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# DIABETES AND ENDOCRINOLOGY

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## Metals as biomarkers for Diabetes Mellitus

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**D**iabetes mellitus is considered one of the most serious diseases. Diabetes is a chronic condition that impairs a person physically as well as emotionally. The major issue with the diabetics is that they can't extract energy from the food necessary for their daily activities. Instead of being absorbed into the cells, the glucose remains in blood and remains as wasted energy. This blood rich in glucose is the cause of number of diseases associated with diabetes mellitus whether these be tumour, tuberculosis, heart stroke, and/or CNS related issues. Diabetes has been found to be caused by either an underproduction of insulin or the resistance of this hormone which is itself a peptide hormone associated with zinc metal. Without zinc, insulin cannot perform its physiological role. The study represents detailed analyses of effect of diabetes mellitus on the concentration of zinc as well as trace and macro-metals found in blood, hair, nails and urines of diabetic patients. The study was carried out to create a link between the altered concentrations of metals and the diseases associated with the complications of diabetes mellitus.

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## Seasonal variation in hemoglobin A1c, blood pressure and body weight in type 2 diabetes

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**Introduction:** Human beings are influenced by the environment and studies have shown seasonal changes have an impact on biological functions. The purpose of this study is to investigate the seasonal variation of glycated hemoglobin (HbA1c), systolic blood pressure (SBP) and hypertension. Uncontrolled diabetes and hyperglycemia is associated with increased complications such as heart disease, stroke, blindness and chronic kidney disease. A 1% increase in HbA1c results in an 18% relative risk of CVD. Demonstration of seasonal variation of these factors will lead to greater understanding of its determinants.

**Methods:** During this retrospective study, we examined seasonal variation in HbA1c, blood pressure and weight changes in 100 patients with type 2 diabetes living in Baltimore, MD. Data was retrieved from the electronic medical records at University of Maryland Midtown Campus outpatient diabetes center from September 2014 to July 2015.

**Results:** HbA1c values were higher in the winter and lower in the summer with 12.4% increase seen during the winter months. The variation in SBP followed a similar pattern with a 6.5% (8.5 mmgh) increase and an increased mean body weight increased of 2.43% (2.2 kg) during the winter months.

**Discussion:** The mechanisms through which seasonal changes induce biological variations are possibly through a combination of increased caloric intake, decreased physical activity, and vitamin D deficiency. Seasonal variation in HbA1c mirrors the variation in seasonal mortality and morbidity due cardiovascular disease including increased arterial blood pressure, acute myocardial infarction, and sudden cardiac death.

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