

Monday 6 January 2020

Cerebral Palsy Alliance is delighted to bring you this free weekly bulletin of the latest published research into cerebral palsy. Our organisation is committed to supporting cerebral palsy research worldwide - through information, education, collaboration and funding. Find out more at cerebralpalsy.org.au/our-research

Professor Nadia Badawi AM

Macquarie Group Foundation Chair of Cerebral Palsy

[Subscribe to CP Research News](#)

Interventions and Management

1. Knee pain and crouch gait in individuals with cerebral palsy: what impact does crouch-related surgery have?

Pelrine ER, Novacheck TF, Boyer ER.

Dev Med Child Neurol. 2019 Dec 29. doi: 10.1111/dmcn.14438. [Epub ahead of print]

AIM: To investigate the effect of crouch-related surgery on knee pain in individuals with cerebral palsy. **METHOD:** We retrospectively identified individuals with two three-dimensional gait analyses at baseline and follow-up visits. All individuals walked in crouch gait at baseline. Visits were 9 months to 42 months apart. Baseline knee pain, age, crouch-related surgery (yes/no), and minimum knee flexion at follow-up were entered into a logistic regression to predict follow-up knee pain. **RESULTS:** Thirty-two individuals (21 males, 11 females; mean [SD] age 12y 10mo [2y 5mo]; 8y 1mo-18y 7mo) received crouch-related surgery, while 19 were managed non-surgically. At baseline, knee pain prevalence was 38% in the surgical group and 21% in the non-surgical group. At follow-up, 34% of the surgical group and 16% of the non-surgical group had knee pain (odds ratio: 2.809, $p=0.285$). **INTERPRETATION:** Crouch-related surgery does not appear to decrease knee pain prevalence compared to a comparison group, based on this preliminary study. Further investigation of the roles of these procedures is indicated with regards to this patient-reported outcome. What this paper adds approximately 38% of individuals undergoing crouch-related surgery had knee pain. Approximately 42% of individuals with baseline knee pain who had surgery still had knee pain 1 year postoperatively. Approximately 50% of those with baseline knee pain managed non-surgically still had knee pain 1 year later. Crouch-related surgery tended not to decrease knee pain prevalence 1 year postoperatively.

PMID: [31885082](#)

2. Research priorities in children requiring elective surgery for conditions affecting the lower limbs: a James Lind Alliance Priority Setting Partnership.

Vella-Baldacchino M, Perry DC, Roposch A, Nicolaou N, Cooke S, Ellis P, Theologis T.

BMJ Open. 2019 Dec 30;9(12):e033233. doi: 10.1136/bmjopen-2019-033233.

OBJECTIVE: To identify and prioritise research questions concerning the elective surgical management of children with conditions affecting the lower limb by engaging patients, carers and healthcare professionals. **DESIGN:** A modified nominal group technique. **SETTING:** UK. **PARTICIPANTS:** 388 individuals (29 patients, 155 parents/carers, 204 healthcare professionals) were recruited through hospital clinics, patient charities and professional organisations and participated in the initial prioritisation survey; 234 individuals took part in the interim prioritisation survey. 33 individuals (3 patients, 9 parents/carers, 11 healthcare professionals, 7 individuals representing the project's steering group and 3 James Lind Alliance (JLA) facilitators) attended the final face-to-face workshop to rank the top 10 research priorities. **INTERVENTIONS:** Surveys were distributed using various media resources such as newsletters, internet messaging boards and the 'Paediatric Lower Limb Surgery Priority Setting Partnership (PSP) website. Printed copies of the questionnaire were also made available to families in

outpatient clinics. OUTCOME MEASURES: Survey results, top 10 and top 26 priority rankings RESULTS: The process took 18 months to complete (July 2017-January 2019); 388 people generated 1023 questions; a total of 801 research questions were classified as true uncertainties. Following the JLA methodology, 75 uncertainties were developed from the initial 801 questions. Twenty six of those were selected through a second survey and were taken to the final face-to-face workshop where the top 10 research priorities were selected. The top10 priorities included questions on cerebral palsy, common hip conditions (ie, Perthes' disease and developmental dysplasia of the hip) as well as rehabilitation techniques and methods to improve shared decision-making between clinicians and patients/families. CONCLUSIONS: This is the first JLA PSP in children's orthopaedic surgery, a particularly under-researched and underfunded area. We have identified important research topics which will guide researchers and funders and direct their efforts in future research.

PMID: [31892663](#)

3. Comparison of Electroacupuncture and Body Acupuncture on Gastrocnemius Muscle Tone in Children with Spastic Cerebral Palsy: A Single Blinded, Randomized Controlled Pilot Trial.

Wang LL, Shan L, Du L, Zhang Y, Jia FY.

Chin J Integr Med. 2020 Jan;26(1):14-19. doi: 10.1007/s11655-019-3082-y. Epub 2020 Jan 2.

OBJECTIVE: To compare the immediate effects of electroacupuncture (EA) and body acupuncture (BA) on gastrocnemius muscle tone in children with spastic cerebral palsy (CP). METHODS: Children with spastic CP, age from 24 to 60 months, who all received rehabilitation treatment in the Department of Developmental and Behavioral Pediatrics, the First Hospital of Jilin University from April 2016 to May 2017 were enrolled in this trial and assigned to EA group and BA group through a random number table. Both EA and BA therapies were performed on acupoints of Zusanli (ST 36), Shangjuxu (ST 37), Sanyinjiao (SP 6), and Xuanzhong (GB 39) for 30 min once. The root mean square (RMS), integrated electromyogram (iEMG) of the gastrocnemius of surface electromyography (sEMG), and Modified Tardieu Scale (MTS) of the two groups were evaluated before and after treatment. All adverse events were accurately recorded. RESULTS: Thirty-six children with spastic CP completed the study (18 cases and 32 legs in the EA group; 18 cases and 31 legs in the BA group). There was no significant difference in RMS, iEMG and MTS between the two groups before treatment ($P>0.05$). After treatment, compared with before treatment, RMS and iEMG significantly reduced and MTS (R2-R1) significantly increased in both EA and BA groups ($P<0.05$), and EA was more effective than BA in RMS and MTS ($P<0.05$). However, the iEMG between the two groups were not statistically significant after treatment ($P>0.05$). There was no serious adverse event during this clinical trial. CONCLUSION: Both EA and BA could significantly relieve the gastrocnemius muscle tone in spastic CP, and EA was more effective than BA. (Registration No. ChiCTR190015007633).

PMID: [31898768](#)

4. Comparison of the effectiveness of partial body weight-supported treadmill exercises, robotic-assisted treadmill exercises, and anti-gravity treadmill exercises in spastic cerebral palsy.

Aras B, Yaşar E, Kesikburun S, Türker D, Tok F, Yılmaz B.

Turk J Phys Med Rehabil. 2019 Nov 22;65(4):361-370. doi: 10.5606/tftrd.2019.3078. eCollection 2019 Jun.

OBJECTIVES: This study aims to compare the effectiveness of the partial body weight-supported treadmill exercise (PBWSTE), robotic-assisted treadmill exercise (RATE), and anti-gravity treadmill exercise (ATE) in children with spastic cerebral palsy (CP). PATIENTS AND METHODS: Between December 01, 2015 and May 01, 2016, a total of 29 children (18 males, 11 females; mean age 9.3 ± 2.3 years; range, 6 to 14 years) with spastic CP were included in the study. The patients were randomly divided into three groups as the PBWSTE group ($n=10$), RATE group ($n=10$), and ATE group ($n=9$). Each group underwent a total of 20 treadmill exercise sessions for 45 min for five days a week for a total of four weeks. The patients were assessed using three-dimensional gait analysis, open-circle indirect calorimeter, six-minute walking test, and Gross Motor Functional Measurement (GMFM) scale before and after treatment and at two months of follow-up. RESULTS: No significant change compared to baseline was found in the walking speed on gait analysis among the groups after the treatment. There was no statistically significant difference among the groups in terms of the GMFM-D, GMFM-E and six-minute walking test ($p>0.05$). There was a significant improvement in the oxygen consumption in the ATE group ($p>0.05$) and RATE group ($p>0.05$), but not in the PBWSTE group ($p<0.05$). CONCLUSION: Our study findings indicate that all three treadmill exercises have a positive impact on walking, and RATE and ATE can be used more actively in patients with spastic CP.

PMID: [31893273](#)

5. Visuo perceptual profiles of children using the Flemish cerebral visual impairment questionnaire.

Ben Itzhak N, Vanclief K, Franki I, Laenen A, Wagemans J, Ortibus E.

Dev Med Child Neurol. 2019 Dec 30. doi: 10.1111/dmcn.14448. [Epub ahead of print]

AIM: To investigate the underlying factor structure of the 46-item Flemish cerebral visual impairment (CVI) questionnaire, differentiate the factor scores of children with and without CVI, and examine the impact of comorbidities on factor scores. **METHOD:** The records of 630 children (386 males, 244 females; median age 77mo; interquartile range 63-98mo) who visited the CVI clinic and the Centre for Developmental Disabilities at the University Hospitals of Leuven from 2001 to 2018 were reviewed systematically. Inclusion criteria included an up-to-date questionnaire, a definitive diagnosis, and clinical assessment. **RESULTS:** Three hundred and forty-five children (179 with CVI [108 males, 71 females; median age 74mo; interquartile range 61-93mo] and 166 without CVI [110 males, 56 females; median age 88mo; interquartile range 70-107mo]) were included. An exploratory factor analysis resulted in a 5-factor (object and face processing impairments; visual (dis)interest; clutter and distance viewing impairments; moving in space impairments; and anxiety-related behaviours) biologically and clinically plausible model, which retained 35 items and explained 56% of the total variance. Mann-Whitney U tests indicated that factors 1 to 4 were significantly higher in children with CVI compared to children without CVI (p-values ranged from p<0.001 to p<0.05; effect sizes ranged from 0.11 to 0.33); factor 5 showed no differences. Autism, developmental coordination disorder, epilepsy, and cerebral palsy impacted factor scores. **INTERPRETATION:** A 5-factor structure of the Flemish CVI questionnaire differentiates children with and without CVI. Comorbidities should be accounted for when researching CVI. **WHAT THIS PAPER ADDS:** Cerebral visual impairment (CVI) is characterized by impaired object and face processing and impaired visual interest. CVI is also characterized by impaired clutter and distance viewing, and impaired moving in space. All children (with or without CVI) demonstrated anxiety-related behaviours. Autism affected object/face processing, whereas developmental coordination disorder, epilepsy, and cerebral palsy affected visual interest.

PMID: [31889310](#)

6. Clinical Indicators of Impaired Swallowing in Children with Neurological Disorders.

Silva RA, da Silva VM, Lopes MVO, Guedes NG, Oliveira-Kumakura AR.

Int J Nurs Knowl. 2019 Dec 31. doi: 10.1111/2047-3095.12271. [Epub ahead of print]

OBJECTIVE: To investigate the clinical indicators of the nursing diagnosis impaired swallowing in children with neurological disorders. **METHODS:** An integrative review was performed on the Scopus, Web of Science, PubMed, Lilacs and Cinahl databases; by crossing the terms impaired deglutition, dysphagia, deglutition disorders, cerebral palsy, microcephaly, which resulted in 45 articles. **RESULTS:** Eighteen indicators were identified in the oral phase, ten in the pharyngeal phase, and nine in the esophageal phase. There was a percentage of 80.4% of the indicators cited in NANDA-International, especially those referring to the oral phase. **CONCLUSIONS:** There are clinical indicators in both phases of impaired swallowing in children with neurological dysfunctions presenting heterogeneous distribution.

PMID: [31891226](#)

7. Effect of virtual reality therapy on functional development in children with cerebral palsy: A single-blind, prospective, randomized-controlled study.

Metin Ökmen B, Doğan Aslan M, Nakipoğlu Yüzer GF, Özgirgin N.

Turk J Phys Med Rehabil. 2019 Nov 22;65(4):371-378. doi: 10.5606/tftrd.2019.2388. eCollection 2019 Jun.

OBJECTIVES: The aim of this study was to investigate the effect of virtual reality (VR) therapy on motor and functional development in children with cerebral palsy (CP). **PATIENTS AND METHODS:** In this single-blind, prospective, randomized-controlled study, a total of 41 patients (28 males, 13 females; mean age 8.49 years; range, 5 to 15 years) receiving inpatient treatment for CP were included between April 2009 and September 2009. The patients were randomly divided into two groups as the study group (n=21) and control group (n=20). Neurophysiological and conventional treatment methods, and occupational therapy were applied to all patients. In addition, a total of 12 VR therapy sessions for one hour were administered three days a week for four weeks to the study group. Before and after treatment, the Bimanual Fine Motor Function (BFMF) test was performed to measure hand functioning, Gross Motor Function Classification System (GMFCS) for functional levels, and Functional Mobility Scale (FMS) for mobility. **RESULTS:** There was a significant increase in the BFMF, GMFCS, and FMS

scores after treatment, compared to baseline values in the study group ($p < 0.05$). There was a statistically significant results in favor of the study group for all parameters after treatment compared to pre-treatment values ($p < 0.05$). **CONCLUSION:** Our study results indicate that VR therapy is a useful treatment method which can be used in rehabilitation of CP with improved motor function. The addition of this method to conventional rehabilitation techniques may have a significant impact on treatment success.

PMID: [31893274](#)

8. Making Self-Management Mobile Health Apps Accessible to People with Disabilities: Qualitative Single-Subject Study.

Zhou L, Saptono A, Setiawan IMA, Parmanto B.

JMIR Mhealth Uhealth. 2020 Jan 3;8(1):e15060. doi: 10.2196/15060.

Over the past decade, a large number of mobile health (mHealth) apps have been created to help individuals to better manage their own health. However, very few of these mHealth apps were specifically designed for people with disabilities, and only a few of them have been assessed for accessibility for people with disabilities. As a result, people with disabilities have difficulties using many of these mHealth apps. The objective of this study was to identify an approach that can be generally applied to improve the accessibility of mHealth apps. We recruited 5 study participants with a primary diagnosis of cerebral palsy or spinal cord injury. All the participants had fine motor impairment or lack of dexterity, and hence, they had difficulties using some mHealth apps. These 5 study participants were first asked to use multiple modules in the client app of a novel mHealth system (iMHere 2.0), during which their performance was observed. Interviews were conducted post use to collect study participants' desired accessibility features. These accessibility features were then implemented into the iMHere 2.0 client app as customizable options. The 5 participants were asked to use the same modules in the app again, and their performance was compared with that in the first round. A brief interview and a questionnaire were then performed at the end of the study to collect the 5 participants' comments and impression of the iMHere 2.0 app in general and of the customizable accessibility features. **RESULTS:** Study results indicate that the study participants on their first use of the iMHere 2.0 client app experienced various levels of difficulty consistent with the severity of their lack of dexterity. Their performance was improved after their desired accessibility features were added into the app, and they liked the customizable accessibility features. These participants also expressed an interest in using this mHealth system for their health self-management tasks. The accessibility features identified in this study improved the accessibility of the mHealth app for people with dexterity issues. Our approach for improving mHealth app accessibility may also be applied to other mHealth apps to make those apps accessible to people with disabilities.

PMID: [31899453](#)

9. Effectiveness of Mechanical Horse-Riding Simulators on Postural Balance in Neurological Rehabilitation: Systematic Review and Meta-Analysis.

Dominguez-Romero JG, Molina-Aroca A, Moral-Munoz JA, Luque-Moreno C, Lucena-Anton D.

Int J Environ Res Public Health. 2019 Dec 25;17(1). pii: E165. doi: 10.3390/ijerph17010165.

Mechanical horse-riding simulators consist of a device that mimics the movement of a real horse, generating between 50 and 100 three-dimensional physical movements (forward and back, left and right, up and down). The main objective of this study is to analyze the effectiveness of mechanical horse-riding simulators to improve postural balance in subjects with neurological disorders. The search was conducted during January-March 2019 in PubMed, Physiotherapy Evidence Database (PEDro), Cochrane, Web of Science, CINAHL, and Scopus. The methodological quality of the studies was evaluated through the PEDro scale. A total of seven articles were included in this systematic review, of which four contributed information to the meta-analysis. Statistical analysis showed favorable results for balance in stroke patients, measured by the Berg Balance Scale (standardized mean difference (SMD) = 3.24; 95% confidence interval (CI): 1.66-4.83). Not conclusive results were found in sitting postural balance, measured using the Gross Motor Function Measure-66 (GMFM-66) Sitting Dimension, in patients with cerebral palsy. Most studies have shown beneficial effects on postural balance compared with conventional physical therapy. However, due to the limited number of articles and their low methodological quality, no solid conclusions can be drawn about the effectiveness of this therapy.

PMID: [31881693](#)

10. Cerebral palsy information system with an approach to information architecture: a systematic review.

Afzali M, Etemad K, Kazemi A, Rabiei R.

BMJ Health Care Inform. 2019 Dec;26(1). pii: e100055. doi: 10.1136/bmjhci-2019-100055.

BACKGROUND: Long-term complications and high costs of cerebral palsy (CP) as well as inconsistency in data related to this disease reveal the need for extensive planning to obtain accurate and complete data for the effective management of patients. **OBJECTIVE:** The present study reviews the information architecture of CP information system. **METHOD:** The relevant articles published from early 1988 to 31 July 2018 were extracted through searching PubMed, Scopus, Cochran, Web of Science and Embase databases conducted independently by two researchers. **RESULTS:** A total of 39 articles on CP information system were reviewed. Hospitals, rehabilitation centres and outpatient clinics were found to be the main organisations in charge of generating CP data. Each CP database used several data sources, with hospitals serving as the most important sources of information and the main generators of data. The main CP datasets were categorised into four groups of demographic data, diagnosis, motor function and visual impairment. The majority of data standards were related to the use of the International Classification of Functioning, Disability and Health and the Gross Motor Function Classification System. Finally, accuracy, completeness and consistency were the criteria employed in data quality control. **CONCLUSION:** Developing a robust CP information system requires deploying the principles of information architecture when developing the system, as these can improve data structure and content of CP system, as well as data quality and data sharing.

PMID: [31892529](#)

11. Quality of life in adolescents with epilepsy, cerebral palsy, and population norms.

Boldyreva U, Streiner DL, Rosenbaum PL, Ronen GM.

Dev Med Child Neurol. 2020 Jan 3. doi: 10.1111/dmcn.14450. [Epub ahead of print]

AIM: To compare: (1) self- and proxy-reported quality of life (QoL) in adolescents with epilepsy, cerebral palsy (CP), both epilepsy and CP, and a representative general population sample; and (2) parental stress between parents of adolescents with epilepsy, CP, or both epilepsy and CP. **METHOD:** This was a cross-sectional observational study with 496 adolescents with epilepsy, 699 with CP, 192 with both CP and epilepsy, and 15 396 from the general population, assessed with the KIDSCREEN-52 and Parenting Stress Index (PSI). **RESULTS:** All KIDSCREEN-52 domains showed statistically significant differences across groups. The epilepsy population showed clinically better scores for 'school environment' than the general population (Cohen's $d=0.62$). Parents scored adolescents with CP lower than adolescents with epilepsy or general populations on 'physical health' ($d=0.57$, $d=0.55$) and 'social-support and peers' ($d=0.82$, $d=0.91$). Parents of adolescents with CP scored them lower than parents of the epilepsy group on 'autonomy' ($d=0.62$). Parents of adolescents with epilepsy scored them lower on 'mood and emotions' ($d=0.52$) and 'social acceptance' ($d=0.66$) than the general population. PSI scores were better for parents of adolescents with CP than for parents of adolescents with epilepsy ($d=2.12$, $d=2.70$, $d=3.35$, $d=1.67$). **INTERPRETATION:** Adolescents with epilepsy or CP self-report equal or better QoL than the general adolescent population, which should comfort families and allow clinicians to address parental concerns. **WHAT THIS PAPER ADDS:** Adolescents with epilepsy, with or without cerebral palsy (CP), self-reported better school environment than adolescents in the general population. Proxy quality of life (QoL) results showed clinically important differences across groups in 6 out of 10 domains of the KIDSCREEN-52. Proxy-reported results showed poorer QoL scores for adolescents with epilepsy or CP than the general population. Parental stress level was lower in parents of children with CP or both CP and epilepsy, than in those with only epilepsy.

PMID: [31898321](#)

12. The Unmet Needs of Parents of Highly Dependent Children with Cerebral Palsy.

Mohd Nordin NA, Hui Shan E, Zanudin A.

Int J Environ Res Public Health. 2019 Dec 16;16(24). pii: E5145. doi: 10.3390/ijerph16245145.

The overall care for children with cerebral palsy (CP) is challenging to the family which causes significant impacts to their livelihood. There is limited qualitative research that reports the unmet needs of parents with physically disabled children, especially highly dependent CP. The aim of this study was to explore the unmet needs of parents of highly dependent children with CP. A qualitative study using semi-structured face to face interviews was carried out among nine parents of children with CP with gross motor classification function score (GMFCS) levels III, IV, and V. The interviews were tape-recorded and transcribed verbatim. Transcribed data was analysed using thematic analysis method. Several unmet needs were highlighted by the parents; namely the needs in receiving information regarding CP conditions, getting psychological and financial support and explaining the child's condition to strangers. In addition, parents expressed the need for better support from the social

welfare department, as well as in effectively organising family functioning. The findings of this study indicate that there is a need for the healthcare professionals to develop suitable strategies to assist the parents of highly dependent children with CP in fulfilling their specific needs. The role of relevant agencies should be optimised in addressing this area of concern.

PMID: [31888294](#)

13. Play Experiences of Children With a High Level of Physical Disability.

Graham N, Mandy A, Clarke C, Morriss-Roberts C.

Am J Occup Ther. 2019 Nov/Dec;73(6):7306205010p1-7306205010p10. doi: 10.5014/ajot.2019.032516.

IMPORTANCE: This research provides practitioners with an understanding of play from the perspective of children with a high level of physical disability. **OBJECTIVE:** To explore the experience of play for children who have a high level of physical disability as a result of cerebral palsy. **DESIGN:** Interpretative phenomenological analysis. Children participated in three interviews each to discuss their experience of play. Visual methods, such as use of video and drawings, enabled a greater depth of discussion. **SETTING:** Participants' homes. **PARTICIPANT:** Six children ages 6-11 yr with a high level of physical disability, recruited via snowball sampling and charities working with children with cerebral palsy. **RESULTS:** We found that making choices and controlling play were important for the children, that they often experienced play differently than their peers, and that they connected with others in play through humor and communication skills. **CONCLUSIONS AND RELEVANCE:** Occupational therapy practitioners can respond to the findings by understanding the embodied unit, recognizing vista play, enabling expression of each child's imagined self, supporting negotiation of identity and disability, recognizing participation in play through watching, enabling opportunities for belonging, enabling development of component skills for play, and supporting strategies for connection. **WHAT THIS ARTICLE ADDS:** This article provides occupational therapy practitioners and other professionals with an understanding of play from the perspective of children who have a high level of physical disability.

PMID: [31891340](#)

14. In clinical practice, cerebral MRI in newborns is highly predictive of neurodevelopmental outcome after therapeutic hypothermia.

Tharmapooopathy P, Chisholm P, Barlas A, Varsami M, Gupta N, Ekitzidou G, Ponnusamy V, Kappelou O, Evanson J, Rosser G, Shah DK.

Eur J Paediatr Neurol. 2019 Dec 17. pii: S1090-3798(19)30438-6. doi: 10.1016/j.ejpn.2019.12.018. [Epub ahead of print]

OBJECTIVE: In the trials, a substantial proportion of newborns who underwent therapeutic hypothermia (TH) had an adverse outcome after hypoxic-ischaemic encephalopathy (HIE). Cooled babies were noted to have fewer cerebral lesions on MRI but when present lesions were predictive of adverse outcome. We investigate the predictive value of cerebral MRI in babies who undergo cooling in the clinical setting outside of the clinical trials in a prospective UK cohort. **RESULTS:** Of 75 babies recruited from four centres, neurodevelopment was available for 69 (92%) with 29% (20/69) being abnormal. The unfavourable MRI group (n = 22) had significantly lower motor (p < 0.001), language (p < 0.001) and cognition (p < 0.001) scores on Bayley-III assessment, compared to the favourable MRI group (n = 47). On multiple regression there was a significant relationship between basal ganglia and thalami abnormality and motor (p = 0.002), cognition (p = 0.011) and language (p = 0.013) outcomes. Half of the babies who had an MRI predictive of adverse outcome (11/22) had highest grade cerebral palsy. Cerebral MRI had 95% sensitivity, 94% specificity, 91% PPV and 98% NPV in predicting neurodevelopment. **CONCLUSIONS:** In this clinical cohort, fewer children had adverse neurodevelopment after TH compared to the TH trials. However, half the children who had an MRI predictive of adverse ND outcome had the most severe form of cerebral palsy. In this cohort, cerebral MRI was found to be highly predictive of neurodevelopmental outcome.

PMID: [31882277](#)

15. Cognitive Outcomes of Children with Very Low Birth Weight at 3 to 5 Years of Age.

Kim HS, Kim EK, Park HK, Ahn DH, Kim MJ, Lee HJ.

J Korean Med Sci. 2020 Jan 6;35(1):e4. doi: 10.3346/jkms.2020.35.e4.

BACKGROUND: The cognitive consequences and risk factors based long-term outcome of very-low-birth-weight (VLBW; < 1,500 g) infants in Korea has not been studied. The aim of this study was to determine the influence of perinatal and neonatal risk factors on the cognitive performance of VLBW children at 3 to 5 years of age. **METHODS:** We enrolled 88 VLBW infants without cystic periventricular leukomalacia for the assessment of their demographic data, cognitive performance, and development of cerebral palsy (CP) at 3 to 5 years of age. Cognitive performance was assessed using the Korean version of the Wechsler Preschool and Primary Scale of Intelligence IV. Growth data were assessed with measurements of weight, height, and head circumference (HC) at the corrected ages of 6, 12, and 18 months, and 3 to 5 years of age. **RESULTS:** In the VLBW group, the full-scale intelligence quotient (FSIQ) was 96.1 ± 15.2 at the mean age of 4.5 years. The incidence rate of CP was 3.4%. Overall, 17% (15/88) of the VLBW children had a below-average FSIQ (< 85). We divided the VLBW children into the abnormal FSIQ group (< 85, n = 15) and the normal FSIQ group (≥ 85 , n = 73). VLBW children with intrauterine growth retardation (IUGR) was associated with a below-average FSIQ at the mean age of 4.5 years (< 85, 8/15, 53.3% vs. ≥ 85 , 5/73, 6.8%; $P < 0.001$). After controlling for associated clinical factors, IUGR in the VLBW children was found to be associated with an abnormal FSIQ at the mean age of 4.5 years ($P = 0.025$). The weight, height, and HC obtained for both groups showed that normal growth was maintained at the mean age of 4.5 years with no significant difference between abnormal and normal FSIQ groups. **CONCLUSION:** Fifteen of 88 (17%) of the VLBW children had a below-average FSIQ (< 85). VLBW with IUGR is associated with poor cognitive outcomes at the mean age of 4.5 years.

PMID: [31898433](#)

16. Why considering sexual differences is necessary when studying encephalopathy of prematurity through rodent models.

Le Dieu-Lugon B, Dupré N, Legouez L, Leroux P, Gonzalez BJ, Marret S, Leroux-Nicollet I, Cleren C.

Eur J Neurosci. 2019 Dec 29. doi: 10.1111/ejn.14664. [Epub ahead of print]

Preterm birth is a high-risk factor for the development of gray and white matter abnormalities, referred to as "encephalopathy of prematurity," that may lead to life-long motor, cognitive, and behavioral impairments. The prevalence and clinical outcomes of encephalopathy of prematurity differ between sexes, and elucidating the underlying biological basis has become a high-priority challenge. Human studies are often limited to assessment of brain region volumes by MRI, which does not provide much information about the underlying mechanisms of lesions related to very preterm birth. However, models using KO mice or pharmacological manipulations in rodents allow relevant observations to help clarify the mechanisms of injury sustaining sex-differential vulnerability. This review focuses on data obtained from mice aged P1-P5 or rats aged P3 when submitted to cerebral damage such as hypoxia-ischemia, as their brain lesions share similarities with lesion patterns occurring in very preterm human brain, before 32 gestational weeks. We first report data on the mechanisms underlying the development of sexual brain dimorphism in rodent, focusing on the hippocampus. In the second part, we describe sex specificities of rodent models of encephalopathy of prematurity (RMEP), focusing on mechanisms underlying differences in hippocampal vulnerability. Finally, we discuss the relevance of these RMEP. Together, this review highlights the need to systematically search for potential effects of sex when studying the mechanisms underlying deficits in RMEP in order to design effective sex-specific medical interventions in human preterms.

PMID: [31885096](#)