**Table C-3. Studies addressing Phe levels and IQ**

| **Study (Author / Year)** | **Type of Phe Measurement** | **Disease Type** | **PKU subjects (N)** | **Age, mean± SD (range)** | **Diet** | **Blood Phe, Mean** ± **SD (range) µmol/L** | **IQ scale(s) used** | **IQ Mean** ± **SD (range)** | **Correlation (p value)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Viau 2011 | Concurrent | Classic moderate mild | 55 | Overall: 11.04 ±4.59 (6-22) | Overall: Mixed | 592 ± 355 (42-1774) | Wechsler | Overall: 99.2 ± 13.6 (69 -132) | -0.098 (0.476) |
| Historical critical |  | 55 |  |  | 365 ± 128 (162-809) |  |  | -0.157 (0.253) |
| Historical, non-critical (Age 7-12 years) |  | 38 |  |  | 530 ± 209 (172-1115) |  |  | -0.057 (0.732) |
| Historical, non-critical(Age > 12 years) |  | 15 |  |  | 693 ± 257 (372-1329) |  |  | -0.034 (0.905) |
| Azadi 2009 | Concurrent | Classic | 10 | 13.28 ± 4.13 (6.58-19.83) | Restricted | 1363.80 ± 410.44 (704-2025) | Raven | 108.40 ± 12.45 (90-128) | 0.21 (0.57) |
| Anastasoaie 2008 | Critical | Classic, moderate, mild, unclassified | 46 | 7.5 ± 3.3 (2.9-15.5) | Restricted | 312 ± 132 (125-852) | Wechsler | 104±15 (68-143) | -0.17 (0.38) |

**Table C-3. Studies addressing Phe levels and IQ (continued)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study (Author / Year)** | **Type of Phe Measurement** | **Disease Type** | **PKU subjects (N)** | **Age, mean± SD (range)** | **Diet** | **Blood Phe, Mean ± SD (range) µmol/L** | **IQ scale(s) used** | **IQ Mean ± SD (range)** | **Correlation (p value)** |
|  Wasserstein 2006 | Concurrent | Classic | 10 | 28.80 ± 3.82 (23-35) | Restricted | 1137.00 ± 327.10 (408-1584) | NR | 98.8 ± 18.13 (74-124) | -0.21 (0.56) |
| Historical  |  |  | 29.1 ± 3.64 (23-35) |  | 607.6 ± 246.8 (282-1170) |  | 98.5 ± 18.1 (74-124) | -0.28 (0.24) |
|  Critical  |  |  | 28.80 ± 3.82 (23.00-35.00) |  | 433.2 ± 98.5 (282-576) |  | 98.8 ± 18.1 (74-124) | -0.24 (0.51) |
| Pfaendner 2005 | Historical | NR | 31 | 29 (18-40) | Mixed | 399.3 ± 163.3 (208.1-686.1) | Hamburg Wechsler | 107.5 ±18.7 (64-148) | -0.46 (<0.01) |
| Critical |  |  | 29 (18-40) |  | 308.6 ± 102.2 (181.5-570.5) |  | 107.5 ±18.7 (64-148) | -0.52 (<0.01) |
| Rupp 2001 | Concurrent |  | 17 | 22.24 ± 2.54 (17-27) |  |  1175.88 ± 319.61 (660-1780) |  | 104.06 ± 15.67 (61-129) | -0.60 (0.01) |
| Historical | Classic |  | 22.24 ± 2.54 (17-27) | Mixed | 654.71 ± 184.73 (420-970) | WAIS-R | 104.06 ± 15.67 (61-129) | -0.65 (0.01) |
| Weglage 2001 | Historical,  | Classic | 15 | 18.47 ± 3.96 (14-30)  | Unrestricted | 661.33 ± 267.62 (230-1420) | CFT20 | 98.4 ± 14.0 (77-132) | -0.36 (0.05) |
| Critical |  |  | 18.47 ± 4.03 (14-30) |  | 519.33 ± 198.58 (230-880) |  | 98.40 ± 14.0 (77-132) | -0.70 (.005) |

**Table C-3. Studies addressing Phe levels and IQ (continued)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study (Author / Year)** | **Type of Phe Measurement** | **Disease Type** | **PKU subjects (N)** | **Age, mean± SD (range)** | **Diet** | **Blood Phe, Mean ± SD (range) µmol/L** | **IQ scale(s) used** | **IQ Mean ± SD (range)** | **Correlation (p value)** |
| Griffiths 2000 | Critical | Classic | 57 | 8.14 ±0.3 | Restricted | 466 ±154 | Multiple | 85.8 ±13.9 | -.035 (<0.01) |
| Weglage 2000 | Concurrent | Classic | 42 | 14.7± 2.9 (10-18) | Not Clear | 894 ± 360  | CFT20 | 100 ±14 (76-127) | -0.25 (ns) |
| Critical |  |  |  |  | 528 ± 96 |  | 100 ±14 (76-127) | -0.33 (<.05) |
| Cerone 1999 | Concurrent | Classic | 16 | 11.1 ± 0.72(10-12) | Unrestricted | 1826.3 ± 462.9 (1320-3000) | Multiple | 104.9 ± 4.7 (98-114) | 0.05 (0.84) |
| Weglage 1995 | Historical | NR | 20 | 10y11m ±1.3 (8.9-13.1) | Not Clear | 11yrs:474±144 (282-810)14 yrs:534 ± 174 (276-1014) | CFT20 | 101.4 ±10.2 (88-121)107.4±10.2 (88-135) | -0.33 (ns)-0.41 (<.05) |
| Leuzzi 1998  | Historical | NR | 14 | 12.30 ± 2.50 (9.00-17.60) | Mixed | 543.79 ± 148.13 (230-800) | WISC-R WAIS | 90.64 ± 13.52 (59-110) | -0.42 (0.13) |
| Ris 1994 | Concurrent | Classic | 25 | 22 (18-26) | Mixed | 1323.28 ± 445.29 (254-2252) | WAIS-R | 89.80 ± 11.17 (71-119) | -0.35 (0.09) |
| Jones 1995 | Concurrent | Classic | 32 | 17.81 ± 6.31 (7.50-29) | Mixed | 1193.28 ± 425.21 (348-2010) | Multiple | 91.91 ± 21.79 (44-127) | -0.20 (0.28) |
| Schmidt 1994 | Concurrent | NR | 17 | 20.5 (17-24) | Mixed | 1233.18 ± 390.16 (564-1932) | WAIS | 110.00 ± 10.96 (89-132) | -0.42 (0.09) |

**Table C-3. Studies addressing Phe levels and IQ (continued)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study (Author / Year)** | **Type of Phe Measurement** | **Disease Type** | **PKU subjects (N)** | **Age, mean± SD (range)** | **Diet** | **Blood Phe, Mean ± SD (range) µmol/L** | **IQ scale(s) used** | **IQ Mean ± SD (range)** | **Correlation (p value)** |
| Welsh 1990 | Concurrent | NR | 11 | 4.64 ± 0.47 (4.08-5.75) | Restricted | 564.55 ± 256.58 (66-1074) | Multiple | 104.73 ± 13.94 (82-120) | 0.13 (0.70) |
| Critical |  |  | 4.64 ± 0.46 (4.08-5.75)4.64 ± 0.47 (4.08-5.75) |  | 570.55 ± 195.1 (66-1074) |  | 104.73 ± 13.6 (82-120) | -0.04 (0.86) |
| Historical |  |  |  |  | 576.55 ± 118.3 (438-840) |  | 104.73 ± 13.94 (82-120) | -0.42 (0.19) |
| Seashore 1985\* | Historical &Critical | Classic | 14 | 11.33 ± 2.19 (8.17-14.50) | Unrestricted | 1613.6 ± 245.2 (1080-2040)\* | Multiple | 90.0 ± 13.32 (68-112) | -0.56 (0.04) |

CFT=Culture Fair Intelligence Test; IQ=intelligence quotient; NR=not reported; Phe=phenylalanine; PKU=phenylketonuria; WAIS=Wechsler Adult Intelligence Scale; WAIS-R=Wechsler Adult Intelligence Scale-Revised; WISC=Wechsler Intelligence Scale for Children; WISC-R=Wechsler Intelligence Scale for Children-Revised
\* Imputed Phe values
Mixed diet=some participants adhering to restricted diet and some not adhering to restricted diet