Association of Vitamin D and Adiposity in Children and Adolescents with type 1 diabetes: a case-control study

Maria Majeed[1], Mohsin Siddiqui[1], Nader Lessan[1]

[1]Imperial College London Diabetes Centre, Abu Dhabi

Background:

Vitamin D (25(OH)D) deficiency is a global public health issue. An association with obesity and diabetes has been described in adult and paediatric populations. This study investigates the prevalence of 25(OH)D deficiency and its correlates in a population of Emirati children and adolescents attending a large diabetes centre in the United Arab Emirates.

Methods and Design:

Participants aged 4-19 years were selected based on diabetes status [type 1 diabetes (T1D), normoglycaemic non-diabetic (NG)] from Abu Dhabi Diabetes and Obesity Study. Body composition was assessed using bioelectrical impedance analysis (Tanita®, Tokyo, Japan). BMI percentile was categorized based on Centre for Disease Control recommendation. 25(OH)D cut-offs were defined as deficient (<30nmol/L), insufficient (30-50nmol/L) and sufficient (>50nmol/L) using WHO Criteria.

Results:

In total, 148 participants with T1D and 296 age and sex matched normoglycaemic controls were included. The prevalence of 25(OH)D (<30nmol/L) deficiency was 22.3% (n=33) in T1D and 40.5% (n=120) in control group. A decline in 25(OH)D levels was observed with increasing age in both groups, from 4-7 years to 15-19 years [T1D, p=0.018), NG, p=0.0001]. A larger proportion of females were 25(OH)D deficient in both groups (NG: 52.6% vs 23.6%, p<0.0001; T1D: 31.7% vs 10.6%, p=0.0020). After adjusting for age and sex, children and adolescents with BMI≥95th percentile were 2.5 times more likely to have 25(OH)D deficiency (OR: 2.69; 95% CI: 1.56, 4.64) than those with BMI 5th - <85th percentile. A negative correlation was observed between adiposity measures and 25(OH)D levels in both groups (T1D p<0.01, NG, p<0.001).

Conclusion:

Vitamin D deficiency is common among Emirati children and adolescents. The lower prevalence among T1D population described here may represent better treatment compliance. Our study also confirms an association between vitamin D deficiency with obesity in general and with body fat mass in particular.

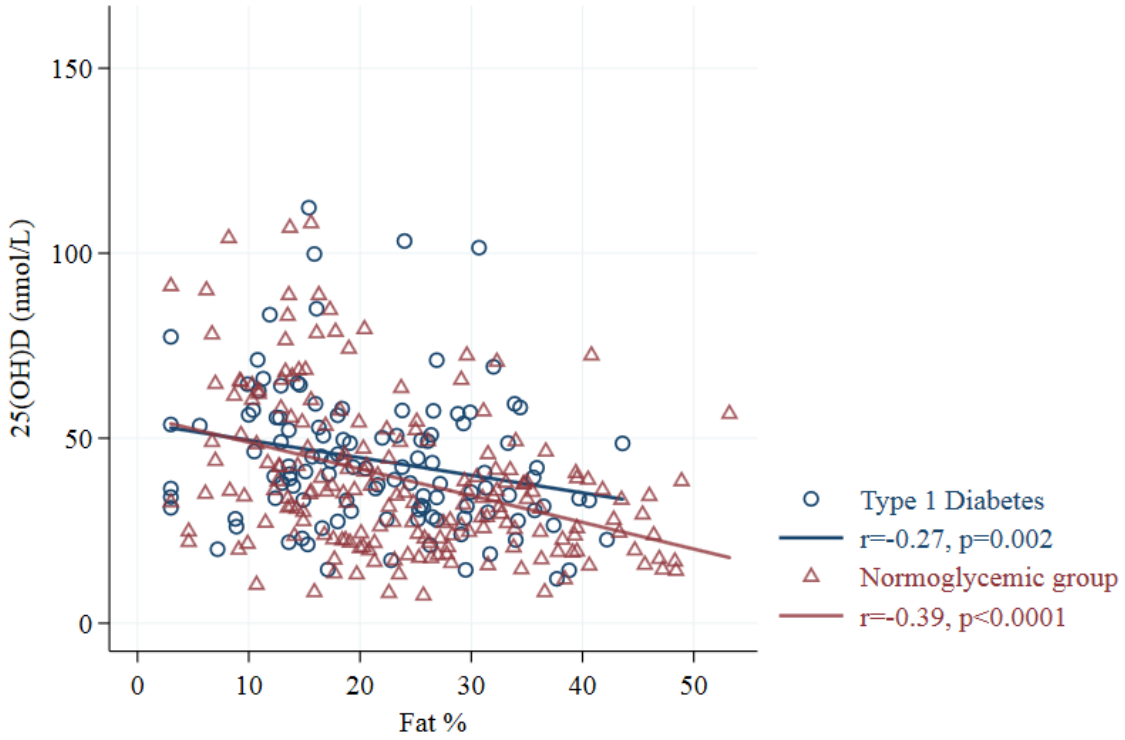

Figure 1: Spearman's correlation between 25(OH)D and fat % in type 1 diabetes (n=118) and normoglycaemic group (n=191)