Obesity and cognitive function in children and adolescents: relevance of socio-economic factors

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Background: Obesity impacts multiple facets of children's and adolescents' lives including cognition. Our group has previously reported the effects of childhood obesity on cognitive function including working memory (WM) in American children. The current study investigates these effects on obesity in children in a different socio-economic setting in the United Arab Emirates.

Methods: We examined the WM (high and low loads) in a sample of 107 Emirati children and adolescents (46 boys, 7-17 years old) from Imperial College London Diabetes Centre (ICLDC) in Abu Dhabi, UAE. BMI was stratified for sex and age by calculating percent of overweight (pOW) using International Obesity Task Force (IOTF) cutoffs [range: 64–239%, BMI 25.22 (12.71-55.52)]. Parents completed the Strength & Difficulty questionnaire (SDQ), comprising of 5 subscales, to screen for mental health and an integrated questionnaire on social background including family livelihood. Separate interactions between WM load and pOW and impaired fasting glucose (IFG) were tested, controlling for IQ, age, sex, family livelihood, and social background.

Results: pOW increased with age [12.75 (7.31-17.84) years]. Whilst working memory show an interaction between Load (high, low) and IFG ($p=0.026$), there was no interaction between Load and pOW. Under lower WM load, children with IFG performed similar to children with normal glucose tolerance (NGT). However, children with NGT performed better at high WM load. For each year increase in age, the odds of having conduct problems decreased by 15%. A uniform socio-economic setting was observed amongst the study group and showed no relation to pOW.

Conclusion: Obesity was not associated with WM deficits or socio-economic setting as seen in the United Status. In contrast, IFG, a common comorbidity of obesity, was observed to have a significant effect on WM in children and adolescents. Our findings support the notion that the effects of obesity on WM observed in the United States may be due to IFG and that these effects are at least partially independent of the socio-economic factors.