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## Study of Serum Magnesium Levels in Preterm Labour

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### **Abstract:**

**INTRODUCTION-** Magnesium plays an important role in the physiology of parturition. Decrease of Magnesium in plasma may be responsible for decrease of the same in myometrium and this might have a considerable influence on the preterm labour. A Hypomagnesaemia lead to neuromuscular irritability leading to uterine hyperactivity which leads to cervical dilatation .Normal range of Magnesium in pregnant women is 1.8 to 4mg/dl.

**METHODS-** t's a prospective case control study conducted in Government hospital, Mangalore from December 2012 to August 2014 after approval from IEC. Blood was collected from patients with established preterm labour

**RESULTS-** The serum Magnesium level of preterm patients ranged from 0.9mg/dl to 3.00m/dl with mean Magnesium level of  $1.47 \pm 0.49$  S.D. In normal pregnant women it ranged from 1.2 to 3.8mg/dl with a mean Magnesium level of  $2.81 \pm 0.52$  S.D ( $P < 0.000$ ) which was highly significant. The difference of serum Magnesium levels observed between the study population and control population is independent of factors like maternal age, parity, gestational age.

**CONCLUSION-** Preterm labour is associated with increased mortality and morbidity. Prevention has to be considered at this moment. Cases can be avoided by simple supplementation of Magnesium. Dietary supplementation of Magnesium might provide an easy and inexpensive means to decrease the problems related to preterm labour.

**Keywords:** Preterm labour, serum Magnesium levels

### **1. Introduction**

Preterm labour occurs in 7-10% of all pregnancies and is a major cause of perinatal and infant mortality and morbidity. Preterm births are multifactorial in origin. In most of these cases the etiology is obscure. Micro and macro minerals are not directly attributed in etiology of preterm labour; they play an important role in etiopathogenesis of preterm labour indirectly. Magnesium plays an important role in the physiology of parturition. Decrease of Magnesium in plasma may be responsible for decrease of the same in myometrium and this might have a considerable influence on the preterm labour. Hypomagnesaemia leads to neuromuscular irritability leading to uterine hyperactivity which leads to cervical dilatation. Normal range of Magnesium in pregnant women is 1.8 to 4mg/dl.

### **2. Aims & Objectives**

To determine the serum Magnesium concentration in women with preterm labour between 28-36 wks of gestation and compare the results with those obtained from pregnant women of same period of gestation not in labour.

To measure Magnesium levels in preterm labour patients.

To correlate Magnesium status of women in preterm labor between 28 to 36 weeks of gestation with indices such as age, parity and gestational age.

### 3. Materials and Methods

It's a Prospective case control study conducted in Government lady Goschen hospital from the year 2012 December to 2014 July in Department of Obstetrics and Gynecology

After taking detailed clinical history, physical and obstetric examination patients presented to labour room in established preterm labour after exclusion selected as cases

Patient came to OPD for antenatal visits are taken as controls and they are followed till delivery.

#### 3.1. Inclusion Criteria

Gestational age between 28 to 36 weeks.

Patients with established preterm labour

#### 3.2 Exclusion Criteria

- Maternal complications: PIH/GDM
- PROM
- Multifetal gestation.
- Presence of infection

After taking consent of the patient, 5ml of blood was collected from anti-cubital vein under aseptic precautions at the time of admission from cases and controls (out patient basis). These samples were analyzed in Department t of Biochemistry, KMC Mangalore.

The quantitative assessment of serum Magnesium level will be done photometrically at 500nm on a semi auto analyzer calibrated for Mg using Magnesium reagent kit.

Components of Reagent

AMP BUFFER	500mM
PH	11.2
Calmagite	0.15mM
EGTA detergent	0.35mM

With 95% confidence interval and 90% power the sample size is calculated to be 100 of which 50 are cases and 50 controls . Data collected by above will be compared using student unpaired t test and chi-square test.

### 4. Results

The serum Magnesium level of preterm patients ranged from 0.9mg/dl to 3.00m/dl with mean Magnesium level of  $1.47 \pm 0.49$  S.D. In normal pregnant women it ranged from 1.2 to 3.8mg/dl with a mean Magnesium level of  $2.81 \pm 0.52$  S.D ( $P < 0.000$ ) which was highly significant. The difference of serum Magnesium levels observed between the study population and control population is independent of factors like maternal age, parity, gestational age.

Age	Serum Ma		Total
	<1.8	1.8-4	
<20	5	1	6
	83.30%	16.70%	100.00%
	13.20%	8.30%	12.00%
21-25	16	7	23
	69.90%	30.40%	100.00%
	42.10%	58.30%	46.00%
26-30	11	3	14
	78.60%	21.40%	100.00%
	28.90%	25.00%	28.00%
>30	6	1	7
	85.70%	14.30%	100.00%
	15.80%	8.30%	14.00%
Total	38	12	50
	76.00%	24.00%	100.00%
	100.00%	100.00%	100.00%

Table 1: Age Distribution  
P Value – 0.678 Not Significant Statistically

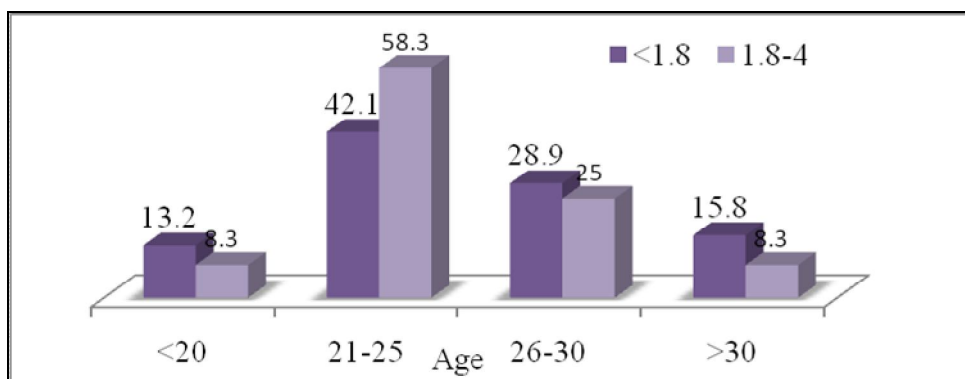


Figure 1

Gestation Age	Serum Ma		Total
	<1.8	1.8-4	
28-30	4	3	7
	57.10%	42.90%	100.00%
	10.50%	25.00%	14.00%
31-32	12	3	15
	80.00%	20.00%	100.00%
	31.60%	25.00%	30.00%
33-36	22	6	28
	78.60%	21.40%	100.00%
	57.90%	50.00%	56.00%
Total	38	12	50
	76.00%	24.00%	100.00%
	100.00%	100.00%	100.00%

Table 2: Period of Gestation  
 P Value – 0.097 Not Significant Statistically

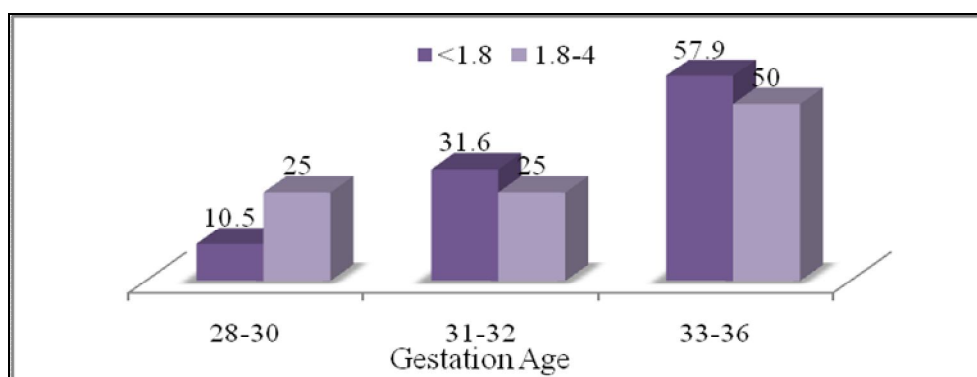


Figure 2

Gravida	Serum Ma		Total
	<1.8	1.8-4	
MULTI	16	8	24
	66.70%	33.30%	100.00%
	42.10%	66.70%	48.00%
PRIMI	22	4	26
	84.60%	15.40%	100.00%
	57.90%	33.30%	52.00%
Total	38	12	50
	76.00%	24.00%	100.00%
	100.00%	100.00%	100.00%

Table 3: Obstetrics Score  
P Value – 0.423 Not Significant Statistically

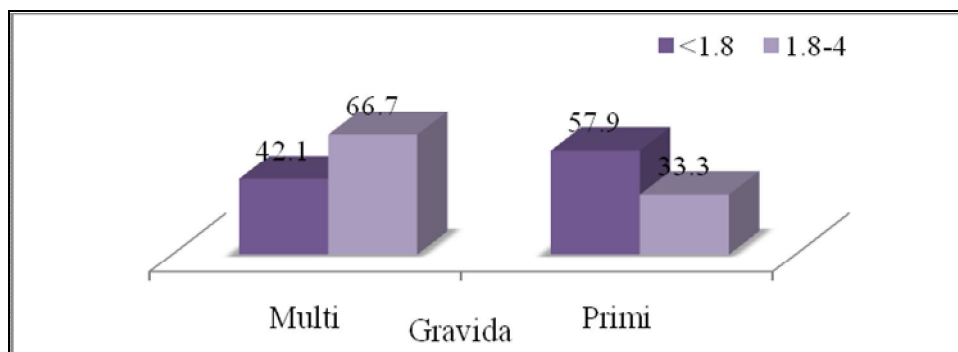


Figure 3

Antenatal Care	Serum Ma		Total
	<1.8	1.8-4	
Booked	23	7	30
	76.70%	23.30%	100.00%
	60.50%	58.30%	60.00%
Un-booked	15	5	20
	75.00%	25.00%	100.00%
	39.50%	41.70%	40.00%
Total	38	12	50
	76.00%	24.00%	100.00%
	100.00%	100.00%	100.00%

Table 4: Antenatal Care  
P Value – 0.008 Not Significant Statistically

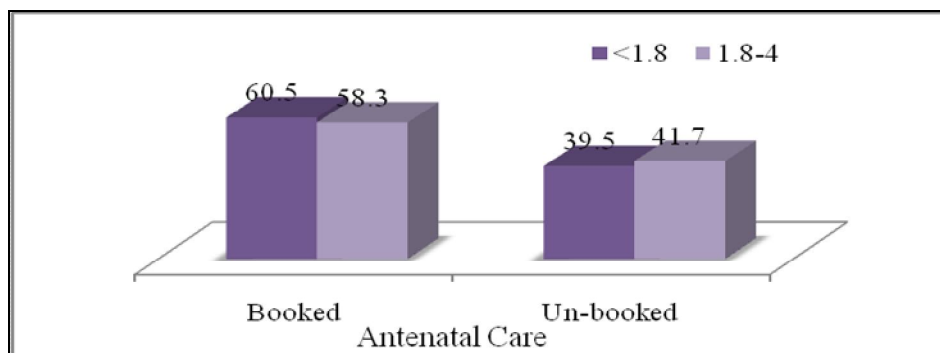


Figure 4

Group	N	Minimum	Maximum	Mean	Std. Deviation	t value	p value
Cases	50	0.9	3	1.47	0.49	13.26	0
Controls	50	1.2	3.8	2.81	0.52	0	HS

Table 5: Serum Megnesium Levels  
P Value – 0.000 Highly Significant Statistically

Mode of Delivery	Serum Ma		Total
	<1.8	1.8-4	
LSCS	4	2	6
	66.70%	33.30%	100.00%
	10.50%	16.70%	12.00%
V	34	10	44
	77.30%	22.70%	100.00%
	89.50%	83.30%	88.00%
Total	38	12	50
	76.00%	24.00%	100.00%
	100.00%	100.00%	100.00%

Table 6: Mode Of Delivery  
P Value – 0.678 Not Significant Statistically

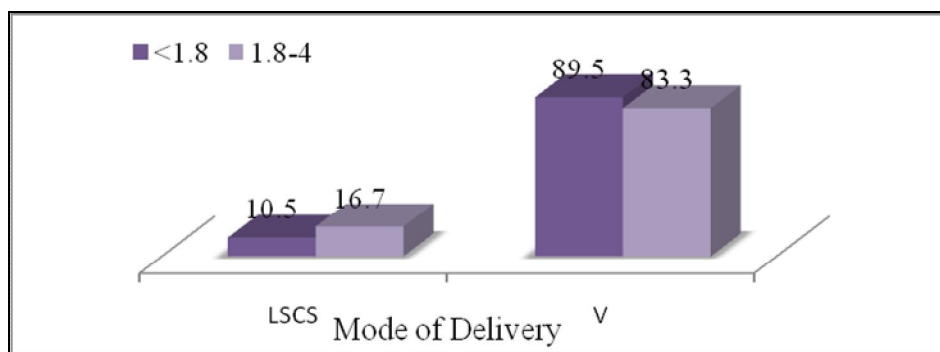


Figure 5

**5. Discussion**

The exact mechanism of action of Magnesium is not understood. Calcium by its action on calmodulin activation brings about uterine contraction, while Magnesium prevents it. The serum Magnesium level may affect the blood flow through the uterus and may contribute towards lysosome stabilization. The stabilization of which brings about release of prostaglandins which initiates contractions. The statistical analysis of the current study shows that the proportion of low serum magnesium level is high among the patients with preterm level compared to normal labour.

**6. Conclusion**

Above findings and analysis suggests that the low serum Magnesium is associated with preterm onset of labour. Hypomagnesaemia may be used as a predictor of preterm labour. Some predictive tests for preterm births are used they still have poor sensitivities and are very expensive. Estimation of Magnesium concentrations is relatively cheap. Magnesium supplementation may be considered in patients with decreased serum Magnesium levels to prevent preterm labour.

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