



PREVALENCE OF VITAMIN D DEFICIENCY AND HYPERINSULINEMIA AMONG OVERWEIGHT CHILDREN AND ADOLESCENTS: A DATABASE STUDY

Nicholas P. Ruthmann MPH, Aneesh Tosh MD
Department of Child Health

INTRODUCTION

- The prevalence of obesity and type 2 diabetes has reached epidemic proportions over the past two decades.
- Previous studies demonstrate an association between low serum 25-hydroxyvitamin D (hypovitaminosis D) with impaired glucose tolerance, hyperinsulinemia, and the subsequent development of type 2 diabetes.
- Hypovitaminosis D has been independently shown to be more prevalent among those who are overweight, a known risk factor for type 2 diabetes.
- Current studies of hypovitaminosis D and hyperinsulinemia prevalence have focused mainly on the adult population. The purpose of this study was to gather data to assess correlations among hypovitaminosis D, hyperinsulinemia, and obesity in an adolescent cohort.

SPECIFIC AIMS

1. Collect health information among adolescent patients seeking care at the MU Adolescent Diabetes and Obesity Clinic (ADOBE).
2. Assess hypovitaminosis D and hyperinsulinemia within this cohort.
3. Evaluate associations among hyperinsulinemia, hypovitaminosis D, and obesity status.
4. Monitor changes in body mass index in this cohort over time.

METHODS

- Cross-sectional study of patients (10-18yrs) enrolled in ADOBE by August 2010. Eligible patients had body mass index (BMI, kg/m²) percentiles for age/gender classified as overweight (>85%) or obese (>95%). Data was obtained via University Hospital medical records. Age was based upon first visit to clinic and race was self-identified.
- Serum 25-hydroxyvitamin D [25(OH)D] was categorized as normal (≥30 ng/mL), insufficient (20-29 ng/mL), or deficient (<20 ng/mL). Hypovitaminosis D was classified as any level below normal.
- Hyperinsulinemia was defined as fasting serum insulin level >20 μU/mL.
- Spearman's rank correlation coefficients were computed and statistical significance was established at p <0.05.

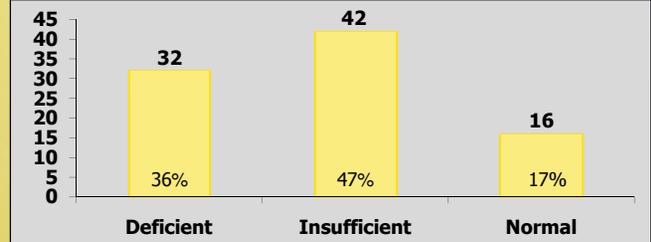
RESULTS

- Mean 25(OH)D level among 90 subjects tested was 24.0 ng/mL (SD 8.6).
- There was no significant statistical association between 25(OH)D status and hyperinsulinemia.
- Increased BMI was associated with increased fasting insulin (r=0.53, p=0.001) and decreased 25-hydroxyvitamin D (r=0.52, p=0.049).

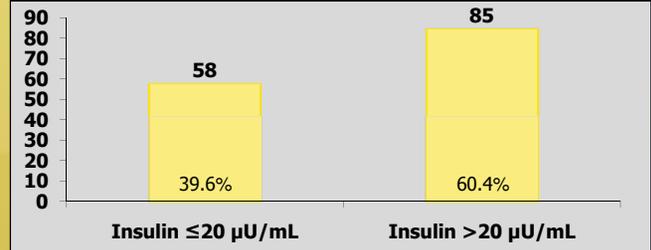
Database Demographic Characteristics (N=212)

	Frequency	Percent	Mean [SD]
Age (yrs)			13.3 [2.5]
Body Mass Index (kg/m ²)			37.6 [9.7]
Female	112	52.8	
Caucasian	131	61.8	
African American	55	25.9	
Hispanic	22	10.4	
Other or Not Specified	4	1.9	

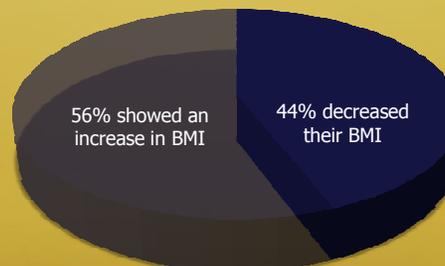
Levels of 25-hydroxyvitamin D in patients tested (n=90)



Fasting insulin levels in patients tested (n=143)



Changes in ADOBE patients' BMI over time (n=159)



CONCLUSIONS

- A moderate association exists between adolescents with low levels of Vitamin D and obesity status.
- A moderate correlation was found between obese adolescents and elevated fasting insulin levels.
- Future ADOBE studies may provide greater statistical power to further investigate the association between hypovitaminosis D and hyperinsulinemia.



University of Missouri-Columbia School of Medicine