**Suppl. Fig. 1.** Flow chart illustrating the number of infants recruited in the study.

 

**Suppl. Table 1.** Definitions of predictor variables

|  |  |
| --- | --- |
| **Perinatal period** | **Definition** |
| Preeclampsia | pregnancy-induced hypertension (>140/90 mm Hg) associated with proteinuria and edema during the second half of gestation |
| Clinical chorioamnionitis | maternal fever >38°C together with uterine tenderness or foul-smelling vaginal discharge |
| **Neonatal period** | **Definition** |
| BPD | oxygen dependence for at least 28 postnatal days, and requirement for supplemental oxygen >21% and/or positive pressure (continuous positive airway pressure or mechanical ventilation) at postmenstrual age 36 weeks (ref. 1) |
| Sepsis | clinical signs of infection and antibiotic treatment for at least 5 days with positive blood cultures |
| NECa  | >= stage II according to the modified Bell’s staging criteria (ref. 2)  |
| Severe IVHb | Detected by sonography: grade III (flooding of >=50% of lateral ventricles with acute ventricular dilatation), or any grade of IVH with intraparenchymal lesion due to venous infarction (ref. 3) |
| cPVL | Detected by sonography: periventricular echolucent cystic lesions excluding those caused by venous infarction (ref. 3) |
| Severe ROPc | treatment-demanding or >= stage III ROP (ref. 4) |
| **Sociodemographic factors** | **Definition** |
| Low maternal education | less than high school level |
| Low SES | determined by parents’ education and occupation and categorized into five classes (I-V), with class IV and class V as low status (ref. 5) |
| SGA | birthweights lower than the 10th percentile for sex and gestational age according to the growth charts for Taiwanese infants (ref 6) |
| **Anthropometric data** | **Definition** |
| Microcephaly | head circumference less than the 10th percentile for sex and age according to World Health Organization growth charts (ref 7) |

BPD, bronchopulmonary dysplasia; NEC, necrotizing enterocolitis; IVH, intraventricular haemorrhage; cPVL, cystic periventricular leukomalacia; ROP, retinopathy of prematurity; SES, socioeconomic status; SGA, small for gestational age. aclassified into stage I-III with increased severity; bclassified into grade I-III and periventricular parenchymal haemorrhage with increased severity; cclassified into stage I-V with increased severity.

**Reference**

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**Suppl. Table 2.** Model fit statistics for the three-group and four-group classifications

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Number of groups** | **Group** | **Parameter** | **Estimate** | **SE** | **T**  | **BIC** |
| 3 | 1 (5.0%) | Intercept | 68.16545 | 4.41573 | 15.437 | -18934 |
|  | Linear | -0.85863 | 0.66743 | -1.286 |
|  | Quadratic | 0.00045 | 0.02124 | 0.021 |
| 2 (35.5%) | Intercept | 86.31247 | 1.58325 | 54.516 |
|  | Linear | 0.34052 | 0.24765 | 1.375 |
|  | Quadratic | -0.03149 | 0.0081 | -3.886 |
| 3 (59.7%) | Intercept | 91.76399 | 1.20702 | 76.025 |
|  | Linear | 0.2335 | 0.19268 | 1.212 |
|  | Quadratic | -0.00087 | 0.00624 | -0.139 |
| 4 | 1 (0.79%) | Intercept | 47.10358 | 10.82872 | 4.35 | -18802 |
|  | Linear | -1.00379 | 1.6842 | -0.596 |
|  | Quadratic | -0.00762 | 0.05335 | -0.143 |
| 2 (8.84%) | Intercept | 75.89628 | 3.09356 | 24.534 |
|  | Linear | -0.31946 | 0.50342 | -0.635 |
|  | Quadratic | -0.02019 | 0.01612 | -1.253 |
| 3 (51.87%) | Intercept | 88.5791 | 1.25466 | 70.6 |
|  | Linear | 0.23224 | 0.19756 | 1.176 |
|  | Quadratic | -0.02051 | 0.00655 | -3.133 |
| 4 (38.47%) | Intercept | 92.17545 | 1.42993 | 64.461 |
|  | Linear | 0.32669 | 0.23327 | 1.4 |
|  | Quadratic | 0.00124 | 0.00743 | 0.167 |

BIC, Bayesian information criterion.

**Suppl. Table 3.** Differences in the demographics, morbidities and head size data among the three mental performance trajectory groups

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Allinfants(n = 1680) | High-stable(n = 1003) | High- declining(n = 593) | Low- declining(n = 84) | *P*value |
| **Perinatal period**Low maternal education, n (%)Low SES, n (%)Preeclampsia, n (%)Clinical chorioamnionitis, n (%)5-min Apgar score < 5, n (%)Male, n (%)Gestational age, mean (SD)Birth weight, mean (SD) SGA, n (%)Multiple births, n (%)**Neonatal period**Severe IVH, n (%)cPVL, n (%)Sepsis, n (%)NEC, n (%)BPD, n (%)Severe ROP, n (%)**After discharge**6-month microcephaly, n (%)12-month microcephaly, n (%) | 791 (47.1)863 (51.4)219 (13.0)186 (11.1)143 (8.5)920 (54.8)28.0 (2.0)1087 (250)326 (19.4)393 (23.4)100 (6.0)61 (3.6)411 (24.5)129 (7.7)554 (33.0)246 (14.6)399 (23.8)362 (21.5) | 380 (37.9)449 (46)141 (14.1)97 (9.7)72 (7.5)455 (45.4)28.3 (1.9)1122 (237)172 (17.1)218 (21.7)44 (4.4)21 (2.4)228 (22.8)65 (6.5)261 (26.0)123 (12.4)194 (21.2)159 (17.2) | 356 (60.0)355 (61.2)72 (12.1)76 (12.9)51 (9.0)374 (63.1)27.8 (2.1)1054.7 (258)131 (22.1)138 (23.3)43 (7.3)21 (4.1)155 (26.2)54 (9.1)245 (41.5)97 (16.9)156 (29.3)158 (28.4) | 55 (65.5)59 (72)6 (7.1)13 (15.5)20 (24.7)58 (69.0)26.9 (2.4)926.1 (251)23 (27.4)21 (25.0)13 (15.5)19 (25.3)28 (33.3)10 (11.9)48 (57.1)26 (31.7)49 (68.1)45 (61.6) | < 0.001< 0.0010.140.21< 0.001< 0.001< 0.001< 0.0010.010.46< 0.001< 0.0010.050.05< 0.001< 0.001< 0.001< 0.001 |

SES, socioeconomic status; SGA, small for gestational age; IVH, intraventricular haemorrhage; cPVL, cystic periventricular leukomalacia; NEC, necrotizing enterocolitis; BPD, bronchopulmonary dysplasia; ROP, retinopathy of prematurity.

**Suppl. Table 4.** Prediction models that include risk factors alone, risk factors plus trajectory groups or plus 24-month MDI for intelligence outcomes

|  |  |
| --- | --- |
|  | **Intellectual disability, odds ratio (95% confidence interval)\*** |
|  | Unadjusted |  | Adjusted |
| Model |  |  | Risk factors only | Risk factors plustrajectory groups | Risk factors plus 24-month MDI  |
| Low maternal educationLow SESSevere IVHcPVLNECBPDSevere ROP6-month microcephalyTrajectory group High-stable High-declining Low-declining24-month MDI  | 3.00 (1.94-4.63)c3.06 (1.94-4.82)c3.94 (1.92-8.07)c8.50 (4.14-17.45)c2.06 (1.23-4.13)a2.10 (1.38-3.20)c2.60 (1.56-4.34)c5.40 (3.50-8.33)c1.00 (reference)17.3 (3.37-24.71)42.5 (31.5-53.2)c0.85 (0.83-0.87)c |  | 2.92 (1.61-5.31)c1.69 (0.91-3.12)2.44 (1.03-5.82)a6.53 (2.79-15.30)c1.92 (1.19-3.95)a2.02 (1.61-2.72)c1.90 (1.03-3.52)a2.56 (1.34-4.89)b------------------------ | 2.25 (1.10-4.60)a1.77 (0.85-3.68)1.84 (0.60-5.69)3.00 (0.96-9.36)2.95 (1.22-7.15)a1.92 (1.02-3.64)b1.75 (0.83-3.72)2.25 (0.99-5.10)1.00 (reference)14.46 (0.99-21.04)37.7 (26.3-48.1)c------ | 3.15 (1.35-7.36)b1.31 (0.56-3.07)3.95 (1.09-7.30)a4.50 (1.17-13.25)a3.25 (1.16-7.08)a2.27 (1.10-4.67)a1.27 (0.52-3.07)3.34 (1.28-6.70)a------------------0.80 (0.78-0.83)c |
|  | **Borderline intelligence, odds ratio (95% confidence interval)\*** |
|  | Unadjusted |  | Adjusted |
| Model |  |  | Risk factors only | Risk factors plustrajectory group | Risk factors plus 24-month MDI  |
| Low maternal educationLow SESSevere IVHcPVLNECBPDSevere ROP6-month microcephalyTrajectory group High-stable High-declining Low-declining24-month MDI | 2.05 (1.53-2.75)c2.06 (1.53-2.77)c1.38 (0.67-2.84)1.93 (0.87-4.28)2.10 (1.27-3.47)b1.52 (1.20-1.97)a2.00 (1.35-2.95)c2.26 (1.65-3.10)c1.00 (reference)4.28 (3.15-5.81)a5.99 (1.70-11.08)0.94 (0.92-0.95)c |  | 1.73 (1.18-2.53)b1.51 (1.03-2.23)a1.12 (0.52-2.43)1.76 (0.76-4.04)1.80 (1.06-3.05)a1.86 (1.61-2.23)c2.00 (1.29-3.09)b2.10 (1.34-3.30)b------------------------ | 1.57 (1.06-2.34)a1.52 (1.01-2.29)a1.15 (0.51-2.62)1.60 (0.67-3.83)1.62 (0.80-3.05)1.54 (1.05-2.26)b2.02 (1.27-3.21)b1.85 (0.94-3.31)1.00 (reference)4.37 (3.11-6.13)b5.66 (0.97-10.11)------ | 1.58 (1.04-2.41)a1.46 (1.05-2.26)a1.23 (0.52-2.91)1.99 (0.78-5.07)2.01 (1.10-3.65)a1.79 (1.18-2.67)b1.83 (1.10-3.06)a2.64 (1.57-4.44)c------------------0.91 (0.89-0.92)c |

\*Using the average intelligence group as the reference. SES, socioeconomic status; IVH, intraventricular haemorrhage; cPVL, cystic periventricular leukomalacia; NEC, necrotizing enterocolitis; BPD, bronchopulmonary dysplasia; ROP, retinopathy of prematurity; MDI, mental development index of the Bayley scales. a*P*< 0.05; b*P* < 0.01; c*P* < 0.001.