Sleep linked to language skills in neurodevelopmental disorders

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New research has discovered that Down's syndrome, Fragile X syndrome and Williams syndrome are all linked to sleep disruption in very young children, and that sleep plays a crucial role in the development of these children's language skills.

Led by Dr. Dean D'Souza of Anglia Ruskin University (ARU) and published in the journal *Research in Developmental Disabilities*, it is the first cross-syndrome study to examine sleep, and the relationship between sleep and language, in very young children with these neurodevelopmental disorders.

Alongside colleagues from the University of Cambridge; Birkbeck, University of London; The LonDownS Consortium, London; Semmelweis University, Budapest; and the University of Oxford; Dr. D'Souza compared the vocabulary size and sleep patterns of 75 infants and toddlers with one of these neurodevelopmental disorders alongside 30 typically developing children of the same age.

The researchers found that sleep was disrupted amongst children with all three neurodevelopmental disorders. On average, typically developing children slept for about 50 minutes longer per night than those with a neurodevelopmental disorder.

They also spent less time awake during the night. Whereas typically developing children spent on average just three minutes awake per night, the children with a neurodevelopmental disorder were awake for around 30 minutes longer.

The study also found that the longer the infants and toddlers with Down's syndrome and Williams syndrome slept at night, the more words they knew. For each additional 10 minutes of sleep, these children would understand the meaning of six additional words. The researchers were unable to test this relationship with children with Fragile X syndrome because of the limited sample size.

The children were tested using a list of 416 words that are commonly acquired in early childhood, with the caregiver indicating whether their child can "understand" or "understand and say" the word. Only one of the 75 children with a neurodevelopmental disorder was able to understand, but not say, all 416 words. This child was 47 months old and had Williams syndrome. Nine of the 30 typically developing children (30%) were able to understand, and say, all 416 words.

Dr. D'Souza, Senior Lecturer in Psychology at Anglia Ruskin University (ARU), said: "Children with neurodevelopmental disorders commonly have difficulties with language development. Many different factors are likely to contribute to this, and our study focused on the role of sleep. This is because sleep is important for learning and memory, and individuals with neurodevelopmental disorders often report having problems sleeping.

"Our research demonstrates that sleep is disrupted very early in development across various neurodevelopmental disorders, and the indications

are that this is contributing to difficulties with learning language.

"Further research is needed to explore whether early interventions to improve the sleeping patterns of children with Down's syndrome, Fragile X syndrome and Williams syndrome would be as beneficial for their language skills as interventions later in their development that specifically target language learning."

More information: Dean D'Souza et al, Sleep is atypical across neurodevelopmental disorders in infants and toddlers: A cross-syndrome study, *Research in Developmental Disabilities* (2019). DOI: 10.1016/j.ridd.2019.103549