical Nursing*. 20, 9/10, 1462-1471.

<sup>3</sup>Singer, L. T., Daviller, M., Bruening, P., Hawkins, S., & Yamashita, T. S. 1996. Social support, psychological distress and parenting strains in mothers of very low birthweight infants. *Family Relations*. 45,3, 343-350.

Meeting developmental problems of premature children require on the part of the teacher: (1) a lot of sensitivity to developmental changes, which appear in this period and responding to them flexibly and adequately, (2) paying attention to the child's resources instead of focusing on deficits, (3) an in-depth diagnosis or rather monitoring of the occurring changes and work within resources and competences appearing both in the area of the current and nearest development, (3) the creation of rich and diversified developmental offers, which may meet the children's varied needs and possibilities.

The role of education systems, nationally, regionally, and locally, should be to ensure that from early childhood to high school facilities, adequate human and material resources are focused on meeting the educational needs of preterm children. This includes making all school staff aware of the increased risk of learning and behavioral difficulties as well as the varied and often complex nature of the needs of children born prematurely. It also involves the provision of specialists such as school psychologists, counselors, and special education teachers (both school-based and itinerant) who can support mainstream classroom teachers in meeting the social and educational needs of preterm children. Education systems also need to ensure that support and guidance is available to parents and families of preterm children by such means as: family education and counseling; home visits from specialists in prematurity; and parent support groups.<sup>1</sup> This is important because effective parental involvement in the education of their children has been found to be a key factor in achieving optimum educational outcomes.<sup>2</sup> Furthermore, teacher education programs need to be reviewed so that teachers undergoing initial training, as well as those subsequently undertaking professional development courses, are provided with ongoing information and skills for working effectively with preterm children and their families.<sup>3</sup>

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<sup>1</sup>Verma, R. P., Sridhar, S., & Spitzer, A. R. 2003. Continuing care of NICU graduates. *Clinical Pediatrics*. 42, 299–315.

<sup>2</sup>Jeynes, W. H. 2005. A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*. 40, 3, 237–269; Jeynes, W. H. 2007. The relation between parental involvement and urban high school student academic achievement: A meta-analysis. *Urban Education*. 42, 1, 82–110.

<sup>3</sup>Hornby, G. 2000. Improving parental involvement. London: Cassell.

## Summary

The kindergarten can play a significant role in supporting the development of preterm children. Therefore, it is important to develop teachers' and parents' knowledge pertaining to preterm children's problems.

Teachers have a key role to play in ensuring effective education for children born prematurely. Comprehensive knowledge about the difficulties that can be experienced by preterm children, of the kind provided by this review, is important in raising awareness and alerting teachers to the need for careful monitoring. Such knowledge should enable teachers to identify the specific difficulties that these children may exhibit. Teachers also need to have an appreciation of the developmental history of individual preterm children and their families. In addition, the development of skills required by teachers for addressing the difficulties encountered when teaching preterm children is important.

It is important to increase parents' awareness that the kindergarten is not only a facility taking care of their children while they are at work, but, first of all, it allows for comprehensive development and achievement of a higher level of children's development in many areas. Future directions of scientific research should take into account comprehensive diagnostics of preterm children's development in the context of implemented therapeutic programmes at kindergartens.

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