

IMPACT OF SLEEP ON ATTENTION IN PRIMARY SCHOOL-AGED CHILDREN WITH ASD IN SINGAPORE

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Introduction: Children with Autism Spectrum Disorder (ASD) have more sleep disturbances than typically developing (TD) children. Common sleep problems in ASD include difficulty in initiating sleep, maintaining sleep and shorter total sleep time. However, previous findings are largely based on Western countries (Australia, Finland, Sweden, United Kingdom and United States). Sleep problems have been associated with day-time attentional difficulties in TD children. For children with ASD, sleep problems can further exacerbate their pre-existing difficulties in shifting attention and sustained attention. Yet, few studies have examined if sleep can impact attention among children with ASD. Use of more objective measures are needed to accurately quantify sleep problems in Asian countries such as Singapore as well as examine cognitive skills in relation to sleep.

Materials and methods: 36 Singaporean children, aged 6 to 13 years participated in the study. 22 children with ASD and 14 TD children.

Actigraphy MotionWatch8. Children wore the watch continuously from Sunday night to Thursday night (5 nights). Continuous Performance Attention Task (CPT). The present study's CPT was adapted from previous studies (Ashworth et al., 2015). Children were instructed to press the 'shift' button whenever they saw the target (monkey) on the screen and inhibit response when they saw other distractor animals. Practice sessions included 20 trials. During the experimental run, stimuli were presented for 300ms, followed by a blank white screen for 1250ms. Raven's Colored Progressive Matrices: RCPM is an extensively used cognitive assessment of non-verbal intelligence among children aged 3 to 12.

Results: Independent t-tests showed that Singaporean children with ASD and TD children only differed in sleep duration but not sleep quality. Children with ASD had later get up time, longer time in bed, longer assumed sleep and longer actual sleep than TD children.

Attention

Independent t-tests revealed that TD children had higher percentage of correct hits, less commission error, faster Response time (RT) for error and less variability in RT for hits. No group difference in RT for hits. This indicates that TD children have lower inattention, lower impulsivity, higher inhibition and less inconsistency in response, suggesting higher sustained attention. There was no difference in processing speed. ASD: Longer sleep duration and later get up time predicted more correct hits. TD: Later bedtime predicted lower percentage of correct hits. Shorter actual sleep time predicted slower RT hits.

Conclusions: Children with ASD did not have significant sleep problems compared to TDs. In contrast, Singaporean TDs had shorter sleep duration. Findings suggest that even though sleep problems could have underlying physiological cause, changes in environmental factors can alleviate these difficulties, such as later school start times and different bedtimes. Children with ASD had difficulties in sustained attention. Deficits in sustained attention among children with ASD are likely partly attributed to cognitive developmental delay (lower IQ), rather than primary impairment in sustained attention ability. Sleep might impact attention components differently for children with ASD and TD children.