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Communication Development Following Prematurity

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- Introduction: SLCNs in the UK
- Evidence to support our understanding of the problems with SLC that children born preterm may be susceptible to
- The neonatal environment & early communication
- What can we do to improve communication outcomes?

- Approximately **10% / 1.2 million children in the UK have long term, persistent SLCN** (Law et al. 2000)
- **SLCN are more common in boys** than girls with between two and three times as many boys having these difficulties as girls (Dockrell et al, 2012)
- **SLCN are associated with other difficulties that the child may be experiencing** such as autism, cerebral palsy, hearing loss or more general learning difficulties (Lindsay et al, 2008)

Speech, language and communication skills: impact on attainment

- **Out of all the EYFSP areas of learning, communication, language and literacy is the best predictor of later attainment at KS1, not only in literacy but also in maths (Better Communication Research Programme, 2011)**
- **(Spoken) vocabulary at 24 months is very strongly associated with later performance at school entry (Roulstone, Law et al, 2010)**

Speech, language and communication skills: impact on attainment

- **Children who did not achieve the expected standard of early language and communication at five were found to be over four times more likely to have below Level 4 reading at 11 than those who did. (Save the Children, 2016)**
- **Vocabulary at 5 years is a powerful predictor of GCSE achievement (Cunningham and Stanovich, 1997)**
- **Long-term impacts for children with SLCN persist; 18% 5 year olds not reaching expected levels according to the EYFSP (Longfield, 2019)**

Attainment of Children Born Prematurely

Increased risk of low educational attainment at the end of the EYFS and at KS1 (age up to 7 years), in addition:

- Prevalence of low educational attainment increases with decreasing GA
- Increased risk of low attainment for reading and maths, and this risk is greater in children born before 26⁺⁰ weeks' GA
- Children born under 32 weeks GA are at increased risk of executive function problems at preschool
- Increased risk of learning disabilities
- Increased risk of Autism Spectrum Conditions

Language Outcomes of Preterm Infants

- Delayed receptive language processing, expressive language, difficulties with grammar, phonological processing and poor short term memory associated with GA, size for GA at birth, illness, neonatal morbidities, HIE, gender and environment. Adolescents born preterm – deficits in higher order language skills.
- 33.7% of preterm infants have SLCN at 18-22 months. 25.6% 27 weeks GA, 41.2% <24 weeks GA ([Hintz et al, 2005](#))
- Delayed ability to gain word linkage skills ([Iverson & Goldin – Meadow, 2005](#))
- Delay in first word acquisition, grammar rule learning, shorter MLUs , fewer nouns and verbs ([Foster –Cohen et al, 2007](#) ; [Kern & Gayraud, 2007](#))

Language Outcomes of Preterm Infants

- Increased risk of speech and language abilities in extremely preterm children (≤ 25 weeks) as compared to those born at term (**Wolke et al, 2008**)
- VLBW infants presented with significantly smaller receptive language vocabularies & smaller lexicons at 24 months compared with term peers. VLBW acquire vocab more slowly than term peers. Difficulties with auditory processing of language (**Stolt et al, 2009**)
- At 12 – 18 months, children born preterm use fewer gestures (**Cattani et al, 2009**)
- Twice as many preterm infants as term show risk factors for language impairment at 2;6. 1/3 preterm children presented with language impairment at 3;6 characterised by short utterances, poor vocabulary, moderate cognitive weakness (**Sansavini et al, 2010**)

Language Outcomes of Preterm Infants

- SLCN at age 27 to 30 months are common and independently associated with increasing levels of deprivation and lower GA (Ene et al, 2019)
- Longitudinal analysis in early years identified slower acquisition of gesture production, word comprehension and word production in children born VPT (Sansavini et al,2011)
- Preterm infants presented with significantly lower receptive vocab compared with term between 3-12 years. Improvement with age for simple language tasks but not for more complex language skills (Van Noort - van der Spek et al,2012)
- Children born preterm develop communicative gestures, and increase use of these as they develop, but develop fewer deictic gestures (Suttora & Salerni, 2012)

Language Outcomes of Preterm Infants

- VLBW and VPT infants scored significantly lower than term infants on all language domains at 7 years even when corrected for social risk. White matter abnormality significantly predicted the language subdomains of phonological awareness, semantics, grammar, and discourse ([Reidy et al, 2013](#))
- **Significant increase** in the risk of mild / moderate language impairment in early preterm children (<27 weeks) as compared to term controls at 2.5 years of age ([Serenius et al, 2013](#))
- **Significantly increased** risk of developmental speech and/or language delay between the ages of 3 and 5 years in preterm children compared to those born at term ([Rabie et al, 2015](#))

Language Outcomes of Preterm Infants

- MLU of preterm children lower than term peers; no clear increase of MLU with age ([Felix et al, 2017](#))
- Children born < 34 weeks GA have lower conversational, semantic and grammar matrices compared with term peers ([Imgrund et al, 2019](#))
- Children born <30 weeks have lower MLUs, smaller vocabulary and less complex syntax compared with term peers ([Sanchez et al, 2019](#))

Language Outcomes of Preterm Infants

- Children born <32 weeks GA are at higher risk of having smaller expressive vocabularies, and are likely to have difficulties combining words at 2 years corrected age ([Sentenac et al, 2020](#))
- COVID -19 has had an impact on typical family centered neonatal care ([Anderson & Lee-Davey., Bliss 2020](#)).
Media and video technology is important BUT it is not a substitute for hands on parent care or interaction which can help reduce stress and anxiety.

- **Significant increase** in the risk of being diagnosed with ASDs in children who were born SGA ([Kuzniewicz et al, 2014](#))
- **Significant increase** in the risk of infantile autism among male children born preterm/extremely low birth weight ([Hwang et al, 2013](#))
- **Significant increase** in the risk of autism in children due to maternal ethnicity (Asian or African American origin) ([Moore et al, 2012](#))
- **Significant increase** in the risk of autism spectrum disorder /condition at 2 to 17 years age in males ([Singh et al, 2013](#))

- What are these studies telling us?
- What are the implications for these speech, language and communication problems for children born preterm?

What About Early Communication in the Neonatal Unit?

- Intense exposure to non-natural sounds
 - Exceeding recommended decibel recommendation
- Overstimulation of neonate has adverse impact on growth and development
- Lack of exposure to language during critical periods of development
- Effects of maternal voice exposure on infant development is potentially positive for interaction, feeding progression, cognitive and neuro - behavioural development ([Provenzi et al, 2018](#); [Sajjadian et al, 2017](#))

What About Early Communication in the Neonatal Unit?

Systematic Review : Harding, Levin, Crossley, Murphy, van den Engel–Hoek (2019), *Journal of Neonatal Nursing*, 25(4),177-188

- Being separated from an infant can impact on parent mental health & well-being and attachment & bonding
- Responding to / interpreting infant states are important adjuncts to support communication
- Early interaction studies have variable outcomes, and possibly do not consider relevant early communication attributes
- What is “early communication”?
- Should specific communication attributes be a part of SLT intervention in the NICU?

What can we do?

Systematic Review : Harding, Levin, Crossley, Murphy, van den Engel –Hoek (2019), *Journal of Neonatal Nursing*, 25(4),177-188

- **Coppola & Cassibba 2010** - Observational study of 20 preterm VLBW infants. More severe condition the more mother only focuses on rather than speaks to infant. Significant increases in mothers looking at the infant over time. Interaction increases once the infant out of the incubator
- **Kusanagi et al, 2011** - Allocation of 51 mother- infant dyads (born 28.5 – 35.5 GA) to control / intervention groups. Outcomes included increased infant – mother interaction; teaching mother modulation of infant states should start on NICU

Systematic Review : Harding, Levin, Crossley, Murphy, van den Engel –Hoek (2019), *Journal of Neonatal Nursing*, 25(4),177-188

- **Milgrom et al, 2013** - RCT , 109 mothers and 123 infants (born 26.1 – 29.5 GA). Outcomes included responsiveness to infant cues, communication and symbolic development
- **Caskey et al, 2014** - Repeated measures design. 36 preterm infants aged 23-30 GA. Outcome measures included adult language word count; infant responses with vocalisations
- **Benassi et al, 2018** - Group allocation for 40 mother –infant dyads ELGA compared with typically developing infants. Important focus on development of reaching, showing, requesting gestures

What can we do?

- **Skin to skin implemented with a flexive position** to improve face to face time can improve vocal attempts and increase mother's vocalisations, gaze and smiling ([Buil et al., 2020](#)).
- **Maternal directed speaking and singing during skin to skin.** Infants vocalise less when their mothers speak or sing. Maternal speaking increases preterm vocalisations during pauses. Singing results in fewer vocalisations and pauses ([Carvalho et al., 2020](#)). Carvalho also published a SR suggesting that mothers should be encouraged to direct voice to a foetus in utero

- Learning to communicate with an infant on a neonatal unit can be stressful
- Infants born preterm are at high risk of developing SLCN
- Supporting parents to attach and bond with their infant can provide a good foundation for initiating and developing appropriate early communication strategies using linguistic approaches
- Parent - Child interaction approaches should be considered and adapted for use on neonatal units
- Further good quality research is needed to understand the mother-infant dyad in relation to language development

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