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The Longterm Outcome for Preterm Infants

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It is universally recognised that preterm infants are at increased risk of suffering from cerebral palsy and neurodevelopmental delay. The difficulty is in quantifying the degree of risk, particularly when the infant has normal brain imaging. Follow-up studies are the main tool that is used to assess the outcomes for preterm infants. Outcome statistics are needed for counselling families on what to expect as their preterm child grows up. They facilitate decision-making for the child's important events such as school entry. The concept of school readiness[1] is important because it brings a large number of factors into play[1].

The outcome data inform doctors on how best to employ screening developmental tools. They provide a benchmark for neonatal units on how well they are performing. Although they are time-consuming, and difficult to organise on a national scale the findings are an invaluable resource for the provision of optimal longterm care. The cost is estimated at $1,000 per child[2].

The ideal outcome for a preterm infant is a 2 year-old child who is walking freely, no abnormal neurological signs, talking 2-3 word sentences, no visual or hearing deficits, and no major behaviour problems. Interventions are required when these milestones are not being reached.

The recently published French EPIPAGE-2 study, Etude Epidemiologique sur le Petits ages Gestationnels, has provided a major contribution to our current-day understanding of what happens to preterm infants[3]. The other large European follow-up studies of preterm infants that have been conducted are the UK[4]–*Epicure*, Belgium[5]–*Epibel*, Sweden[6]-*Express* and Norway[7].

EPIPAGE-2 is a longitudinal, population based cohort program in all maternity hospitals across 25 French regions. France has 696,000 births annually, the second highest in Europe behind Germany. EPIPAGE- 1 was the previous French longitudinal study[8] of preterm infants born in 1997-1998.

EPIPAGE-2 commenced in March 2011. It recruited infants born at 22-26 weeks, 27-31 weeks, and 32-34 weeks. A total of 3,083 of these infants have been comprehensively assessed at age 5 years. The assessments were performed in 110 centres specifically opened for the study. EPIPAGE is one of the largest population based studies of its kind on the outcome for preterm infants.

The assessment consisted of an interview with the parents, a self-administered questionnaire, a clinical paediatric examination, and a psychology assessment. The domains examined were motor, sensory, cognitive and behaviour. There is a special mention of working memory because of its importance in learning. It is described as the small amount of information that can be held in the mind and used in the execution of tasks. The function is located in the pre-frontal cortex. Problems with working memory lead to difficulties in learning. A good working memory is related to good performances in literacy and numeracy.

When reporting outcomes for preterm infants, the gross motor function, cognitive abilities, and sensory impairments are important. However, an emerging priority is the impact of minor disabilities on the child's education.

Infants with major white matter injury had the highest rates of neurodevelopmental deficits. In preterm infants with normal cranial ultrasound findings, cognitive delay were the most frequently encountered problems. It is postulated that there are impaired development of the dendritic connections and cortical/subcortical circuits in the cerebral cortex and basal ganglia. It is known that preterm children use different circuits for auditory language processing at school age than term controls.

The authors have previously reported that the presence of major white matter injury (WMI) is associated with deficit rates in excess of 50%.

The EPIPAGE-2 study confirms that adverse outcomes are related to lower gestational age. The authors set out their findings according to 3 gestation categories – 24-26, 27-31, 32-34 weeks.
At age 5 years, almost all of the children were attending school. The number requiring additional school support ranged from 27% for the 24-26 weeks group, 14% for the 27-31 weeks group, and 6% for the 32-34 weeks group.

The moderate/severe neurodevelopmental delays rates were 28%, 19%, and 12% respectively.
The rates of mild neurodevelopmental delay were 38%, 36% and 34% respectively. Those with behavioural problems were included in this category. The behaviour domain included those with hyperactivity, inattention, emotional, and conduct problems. Behavioural problems were a common concern expressed by parents. More than half, whose children were classified as having no neurodevelopmental disabilities, had concerns about their child's behaviour.

The cerebral palsy rate ranged from 8.8% at 24-26 weeks, 5.5% at 27-31 weeks, to 2.4% at 32-34 weeks.

The findings are helpful in the planning of support services for preterm infants. The need for an SNA at school was 20% for those 24-26 weeks gestation, 10% for those 27-31 weeks, and 6% for those 30-34 weeks. The need for a speech and language therapist was 31%, 16% and 14% respectively.

The EPIPAGE-2 study and its findings provide a useful template on how preterm infants are best followed up and cared for.

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