

**Sudan University of Science and Technology**  
**College of Graduate Studies**

**Serum Levels of Magnesium, and Creatinine in Sudanese  
Patients with Type 2 Diabetes Mellitus**

مستوي الماغنيسيوم والكرياتينين في مصل الدم عند السودانين المصابين بمرض  
السكري من النوع الثاني

**A thesis submitted in partial fulfillment for MSc in Clinical  
Chemistry**

**By:**

**Musab Ibrahim Abdelrhman**

BSc. in Medical Laboratory Science (2004)  
Sudan University of Science and Technology  
(Clinical Chemistry)

**Supervisor:**

**Dr. Bader Eldien Hassan Elabid**

MB BS (U of K), MD Clinical Pathology  
Associate Professor of Chemical Pathology  
University of Science and Technology

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## **Dedication**

To my family,.....,  
To my parents, brother and sisters  
.....and to my friends  
I dedicate this work

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I would like to express my profound thanks to my supervisor, Dr. Bader Eldien Hassan Elabid for his fruitful guidance, unlimited assistance, encouragement and sustained interest throughout the course of this work.

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## **Abstract**

A cross-sectional study conducted during the period from December 2009 to August 2010, compared the serum levels of magnesium and creatinine of 50 Sudanese patients with type 2 diabetes mellitus (as a test group) and 30 apparently healthy volunteers (as a control group). Participants in this study were from Hajalsafi hospital and Khartoum north diabetic center, both in Khartoum state, Sudan. The serum levels of magnesium and creatinine were measured using reagent kits and a spectrophotometer (B.T.S-310) from Biosystem company.

Serum magnesium was significantly reduced, whereas serum creatinine was significantly raised in the diabetic group when compared to the control group, ( $p < 0.05$ ).

In the diabetic group, there was no correlation between the duration of the disease with both; the serum levels of magnesium and that of creatinine, whereas the body mass index of patients showed weak positive correlations with both; the serum levels of magnesium and that of creatinine.

From this study, it is concluded that; in Sudanese patients with type 2 diabetes mellitus the serum levels of magnesium are reduced and the serum levels of creatinine are raised. The serum levels of magnesium and creatinine have weak positive correlations with the body mass index of the diabetic patients and no correlations with the duration of diabetes.

اجريت هذه الدراسة الم قطعية خلال الفترة من ديسمبر 2009م حتي اغسطس 2010م حيث تمت م مقارنة مستويات الماغنيسيوم و الكرياتينين فى مصل الدم عند 50 من المرضى السودانيين المصابين بداء السكري من النوع الثاني مع 30 من المتطوعين الاصحاء غير المصابين بداء السكري (كمجموعة ضابطة).

كل المشاركين في هذه الدراسة كانوا من مستشفى حاج الصافي ومركز الخرطوم بحري لمرض السكري وهذان المركزان يقعان بولاية الخرطوم. مستويات الماغنيسيوم و الكرياتينين تم قياسها بواسطة جهاز م قياس الطيف اللوني (بى . تى . إس - 310) بإستخدام محاليل من شركة بايو سستم. كان هناك إنخفاض ذو دلالة احصائية معنويه في المستوى الوسطى للماغنيسيوم عند مرضى السكرى حيث كان الاحتمال الاحصائي اقل من 0.05 كما كان هناك ارتفاع ملحوظ وذو دلالة احصائية معنوية في مستوى الكرياتينين عند مرضى السكرى حيث كان الاحتمال الاحصائي اقل من 0.05 وذلك عند الم مقارنة بالمجموعة الضابطة .

فى مرض السكرى من النوع الثانى ، لم يكن هناك إرتباط بين مدة المرض مع مستويات كل من الماغنيسيوم و الكرياتينين ، بينما مؤشر كتلة الجسم أوضح أن هناك إرتباط موجب ضعيف مع مستويات كل من الماغنيسيوم و الكرياتينين فى مصل الدم .

من هذه الدراسة نخلص للآتي : مرض السكري من النوع الثاني يؤدي الي انخفاض مستوى الماغنيسيوم في مصل الدم والى ارتفاع مستوى الكرياتينين . كما إن مستوى الماغنيسيوم والكرياتينين لا يرتبطان ارتباطاً موجباً مع مدة المرض. ولكن لهما ارتباط موجب ضعيف مع مؤشر كتلة الجسم.

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## **Abbreviations**

BMI	Body mass index
ECF	Extracellular fluid
IDDM	Insulin dependant diabetes mellitus
IFG	Impaired fasting glucose
IGT	Impaired glucose tolerance
OGTT	Oral glucose tolerance test
EGTA	Ethylene glycol bis (2-aminoethyl ether) tetra acetic acid



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