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#### COGNITIVE DISORDERS IN CHILDREN WHO HAVE SUFFERED PERINATAL DAMAGE TO THE NERVOUS SYSTEM

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**Annotation:** Perinatal damage to the nervous system (PDNS) is a major contributor to developmental delays in children, with cognitive impairments as a common outcome. This study evaluates the impact of PDNS on cognitive function using clinical data from 200 children aged 3-7 years. Statistical analysis highlights the role of neuroimaging, cognitive assessments, and tailored therapeutic interventions. Early detection and intervention are shown to significantly reduce long-term disabilities.

**Keywords:** Perinatal brain injury,Cognitive impairment,Developmental delay,Early intervention,Neurorehabilitation

#### Introduction

Perinatal brain injuries (PBIs) occur during late pregnancy, labor, or shortly after birth, posing risks for long-term neurological sequelae. Common causes include:

- 1. **Hypoxia-Ischemia**: Oxygen deprivation during delivery.
- 2. **Infections**: Such as intrauterine viral or bacterial infections.
- 3. **Trauma**: Mechanical injury during labor.

According to the **World Health Organization (WHO)**, PBIs affect approximately 5-10 out of every 1,000 live births globally, with higher rates in low- and middle-income countries due to limited access to prenatal care. Cognitive impairments in these children range from mild attention deficits to severe intellectual disabilities.

#### **Materials and Methods**

#### Study Design

This study employed a **longitudinal cohort design**, tracking neurodevelopmental outcomes over a 2-year period.

#### Participants

- **Group A (PDNS group)**: 100 children diagnosed with PDNS.
- Group B (control group): 100 age-matched typically developing children.

#### Assessments

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- 1. **Cognitive Testing**:
- WISC-IV: General IQ assessment.
- BRIEF-P: Behavioral Rating Inventory of Executive Function for Pre-schoolers.
- Peabody Picture Vocabulary Test: Evaluates receptive language skills.
- 2. Neuroimaging:

• MRI scans to detect structural abnormalities (e.g., periventricular leukomalacia, cortical atrophy).

#### 3. **Parental Questionnaires**:

Ages and Stages Questionnaire (ASQ): Measures developmental milestones.

• Family Adaptation Scale: Evaluates caregiver stress and involvement in rehabilitation.

## Results

### **Neuroimaging Findings**

• 70% of children in Group A showed significant white matter damage, with periventricular leukomalacia being the most common abnormality.

- Cortical atrophy was noted in 20% of cases.
- No structural abnormalities were identified in Group B.

## **Cognitive Outcomes**

- Mean IQ Scores:
- $\circ \qquad \qquad \text{Group A: } 78 \pm 10$
- Group B:  $98 \pm 8 \ (p < 0.001)$
- Executive Function:
  - Group A had a 65% delay in executive functions compared to Group B.

### Language Development:

55% of children in Group A had delayed expressive language, compared to 5% in

#### Group B.

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### **Therapeutic Efficacy**

Children in Group A who underwent intensive therapy demonstrated:

- 50% improvement in attention span over 12 months.
- 40% reduction in language delays after 18 months of speech therapy.
- 60% enhancement in problem-solving abilities following cognitive training.

### Statistical Insights

• Early diagnosis (before 12 months) led to a 30% better outcome in cognitive metrics than late diagnosis (after 18 months).

• Parental involvement in therapy correlated with a 20% increase in rehabilitation success.

#### Discussion

#### **Impact of PDNS on Cognitive Development**

PDNS significantly alters neurodevelopment, particularly in areas associated with memory, attention, and problem-solving. White matter damage, commonly detected in neuroimaging, disrupts neural pathways essential for cognitive processing.

### Importance of Early Intervention

Children diagnosed before 12 months and treated with structured programs exhibited better cognitive and behavioral outcomes. Key interventions include:

- 1. **Cognitive Training**: Focused activities like puzzles and memory games.
- 2. Speech and Language Therapy: Techniques to enhance verbal communication.

3. **Family-Centered Care**: Educating caregivers to support therapy at home.

### Limitations

While the study provides compelling evidence, limitations include a relatively small sample size and the need for longer follow-up periods to assess academic outcomes.

### Conclusion

Cognitive impairments resulting from PDNS are prevalent and significantly affect quality of life. Early detection through neuroimaging and cognitive assessments, combined with tailored rehabilitation, offers the best outcomes. Public health initiatives should prioritize prenatal care, early screening, and affordable therapy programs to mitigate the impact of PDNS globally.

### **Additional Recommendations**

1. **Policy Changes**: Advocate for mandatory prenatal screening programs.

2. **Training Programs**: Increase the availability of trained pediatric neurologists and therapists in low-resource areas.

3. **Parental Support Groups**: Provide resources for families to navigate challenges associated with PDNS.

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