

Trimester Level Serum Magnesium in Pregnant Women in Urban Area of Bhopal Region, IndiaSeema Tamrakar¹, Surya Tiwari², Aditya Thakur³, Jaidev Singh^{4*}¹Assistant Professor, Department of Biochemistry, Mahaveer Institute of Medical Science, Bhopal²Associate Professor, Department of Biochemistry, Chirayu Medical College & Hospital, Bhopal³Associate Professor, Department of PSM, NSCB Medical College, Jabalpur⁴Associate Professor, Department of Biochemistry, NSCB Medical College, Jabalpur

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Conflict of interest: Nil

Abstract:

Background: Magnesium deficiency is frequent in women of childbearing age in both developing and developed countries. The demand of magnesium increases during pregnancy period, and the majority of pregnant women likely do not meet this increased need. Magnesium insufficiency during pregnancy may create a health risk for both the mother and the newborn.

Aim: Aim of this study is to demonstrate the role of magnesium in 1st to 3rd trimester of pregnancy.

Material and Methods: This present study conducted at Department of Biochemistry Mahaveer institute of medical sciences Bhopal, associated with the Department of Obs. & Gynae MIMS Bhopal, Total 150 cases attended ANC Clinic at the MIMS Hospital Bhopal. Pregnant women were taken from 20-35 years of age group. Estimation of serum magnesium concentration was done by automated calmagite kit method.

Findings: Mg levels were found slightly decreases in the 1st to 3rd trimesters, but the difference was not statistically significant.

Conclusion: Results of the study demonstrated that magnesium could be an effective element for fetal wellbeing. Deficiency of magnesium may be possibly associated with pre-eclampsia and preterm delivery and possibly with low birth weight.

Keywords: Magnesium, Pregnancy, Trimester period.

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Introduction

Magnesium ions are required by all living cells, they play a crucial role in the structure and function of the human body. It is the body's fourth most abundant mineral and is necessary for good health. Approximately 50% of total body magnesium is found in bone and the other half is mostly found inside cells of body tissues and organs.

Only 1% of magnesium is found in the blood, but the body works very hard to maintain a constant blood level of magnesium [1]. Mg⁺⁺ is one of the important minerals, [2] that are required for cell multiplication in a growing fetus and is an important element of life chemistry in maintaining a balanced neuromuscular system. Magnesium plays an important role during pregnancy, Pregnant women have lower blood magnesium levels than non-pregnant women due to increased demand for mother and growing fetus and increased renal excretion of magnesium 25 percent more than non-pregnant women due to increase in GFR and Hemodilution in the second and third trimesters [3, 4].

Micronutrient, such as magnesium is essential for a baby's appropriate growth and development during pregnancy. Magnesium Deficiency in mothers can affect not only the mother's health but her babies too. The development of new tissue (maternal and fetal) throughout pregnancy requires a higher magnesium intake than that of normal non-pregnant women of comparable age [5].

Serum magnesium has been shown to fall in pregnancy [6]. Magnesium has established its role in obstetrics, being an essential element for fetal wellbeing. Deficiency of magnesium may be possibly associated with pre-eclampsia and preterm delivery and possibly with low birth weight [7]. Magnesium deficiency during pregnancy has been shown to increase neonatal mortality and morbidity [8]. Mg is an important nutrient for preventing certain diseases throughout the pregnancy. Common causes of Mg deficiency include inadequate dietary intake or gastrointestinal absorption, increased losses through the

gastrointestinal or renal systems, and increased requirements for Mg, such as in pregnancy [9, 10].

Material & Method

This observational prospective study conducted at Department of Biochemistry, Mahaveer institute of medical sciences Bhopal, associated with the Department of Obs. & Gynae MIMS Bhopal, Total 100 cases attended ANC Clinic at the MIMS Hospital Bhopal.

Study Comprised of Three Groups of Patients. Group - A. 50 pregnant women of 1st trimester of pregnancy, Group - B. 50 pregnant women of 2nd trimester of pregnancy, Group - C. 50 pregnant women of 3rd trimester of pregnancy. Pregnant women were taken from 20-35 years of age group. Inclusion criteria of Pregnant women 1st 2nd and 3rd trimester of pregnancy, exclusion criteria of Pregnant women already suffering from thyroid disease asthma / hypertension / diabetes mellitus and / any other systemic disease. Study was

approved by the Ethical committee of the institutes. Informed consent was obtained from all patients. 3-5 ml of blood sample was withdrawn from the antecubital vein, and the blood sample was, collected in plain vacutainers. The blood sample was centrifuged for 15 minutes, at 3000 rpm at room temperature. The serum was stored at 4°C for biochemical investigations. Estimation of serum magnesium was done by calmagite kit method ¹¹. Statistical analysis was done by Graph Pad Prism version 5, unpaired T-test was used.

$p < 0.05$ was considered as statistically significant.

Results: Study group comprised into three groups: (n - total 150 pregnant women)

- 50 pregnant women of 1st trimester of pregnancy
- 50 pregnant women of 2nd trimester of pregnancy
- 50 pregnant women of 3rd trimester of pregnancy

Table 1: Concentration of magnesium in maternal serum- during pregnancy (mean \pm SD) (n = 150)

Groups	Pregnant women -1 st trimester Mg mg/dl Mean \pm SD	Pregnant women -2 nd trimester Mg mg/dl Mean \pm SD	Pregnant women -3 rd trimester Mg mg/dl Mean \pm SD	P value (<0.05)
Mg mg/dl Level	2.18 \pm 0.07	2.15 \pm 0.06	2.14 \pm 0.07	NS

Three Trimester value of maternal serum- during pregnancy

Discussion

In present study serum Mg levels were found slightly decreases in the 1st to 3rd trimesters, but the difference was not statistically significant. Earlier studies have also reported similar findings, Chesley et al (1972) [12], Sheldon et al (1985) [13], Franz KB et al (1987) [14], Kamal S et al (2003) [15] Baloch GH et al (2012) [16], Tabrizi et al (2014) [17].

Serum magnesium levels were found to be slightly lower; this may be related to Hemodilution, renal clearance during pregnancy, and mineral consumption by the growing fetus [18]. In lactation breast milk provides approximately 42 mg/d (in 750 mL of breast milk) [19]. therefore Serum magnesium has been shown to decrease in pregnancy [20]. Magnesium, an essential trace element for the human body, is needed for proper bone formation and in various intracellular enzymatic processes [21]. The World Health Organization states that deficiencies of magnesium developed and developing countries. Studies of the prevalence of hypomagnesemia in the general population are both scarce and problematic. Although a range between 2.5% and 15% in otherwise healthy individuals has been reported [22,23].

Conclusion

Physiological changes associated with pregnancy, require an increased availability of trace elements such as Mg is the most important micronutrient for the proper course of pregnancy and fetal development. Any changes in their concentrations can cause interactions that are dangerous to the health of the mother and fetus.

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