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Specialized and updated training on supporting advanced technologies for early childhood education and care professionals and graduates

MODULE III.3 AND MODULE III.4

Pathologies in early ages: Prematurity and maturational delay

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I. Introduction

In the first years of life, specifically in the period 0-3 years of age, a series of developmental delays can be detected that may be due to a known vs. unknown aetiology. This chapter will specifically address two cases, prematurity and mild developmental delays. Both can lead to permanent developmental problems. Therefore, early detection and intervention are essential to prevent significant impairments in the future.

II. Objectives

1. To understand the most significant characteristics of prematurity in human babies.

2. To understand the most significant characteristics of mild developmental delays in ages 0-6 years.

III. Specific contents of the theme

Prematurity.

A term birth is defined as a birth at 40 weeks' gestation. Prematurity includes babies born at less than 37 weeks gestation, or with a birth weight of less than 2,500 grams. The causes of these circumstances are diverse and complex, and may be related to problems during gestation (socio-economic, multiple pregnancies, emotional and affective situations of the mother, hospitalisations or chronic illnesses of the mother, among others).

Low birth weight (LBW) has long been an important topic in neonatological and paediatric studies, as it is directly related to infant mortality and short- and long-term morbidity. However, the analysis of low birth weight has an associated prognostic scaling. Babies born weighing between 1,500-2,500 grams would be understood as low birth weight, those between 1,000 and 1,499 grams as very low birth weight, and those weighing less than 1,000 grams would fall into the category of extremely low birth weight. However, it is important to consider the causes of underweight, as the aetiology is related to the type of intervention and the prognosis.

Birth weight is determined by the growth of the foetus during gestation and the duration of gestation. LBW may be due to preterm birth but with normal growth up to the time of preterm delivery, or because the new-born is small for its gestational age, i.e. there has been an intrauterine growth restriction (IUGR). The aetiology will have differences for the development of the baby. For example, preterm birth leads to

high mortality rates, as well as medical, neurocognitive and behavioural problems, and IUGR in its most severe form leads to metabolic disorders and, in less extreme cases, long-term growth deficits, learning disabilities and even chronic diseases in adulthood, such as hypertension, type 2 diabetes and coronary heart disease (Minded and Zelkowitz, 2020).

3.1.1. Babies with low birth weight due to premature birth.

Children who are born prematurely and have a low birth weight have a higher probability of mortality, neurodevelopmental disabilities, behavioural problems and economic costs for the affected families. Furthermore, the families of these children are often exposed to long periods of hospitalisation of their baby in the neonatal and/or paediatric intensive care unit (ICU). This situation can lead to stress and anxiety in parenting figures. However, advances in medicine combined with technological advances are now leading to a better prognosis for this type of condition. The common characteristics of low-birth-weight babies are:

1. Problems in psychomotor development.

2. Joint attention problems.

3. Problems in language development (morphosyntactic and semantic).

4. Problems in cognitive development.

However, the degree of impairment will depend on weight and other circumstances of embryonic development and/or birth. Early intervention is recommended to alleviate these difficulties. This intervention will focus on working with children and their families, guided by an interdisciplinary intervention delivered by multi-professional teams.

3.1.2. Very low birth weight babies due to premature birth.

Babies with a very low birth weight are at a higher risk of suffering cognitive and behavioural problems. Early stimulation interventions have been developed in relation to sensory stimulation, medical follow-up, support to parenting figures and early schooling in a nursery school with specialised special needs education professionals. Premature babies move from the maternal environment to a Neonatal Intensive Care Unit (NICU) environment where there are strong stimuli such as bright lights, noises, etc., which are difficult for them to process.

3.1.3. Proposals for intervention in prematurity.

There are now several options for early intervention in cases of prematurity. In addition to the absolutely essential medical follow-up for these babies, sensory stimulation programmes are being developed to enhance relationships between babies and parents in NICU settings. Particularly noteworthy are pre- and post-discharge parenting programmes based on the use of cognitive, motor and behavioural self-regulation, such as the " Infant Health and Development Program (IHDP)" (Ramey et al., 1992). The "Neonatal Behavioral Assessment Scale" (NBAS) (Aydlett, 2011; Barlow et al., 2018; Brazelton, 1973; Buckner, 1983) is also being used. This scale facilitates parental observation of the infant's sensory skills and responsiveness to self-regulatory processes. In addition, it offers an intervention proposal "Neonatal Induvidualized Developmental Care and Assessment Program" (NIDCAP), the application of this programme facilitates a decrease in the incidence of intra-ventricular haemorrhage, reduces days of mechanical ventilation, enables weight gain and decreases days of admission to the NICU (Als, 2009; Als and B McAnulty, 2011; McAnulty et al., 2010; Westrup, 2007).

Another intervention that is proving to be very effective is the application of the Kanguro method. This method was originally developed to care for premature newborns in unreliable incubator environments. This method can be applied by either the mother or the father and is considered to be effective in preventing hypothermia, improving sleep rhythm and quality, physiological stabilisation of behaviour and in the newborn’s growth and neurodevelopment. It also improves parental stress and attachment between the baby and parenting figures, along with reducing hospitalisation and antibiotic use in low-birth-weight infants (Birhanu and Mathibe-Neke, 2022; Jamehdar, el al., 2022; Letzkus et al., 2022; Mehrpisheh et al., 2022; Pradhan et al., 2022; Kiputa et al., 2022; Taha and Wikkeling-Scott, 2022).

3. 2. Maturational delay

Maturational delay is a delay without the detection of a specific aetiology , whether physical, psychological or sensory. It presents as slower development according to the parameters in the developmental scales (paediatric, Brunet-Lézine, Battelle, etc.) and does not exceed one year of difference with respect to the age level of the subject being assessed, it also presents with a Global Development Quotient CDG of not less than 70, ranging between 70-99 out of 100. The delay may affect one, two, three or all areas of development (motor, cognitive, language, social-emotional, and/or personal autonomy). We must start from the premise that development, especially in the 0-3 years stage, is global and interrelated, for example, fine or gross motor skills will condition cognitive development and this is directly related to the development of communication, language and socialisation. Likewise, psychomotor development will affect the development of personal autonomy.

Early detection is essential to implement stimulation programmes in the required areas of development and such detection is directly linked to a better prognosis.

3.2.1. Proposals for intervention in maturational delay.

Module VIII will deal specifically with the creation of early stimulation programmes in the periods 0-3 and 3-6 years. However, we will then give an overview of possible instruments to be taken into account when creating intervention programmes. In the first place, the Portage Guide is a very useful instrument for creating programmes aimed at children with prematurity and those with a slight maturational delay.

The Portage Guide to Preschool Education (revised edition) is the result of a project, Project Portage, from the Cooperative Educational Service Agency 12 in Wisconsin (USA) (Bluma et al., 1978). The guide is available in both English and Spanish.

The Guide has a list of Objectives (behaviours) ordered by developmental age (from 0-1, 1-2, up to 5-6 years) that helps users to make an accurate observation of the child's development. Each objective has a number that corresponds to a card. It offers different activities or tasks that can help to implement the development of the specific behaviour specified in the objective. The Portage Guide covers the following areas of development: Stimulating the baby, Socialisation, Language, Self-help, Cognition and Motor Development. It also provides a series of guidelines for the design of the stimulation programme. In addition, it includes a section on reinforcement and work on the basic prerequisites for learning (attention, imitation and following instructions), which are fundamental elements for the proper development of early intervention programmes. It is worth highlighting the importance of the "How to stimulate the baby" area for intervention with premature babies or babies with developmental delay. This includes both objectives for observational behaviours in the 0-1 year stage as guides to intervention in this period. Similarly, the Portage Guide includes guidelines for intervention by early childhood professionals that describe the type of support that can be given (physical, through language, or both, including the behavioural techniques of modelling, shaping and social reinforcement). Table 1 shows the number of targets and guidance sheets per developmental area.

Table 1. Objectives and guidance sheets by area of development in the Portage Guide.

Development area	Objectives	Intervention sheets
How to stimulate the baby	45	45
Socialisation	83	83
Language	99	99
Self-help	105	105
Cognition	108	108
Motor Development	140	140
TOTAL	**580**	**580**

Another important tool for recording, developmental analysis and intervention is the eEarlyCare web application (Sáiz-Manzanares, Marticorena-Sánchez and Arnaiz-González, 2020a; 2022; Sáiz-Manzanares et al., 2020b). eEarlyCare includes a module for recording and analysing behavioural observation indicators and a module for therapeutic intervention, the "eEarlyCare intervention Program". A more detailed review of the tool is presented in Module VII. 3.

Summary

This topic,III.2, covered the definition of types of prematurity and the definition of mild developmental delay in children in the 0-6 years age range.

Glossary

CDG: Global Development Quotient.

IHDP: Infant Health and Development Program.

IUGR: Intrauterine growth restriction.

LBW: Low Birth Weight. Low birth weight.

NBAS: Neonatal Behavioral Assessment Scale.

NIDCAP: Neonatal Induvidualized Developmental Care and Assessment Program.

ICU: intensive care unit.

NICU: neonatal intensive care unit.

PICU: paediatric intensive care unit.

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Resources

Web

Brazelton Institute NBAS

https://www.childrenshospital.org/research/centers/brazelton-institute-research/nbas

Mentoring Caregivers. Changing Hospitals. Improving the Futures for Newborns and Their Families. https://nidcap.org/

NIDCAP Cincinnati. NIDCAP Training Center: A National Leader in Developmental Care. https://www.cincinnatichildrens.org/service/n/nicu/hcp/nidcap