

Serum Magnesium Level of Newly Detected Patients with Glucose Intolerance and Its Comparison with Serum Magnesium Level of Age and Sex Matched Healthy Volunteers

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Disclaimer

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- **Introduction**
- Methods
- Results and
- Discussion

Introduction

- Magnesium – second most common intracellular cation, basic composition of many enzymes and cofactor
- Hypomagnesaemia is associated with insulin resistance and diabetes
- Low magnesium (Mg) has been reported in patients with DM and south-Asians are at increased risk

- Hypomagnesaemia – associated with progression of diabetic complications
- Uncontrolled diabetes – osmotic diuresis and hypomagnesaemia
- Vicious cycle – hypomagnesaemia, diabetes and hypomagnesaemia

- Mg supplementation – good glycaemic control and may prevent or delay complications
- If patients with glucose intolerance are investigated and found to have low Mg levels, Mg replacement will help them achieve better outcome

Aims

- To evaluate serum Mg level of newly detected patients with glucose intolerance
- To compare these values with serum Mg levels of age and sex matched healthy volunteers
- To correlate level of serum Mg with glycaemic status of such patients

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Methods

- Type of study: Case-control study
- Place of study: OPD, BIRDEM
- Period of study: July-September 2017
- Study participants:
 - Fifty newly detected (disease duration <3 months) patients with glucose intolerance as cases
 - Fifty age and sex matched healthy volunteers as controls

Inclusion criteria

- Newly detected (disease duration <3 months) patients with glucose intolerance (DM 49, IGT 1) as cases
- Age and sex matched healthy volunteers as controls

Exclusion criteria

- GDM, type 1 diabetes and other specific types of diabetes
- Patients on diuretic or laxative treatment
- Patients with diarrhea or vomiting, malabsorption syndrome
- Known cases of parathyroid disorders
- Diagnosed cases of electrolyte imbalance

Ethical issues

- The research protocol was approved by the Ethical Review Committee (ERC) of Bangladesh Diabetic Somiti (BADAS)
- Data were collected consecutively and purposively from patients after informed written consent was taken

Laboratory method

- Mg was tested by The ARCITECT c System family instruments manufactured by Abbott Laboratories, Abbott Park, IL, USA

Statistical method

- Data were analyzed by using SPSS version 20.0 and appropriate statistical tests were performed

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Results

- Total 50 (DM 49 and IGT 1) patients with glucose intolerance were cases and 50 age and sex matched healthy volunteers were controls
- Serum Mg
 - normal in 29 cases and 37 controls
 - low in 21 cases and 13 controls

Table I. Base-line clinical characteristics of cases (50) and controls (50)

Character-istics	Cases (N-50)	Controls (N-50)	p value
Age (years)	43.68±11.07	43.26±11.23	0.875
Male:Female	1:1.5	1:1.5	---
BMI (kg/m ²)	27.70±1.98	25.33±2.64	0.386
Systolic BP (mm Hg)	133.10±14.87	122.50±10.0 6	0.001*
Diastolic BP (mm Hg)	83.00±6.22	76.94±9.71	0.004*

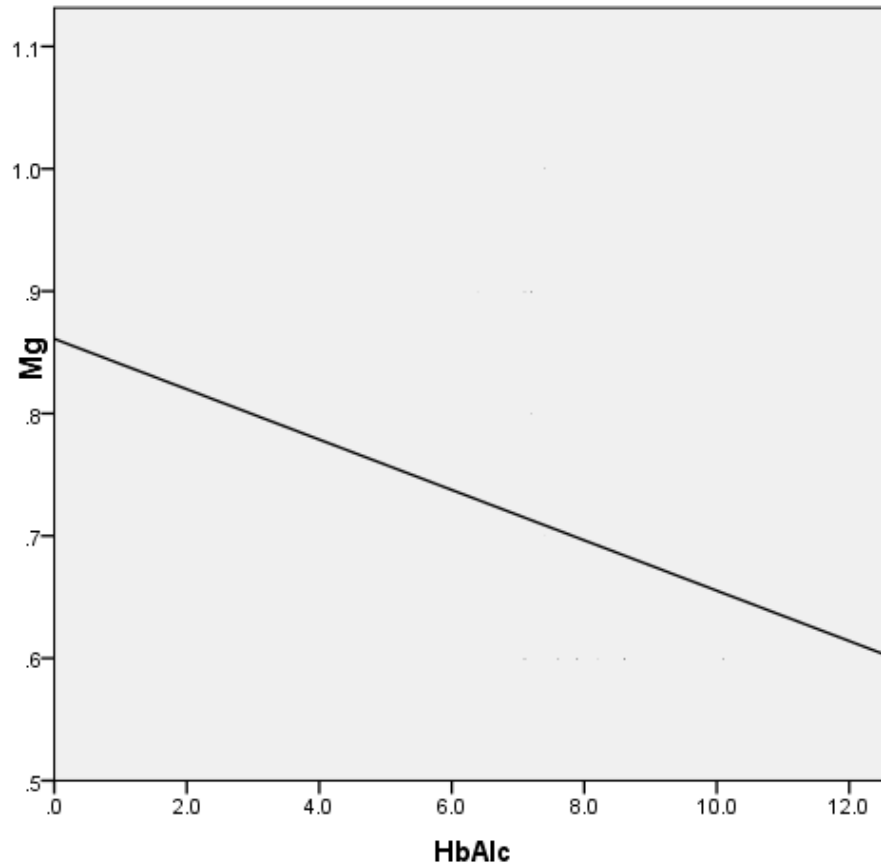
Table II. Base-line glycaemic status of cases (50) and controls (50)

Character-istics	Cases (N-50)	Controls (N-50)	p value
DM:IGT	49:1	---	---
FBG (m.mol/L)	8.984±1.90	---	---
2-h BG (m.mol/L)	14.52±7.22	---	---
RBG (m.mol/L)	---	6.50±0.38	---
HbA1c (%)	7.87±.93	---	---

Table III. Serum magnesium and other biochemical parameters of cases (50) and controls (50)

Character-istics	Cases (N-50)	Controls (N-50)	p value
S. Mg (m.mol/L)	0.70±0.14	0.85±0.15	0.362
S. Ca (mg/dL)	8.78±0.28	8.52±1.27	0.004*
S. Creatinine (mg/dL)	0.89±.145	0.81±.096	0.002*
ALT (U/L)	52.46±10.02	41.62±15.48	0.001*

Figure 1. Relationship between HbA1c and serum Mg level among cases



$r = -0.526$

Figure 2. Relationship between FBG and serum Mg level among cases

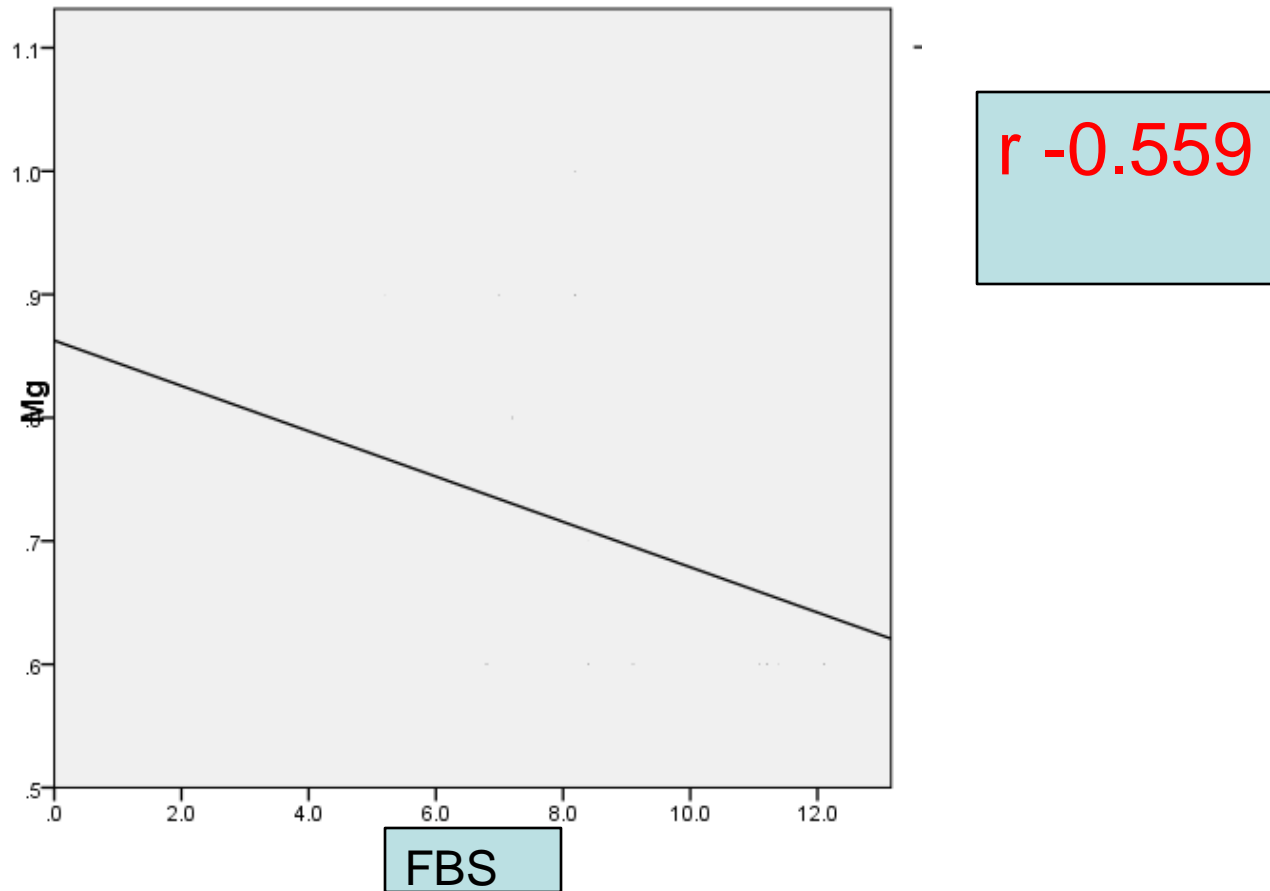
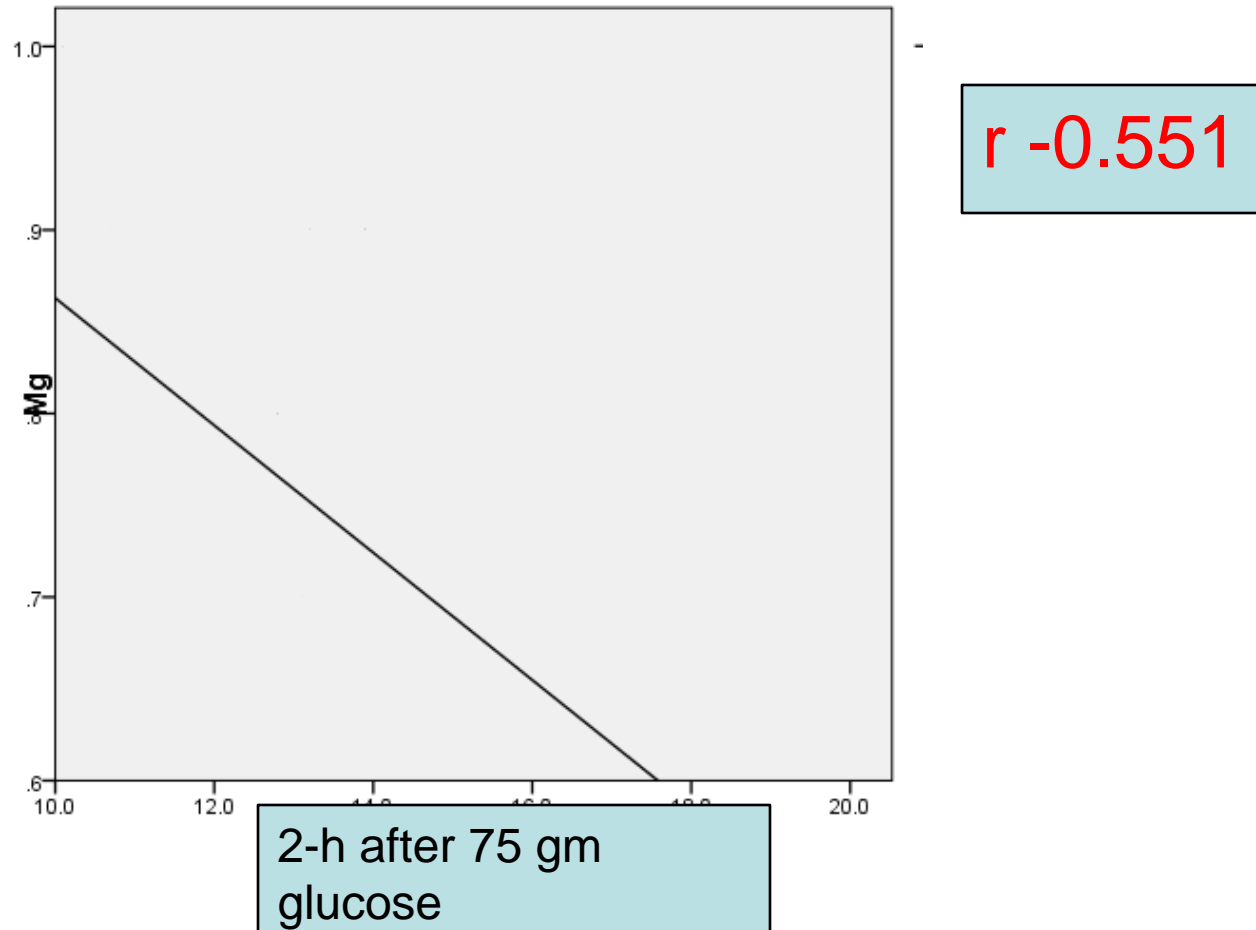


Figure 3. Relationship between 2-h after 75 gm glucose and serum Mg among cases



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Discussion

- Hypomagnesaemia is associated with neuropathy and other diabetic complications
- Diabetic patients – higher renal Mg excretion
 - reduced tubular Mg reabsorption resulting from glucose-induced osmotic diuresis
 - possibly resulting from insulin resistance

- Results from current study – Mg level was low in newly detected patients with glucose intolerance and there was inverse relation of Mg with their glycaemic control
- Serum Mg level was negatively correlated with HbA1c in different studies and it is a consistent finding

Limitations and recommendation

- Single center study
- Small number of study participants
- No patient with IFG
- A larger multi-center study with increased number of study participants is recommended

Conclusion

- Serum Mg level was lower among patients with glucose intolerance (DM and IGT) than controls but the difference was not significant
- Among patients with glucose intolerance serum Mg level was negatively correlated with glycaemic status

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Thank you all

