

Exploration of the Possible Link Between Emotional Problems and Cholesterol Levels Among Children Diagnosed with Attention-Deficit Hyperactivity Disorder

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Abstract : Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by inattention and hyperactive-impulsive behavior. Evidence shows that ADHD and mood problems such as depression and anxiety often co-occur and yet not everyone with ADHD reported elevated emotional problems. Given that cholesterol is essential for healthy brain development including the regions governing emotion regulation, reports found lower cholesterol levels in patients with major depressive disorder and those with suicide attempt behavior compared to healthy subjects. This study explored whether ADHD adolescents experienced more emotional problems and whether emotional problems correlated with cholesterol levels in these adolescents. This study used a portion of data from the longitudinal cohort study which was designed to investigate the long-term impact of family socioeconomic status on child development. In 2018/19, parents of 300 adolescents (average age: 12.57+/-0.49 years) were asked to rate their children's emotional problems and report whether their children had doctor-diagnosed psychiatric diseases. We further collected blood samples from 263 children to study their lipid profile (total cholesterol, high-density lipoprotein (HDL)-cholesterol, and low-density lipoprotein (LDL)-cholesterol). Regression analyses were performed to test the relationships between variables of interest. Among 300 children, 27 (9%) had ADHD diagnosis. Analysis based on overall sample found no association between ADHD and emotional problems, but when investigating the relationship by gender, there was a significant interaction effect of ADHD and gender on emotional problems ($p=0.037$), with ADHD males displaying more emotional problems than ADHD females. Further analyses based on 263 children (21 with ADHD diagnosis) found significant interaction effect of ADHD and gender on total cholesterol ($p=0.038$) and low LDL-cholesterol levels ($p=0.013$) after adjusting for the child's physical disease history. Specifically, ADHD males had significantly lower total cholesterol and low lipoprotein-cholesterol levels than ADHD females. In ADHD males, more emotional problems were associated with lower LDL-cholesterol levels ($B = -4.26$, 95%CI (-7.46, -1.07), $p=0.013$). We found preliminary support for the association between more emotional problems and lower cholesterol levels in ADHD children, especially among males. Although larger prospective studies are needed to substantiate these claims, the evidence highlights the importance of healthy lifestyle to keep cholesterol levels in normal range which can have positive effects on physical and mental health.

Keywords : attention-deficit hyperactivity disorder, cholesterol, emotional problems, adolescents

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