Table 1 Associations between the restless and insomnia sleep patterns and psychiatric disorder diagnoses in young people with 22q11.2DS

Supplementary material

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|  | Restless sleep |  | Insomnia |  | Both patterns vs. No pattern |
| **Psychiatric Disorder (research diagnosis)** | **Scored, n (%)** | **No score, n (%)** | **p** | **Scored, n (%)** | **No score, n (%)** | **p** | **Scored, n (%)** | **No score, n (%)** | **p** |
| **Any Psychiatric Disorder** | 48 (80.0) | 38 (52.8) | **0.001** | 29 (74.4) | 57 (61.3) | 0.151 | 20 (76.9) | 29 (49.2) | **0.017** |
| **ADHD diagnosis** | 33 (55.0) | 21 (26.3) | **0.001** | 18 (42.9) | 36 (36.7) | 0.495 | 13 (50) | 16 (25) | **0.021** |
| **Any anxiety diagnosis** | 20 (33.3) | 15 (18.8) | **0.049** | 12 (28.6) | 23 (23.5) | 0.523 | 8 (30.8) | 11 (17.2) | 0.152 |
| **CD diagnosis**  | 0 (0) | 0 (0) | **-** | 0 (0) | 0 (0) | **-** | 0 (0) | 0 (0) | **-** |
| **ODD diagnosis** | 17 (28.8) | 8 (10.5) | **0.007** | 11 (28.2) | 14 (14.6) | 0.065 | 9 (34.6) | 7 (11.5) | **0.011** |
| **Indicative ASD\*** | 25 (43.9) | 20 (29.4) | 0.094 | 18 (47.4) | 27 (31.0) | 0.080 | 10 (41.7) | 12 (22.2) | 0.078 |
| **Indicative DCD\*** | 38 (88.4) | 41 (76) | 0.117 | 24 (88.9) | 55 (78.6) | 0.241 | 16 (88.9) | 33 (73.3) | 0.180 |
| **IQ** | **Mean score (s.d)** | **Mean score (s.d)** | **p** | **Mean score (s.d)** | **Mean score (s.d)** | **p** | **Mean score (s.d)** | **Mean score (s.d)** | **p** |
| **Full-scale IQ**  | 74.9 (12.1) | 77.9 (12.3) | 0.194 | 75.3 (10.6) | 77.1 (12.8) | 0.471 | 75.3 (11.2) | 78.4 (12.8) | 0.313 |
| **Performance IQ**  | 77.1 (11.4) | 79.3 (12.0) | 0.298 | 76.6 (9.85) | 79.0 (12.4) | 0.317 | 77.9 (10.6) | 80.5 (12.5) | 0.403 |
| **Verbal IQ**  | 76.5 (13.4) | 79.9 (13.5) | 0.176 | 77.4 (12.3) | 78.8 (14.0) | 0.598 | 76.6 (12.0) | 80.2 (13.6) | 0.287 |
| **Cognitive processing** | **Median score (s.d)** | **Median score (s.d)** | **p** | **Median score (s.d)** | **Median score (s.d)** | **p** | **Median score (s.d)** | **Median score (s.d)** | **p** |
| **Processing speed (five-choice reaction time)** | 0.290 (2.31) | 0.380 (1.59) | 0.995 | 0.090 (1.21) | 0.380 (2.15) | 0.825 | 0.090 (1.12) | 0.040 (1.64) | 0.717 |
| **Sustained attention (rapid visual processing)** | -2.18 (4.82) | -1.31 (2.01) | **0.03** | -2.22 (2.42) | -1.71 (3.95) | 0.823 | -2.26 (2.53) | -1.26 (1.95) | 0.116 |
| **Visual attention (match to sample)** | 42 (7.58) | 42 (39.7) | 0.780 | 41 (8.67) | 42 (6.88) | **0.043** | 41 (7.90) | 42 (6.63) | 0.179 |
| **Spatial planning** | -1.05 (0.963) | -1.05 (1.06) | 0.847 | -1.05 (0.994) | -1.05 (1.03) | 0.578 | -0.816 (0.915) | -0.910 (1.05) | 0.528 |
| **Spatial working memory** | -1.18 (0.948) | -1.04 (0.922) | 0.989 | -1.37 (0.919) | -1.04 (0.936) | 0.390 | -1.07 (0.906) | -0.990 (0.913) | 0.675 |
| **Set shifting ability** | 82.0 (19.4) | 90.5 (22.0) | **0.011** | 84 (22.1) | 88 (21.3) | 0.430 | 84.5 (19.0) | 92 (20.9) | 0.088 |
| **Errors on WCST** | 101 (21.6) | 93.5 (20.1) | 0.096 | 98 (19.3) | 97.5 (21.7) | 0.496 | 101 (18.0) | 94 (20.1) | 0.128 |

Table 2 The assessments conducted in the study and reliability measures/articles in similar populations

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| --- | --- |
| Assessment | Reliability measures  |
| Child and Adolescent Psychiatric Assessment (CAPA) | The Child and Adolescent Psychiatric Assessment (CAPA), Angold, Adrian et al. Journal of the American Academy of Child & Adolescent Psychiatry, Volume 39, Issue 1, 39 – 48; Wamboldt MZ, Wasmboldt FS, Gavin L & McTaggart S (2001) A parent-child relationship scale derived from the Child and Adolescent Psychiatric Assessment (CAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*, 40:945-953. |
| Social Communication Questionnaire (SCQ) | Berument, S.K., M. Rutter, C. Lord, A. Pickles & A. Bailey. 1999. Autism screening questionnaire: diagnostic validity BrJ psychiatry 175: 444-51. |
| Developmental Coordination Disorder Questionnaire (DCDQ) | Einfeld, S.L. & B.T. Tonge. Manual for the Developmental Behaviour Checklist (Second Edition) - Primary Carer Version (DBC-P) and Teacher Version (DBC-T). 2002. Melbourne and Sydney, Monash University Centre for Developmental Psychiatry and Psychology and School of Psychiatry, University of New South Wales. |
| The Cambridge Neuropsychological Test Automated Battery (CANTAB) | http://www.cantab.com. Accessed 26/03/2008; Matsuura N, Ishitobi M, Arai S, Kawamura K, Asano M, Inohara K, Narimoto T, Wada Y, Hiratani M, Kosaka H. Distinguishing between autism spectrum disorder and attention deficit hyperactivity disorder by using behavioral checklists, cognitive assessments, and neuropsychological test battery. Asian J Psychiatr. 2014 Dec; 12:50-7. |
| The Weschler Abbreviated Scale of Intelligence (WASI) | Wechsler D. Wechsler Abbreviated Scale of Intelligence. San Antonio, TX: Psychcorp; 1999; Bishop SL, Farmer C, Thurm A. Measurement of nonverbal IQ in autism spectrum disorder: scores in young adulthood compared to early childhood. *J Autism Dev Disord*. 2015;45(4):966-74. |
| The Wisconsin Card Sorting Task (WCST) | Ozonoff, S. (1995). Reliability and validity of the Wisconsin Card Sorting Test in studies of autism. Neuropsychology, 9(4), 491-500; Stephen C. Bowden, Kylie S. Fowler, Richard C. Bell, Gregory Whelan, Christine C. Clifford, Alison J. Ritter & Caroline M. Long (1998) The Reliability and Internal Validity of the Wisconsin Card Sorting Test, Neuropsychological Rehabilitation, 8:3, 243-254, DOI: 10.1080/713755573 |

Table 3 Factor loadings and variance for the exploratory factor analysis (EFA) after rotation of the matrix

|  |  |  |
| --- | --- | --- |
| Variables  | Restless (factor 1) | Insomnia (factor 2) |
| Initial insomnia | -0.0157 | 0.8027 |
| Middle and Early insomnia | 0.0492 | 0.8261 |
| Tiredness, Fatigue and Hypersomnia | 0.7860 | -0.0569 |
| Restless sleep | 0.7578 | 0.0.342 |
| Inadequately rested  | 0.6406 | 0.1549 |



Figure 1 Visualisation of the two-factor outcome from the exploratory factor analysis (EFA). After exclusion of the parasomnia items (nightmares, night terrors and sleep walking), the hypersomnia, tiredness and fatigability were combined into one item ‘tiredness-related’ because they correlated strongly. Similarly, early and middle insomnia were combined. EFA indicated that a structure of two patterns ‘restless sleep’ and ‘insomnia’ best described the sleep problems of children with 22q11.2DS.



Figure 2 Scree plot showing evidence to support the decision to use two factors in the exploratory factor analysis