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Signs of a delayed development of the frontal-thalamic system, which forms part of the brain substrate of executive functions, are observed more often in children aged 9-10 with obesity than in their lean counterparts

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Obese children have reduced indices of certain cognitive functions from the executive domain (EF). R Machinskaya assumed that the difficulties with attention in children with ADHD originate from immaturity or non-optimal functional state of the frontal-thalamic system (FTS), which manifests itself as bilaterally-synchronous groups of theta waves in the frontal and/or central leads (FCTW) in the rest-state EEG. MRT studies have detected structural deviations as well as delayed development, primarily in the frontal lobes of the brain of obese adolescents. We have analyzed the frequency of FCTW occurrences in the EEG of 52 children with obesity and 46 matching children with normal weight (NW) and evaluated attention, mental flexibility (MF) and response inhibition in FCTW and Non-FCTW children with obesity and NW. Among children with obesity, FCTW-children were more common than among their lean counterparts (60% and 30%, respectively). Towards the end of the letter cancellation test (LCT), the obese children exhausted their attention. No observable differences were found in the cognitive outcomes between the Non-FCTW children with obesity and NW, while the FCTW-children with obesity demonstrated poorer performance in MF and number of viewed letters in the LCT vis-a-vis their lean counterparts. FCTW presence in the EEG of children with obesity positively correlates with the reaction time in a response inhibition test. In the FCTW-children, BMI and MF correlate reversely. Thus, children with obesity have an increased probability of a delayed functional development of FTS. It seems that children with a delayed development (or non-optimal state) of FTS combined with obesity have lower cognitive outcomes due to the fact that obesity exacerbates delays in the development or non-optimal state of FTS.

Biography

Gaukhar Datkhabayeva completed her Ph.d in Human Physiology and thesis was devoted to EEG-investigation of functional brain state self-regulation. She has worked at the Kazakh Academy of Nutrition as a Senior Researcher for a number of years and has carried out investigations of food and behavioral factors contributing to childhood obesity, as well as the influence of obesity on children's cognitive functions, as part of a program of prevention of pediatric obesity in school-age children in Kazakhstan. Her research interests are on popularization of healthy nutrition and elaboration of effective strategies for the promotion of healthy nutrition choices.

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