Educational outcomes following preterm birth: What teachers need to know

Samantha Johnson
Department of Health Sciences
University of Leicester
Outline

• Why is preterm birth important?
• What is preterm birth?
• Long term effects on development
  – Neurodevelopmental disability
  – Motor & cognitive development
  – Attention, social & emotional outcomes
• Impact on learning & education
• Supporting children born preterm
Why is preterm birth important?

- Globally, 15 million babies are born preterm each year
- All newborns are vulnerable, but preterm babies are acutely so. Many require special care simply to remain alive.
- Many of the preterm babies who survive face a lifetime of disability.
- An increased awareness of the long-term consequences of preterm birth is required to fashion policies to support these survivors and their families as part of a more generalized improvement in quality of care.
Why is preterm birth important?

- In the UK, 7-8% of babies are born preterm
- Preterm birth rates are rising, as are survival rates
- The number of preterm children entering schools is increasing
- Long term outcomes do not appear to be improving despite improved survival and neonatal care
- Most preterm children attend mainstream school
- Almost all education professionals will be responsible for supporting children born preterm
- Knowledge and preparation about health conditions is crucial for appropriate educational management
Why is preterm birth important?

“This new generation of children and young people includes some with rare chromosomal disorders, some who survived extreme prematurity or multiple disabilities at birth, and others affected by prenatal drug and alcohol abuse. These children have complex learning difficulties and disabilities (CLDD). They learn and respond differently to previous generations of children with profound and multiple/severe learning difficulties.”

[Source: http://complexld.ssatrust.org.uk]
What is preterm birth?

<table>
<thead>
<tr>
<th>Completed weeks of gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Term</td>
</tr>
</tbody>
</table>

**All Preterm**

**Very Preterm**

**Moderate**

**Late**

**Extremely**

<table>
<thead>
<tr>
<th>&lt;28&lt;sup&gt;th&lt;/sup&gt; weeks’ gestation</th>
<th>28&lt;sup&gt;th&lt;/sup&gt; - 31&lt;sup&gt;st&lt;/sup&gt; weeks’ gestation</th>
<th>32&lt;sup&gt;nd&lt;/sup&gt; to 36&lt;sup&gt;th&lt;/sup&gt; weeks’ gestation</th>
<th>37&lt;sup&gt;th&lt;/sup&gt; to 41&lt;sup&gt;st&lt;/sup&gt; weeks’ gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely preterm</td>
<td>Very preterm</td>
<td>Late and moderately preterm</td>
<td>Term</td>
</tr>
<tr>
<td>4,200 births per year</td>
<td>6,600 births per year</td>
<td>50,000 births per year</td>
<td>705,000 births per year</td>
</tr>
<tr>
<td>0.5% of all births</td>
<td>0.9% of all births</td>
<td>6.5% of all births</td>
<td>92.1% of all births</td>
</tr>
</tbody>
</table>

[Source: MBRRACEUK; Perinatal Mortality Surveillance Report. University of Leicester; 2015]
The long term consequences of preterm birth . . .

- **Key findings:**

- Preterm birth affects multiple areas of development

- Most research is focused on very preterm children, but effects can be seen after birth at all preterm gestations

- The prevalence and severity of problems is related to the baby’s gestational age at birth

- The earlier the baby is born, the greater the risk s/he will develop long term problems

- Problems are evident in infancy and persist throughout the lifespan

[For a review see: Johnson S, Marlow N. *Arch Dis Child* 2016;0:1–6.]
The EPICure Studies

• National cohort study of survival and outcome following extremely preterm birth
• All babies born before 26 weeks of gestation in a 10 month period in 1995
• Babies born in the whole of the UK and Ireland were identified
• Surviving children assessed at:
  – 2.5 years
  – 6 years
  – 11 years
  – 19 years
Neurodevelopmental disability – 11 years

Prevalence (%)

- Term-born control
  (≥ 37 weeks)
- Extremely preterm
  (<26 weeks)

Adverse neurodevelopmental outcomes at 11 years of age

[Source: Johnson et al. Pediatrics 2009;124;e249-e257]
Motor impairment – 8 years

[Source: Spittle et al. Pediatrics 2018]
Cognitive problems are not just low IQ

- Consistent findings from many studies across the world:
  - Simultaneous information processing worse than sequential
  - Non-verbal IQ is lower than verbal IQ

- Deficits in a wide range of general cognitive skills:
  - Working memory
  - Attention
  - Visuo-spatial skills
  - Executive functions
  - Processing speed
  - Language deficits
  - Fine motor coordination
  - Sensory processing

Core deficits underlying learning difficulties
Psychiatric disorders

[Source: Johnson & Marlow. Pediatric Research 2011]
Becky’s story
Summary of behavioural, social and emotional outcomes

• **Increased risk** for problems & disorders:
  – Inattention / ADHD
  – Social and communication problems / ASD
  – Anxiety and worries / Emotional Disorders

• **No more likely** to have externalising behaviour problems than children born at term

• Special constellation of problems means preterm children may present differently to other children with BSED

• Problems may be missed in educational settings . . . ?
Impact on learning and school performance

Figure 1. Prevalence of special educational need by gestation at delivery.
doi:10.1371/journal.pmed.1000289.g001

[Mackay et al. PLOS Medicine 2010]
Academic attainment – Key Stage 1

Greatest difficulties in mathematics

Figure 2  Mean difference (95% CI) in teacher ratings of academic attainment for 145 extremely preterm children (<26 weeks gestation) and 171 term-born controls assessed at 11 years of age in the UK & Ireland EPICure Study.51
Understanding mathematics difficulties

• Maths problems appear to be related to poor general cognitive abilities
  – working memory
  – visuospatial skills
  – not deficits in number skills

• Interventions for children with Dyscalculia are unlikely to be effective for preterm born children

• SSAT . . . different kinds of difficulties . . . ?

[Source: Simms et al., Pediatric Research 2015]
“It’s OK, they’ll catch up eventually . . .”

Extremely preterm compared to term-born controls

[Source: Linsell et al., Arch Dis Child 2017]
Academic trajectories

Figure 1  Summary measures of Key Stage scores at each time point, split by gestational age groups.

[Source: Odd et al., Arch Dis Child 2019]
Putting it all together . . .

Neurosensory
- Cerebral Palsy/neuromotor impairment
- Vision & hearing impairments
- Fine motor deficits
- Visuospatial deficits

Cognition
- Low IQ, especially nonverbal IQ
- Working memory
- Processing speed
- Executive function
- Inattention

Behaviour and emotions
- Attention problems/ADHD
- Peer relationship problems/ASD
- Anxiety/Emotional disorders
- No increased risk for conduct problems

Learning and attainment
- Learning difficulties
- Poor attainment
- Special educational needs
- Lower occupational status and earning potential as adults
Supporting children born preterm

Timing and content of interventions to enhance cognitive performance of very-low-birthweight children

take place for VLBW children? Previous research has indicated that interventions in infancy may have short-term but not positive long-term effects on cognitive or academic performance.² It is not surprising that interventions in the first few months of life may not be enough to solve the complex issue of cognitive deficits in preterm children at school age. This highlights the need for intervention at around school age, either before school entry or early on in school.

Education professionals’ knowledge of preterm birth

[Source: Johnson et al. *Dev Med Child Neurol*, 2015]
Education professionals’ knowledge of preterm birth

[Source: Johnson et al. *Dev Med Child Neurol*, 2015]
Education professionals’ knowledge of preterm birth

- Risk for poor social skills
- Risk for inattention
- Risk for maths difficulties

[Source: Johnson et al. *Dev Med Child Neurol*, 2015]
Preterm birth e-learning resource

• Designed for education professionals
• 5 short 10-minute sections
• Approximately 1 hour of learning
• Control own pace of learning
• Engaging interactive multi-media content
• Quizzes to test learning objectives
• Strategies to support children in the classroom – pdf builder
• Co-designed with stakeholders
Supporting children born preterm

- Overview of the developmental history of the individual child is essential.

- Access to specialist support and advice - professionals should work together to develop a trans-disciplinary approach when both assessing and planning the child’s individual learning pathways.

- It is important to treat the child holistically, and reduce the possibility of fragmented intervention.

- Close liaison with families and carers is needed to help meet the complex needs of the child.

- Appropriate resources to meet each learner’s unique and complex needs. Learning is mediated through social relationships. Educational intervention needs to respond to where the child is both developmentally and socially.

- Training for staff to recognise the possible learning disabilities and difficulties associated with preterm birth.
Summary

- Children born preterm are at risk for cognitive, attention, social and emotional problems
- Their difficulties may be hard to spot in the classroom
- These difficulties can impact on attainment at school
- Developmental follow-up only to 2 or 4 years of age
- Teachers have a key role in supporting these children
- Professionals need to be aware of the issues
- Identify difficulties & provide appropriate support
- Need an individualised approach – prematurity is a risk factor not a diagnosis
Thank you

@SamJPsych