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Relationship of thyroid hormone levels to anthropometric indices and use of food packaging materials in North Indian obese children

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Statement of the problem: Obesity is a global health problem and its prevalence is continuously increasing worldwide along with increasing intake of fast food among children. The different food packaging materials being used in packaging the food items work as a source of chemical migrator in children. Hence, the present study was designed to correlate the food packaging materials with thyroid hormone levels (T3, T4, and TSH) and anthropometric indices [body mass index (BMI) and waist to hip ratio (WHR) in obese, non-obese and underweight children. Methodology: 189 children (age group ≥6 to ≤16) were enrolled and grouped into obese (n=30), non-obese/control (n=100) and underweight (n=59) according to age & gender specific CDC 2000 growth charts. Thyroid profile [total triiodothyronine (T3), total thyroxine (T4), and thyroid stimulating hormone (TSH)] were studied in all three groups by ADVIA Centaur XP chemiluminescence immunoassay. A questionnaire was designed to evaluate the exposure of children to food packaging materials. Statistical analysis (ANOVA and correlation) was conducted suing SPSS 16.0. Findings: Post hoc level of significance was observed between obese and non-obese children with respect to BMI (p=<0.001, 95% CI: 6.98-8.68), WHR (p=<0.001, 95% CI: 0.06-0.14), T4 (p=0.01, 95% CI: 0.34-2.45) and TSH (p=0.013, 95% CI: 0.21-1.79). Similar significant results were also observed between obese and underweight children with respect to BMI (p=<0.001, 95% CI: 9.94-11.78), WHR (p=<0.001, 95%CI: 0.05-0.014), T4 (p=0.021, 95%CI 0.20-2.48) and TSH (p=0.008, 95%CI: 0.30-2.0). Pearson's correlation statistics showed significant correlation between WHR and use of microwaved food items (r=0.454, p=0.012); THS and use of metal cans (r=0.469, p =0.009) and TSH and use of ceramic kitchenware (r=0.556, p=0.001) in obese children. Significant positive correlation between WHR and use of paperboard boxes with polyethylene liner bags (r=0.269, p=0.039) was also observed in underweight children. Conclusion & Significance: This study revealed that use of metal cans and ceramic kitchenware that might contain metals, might act as chemical migrator impairing TSH hormone level in obese children causing childhood obesity.

Biography

Vivek Singh Malik is currently pursuing his Ph.D. from Department of Community Medicine and School of Public health. He was awarded Indian Council of Medical Research, Senior Research Fellowship in 2016 to pursue his Ph.D. His past work involved measurement of environmental contaminants (cotinine, hydroxypyrine and methoxyphenols) in biological samples project funded by ICMR (Indo-US). He is currently exploring the role of metals and other environmental contaminant with childhood obesity and other metabolic disorders. In his carrier he has gained expertise in mineralomics and Metablomics field. His current PhD. work is focused to develop a model/scale using questionnaire based assessment in North Indian children and finding relationships between heavy metal exposures.

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