SERUM MAGNESIUM LEVELS IN PRETERM LABOUR IN RELATION TO SOCIOECONOMIC STATUS.

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ABSTRACT

The present study revealed significantly lower levels of serum magnesium in patients with preterm labour without any apparent cause as compared to normal term pregnant women in labour. The values were also lower in women with low socioeconomic status, older age and consuming vegetarian diet. Hence, estimation of serum magnesium levels in pregnancy may be a useful parameter in preterm labour.

KEY WORDS: Magnesium, preterm labour, socioeconomic status, diet.

INTRODUCTION

The aetiology of preterm labour is only partially understood. Multiple factors namely, antepartum haemorrhage, preeclampsia, eclampsia, premature rupture of membrane, multiple pregnancy may play a role either singly or in combination. Attention has been drawn towards the role of magnesium in pregnancy by various authors. In human pregnancy, there have been reports of a decrease in plasma magnesium by various workers (1-2). Ray et. al. (3) demonstrated that serum magnesium level diminished gradually from first to third trimester of pregnancy. With the onset of labour, there is a further decrease in plasma magnesium in patients with preterm labour. Retrospective analysis of administration of oral magnesium during antenatal care in Germany showed a significant decrease in preterm labour (4). *In vitro* studies have shown that magnesium excess can affect diverse enzyme systems indicating that caution must be exercised to determine the safety and effect of exogenous magnesium (4). Magnesium nutritional status can be influenced by a number of factors, but, the easiest to correct is magnesium intake. In addition,

dietary factors can modulate the absorption of the amount of magnesium ingested. Magnesium intake depends to a certain extent on socioeconomic background of the person. The diets rich in magnesium are whole grain, lean meat, low fat, low sugar, skimmed milk, abundant fruits and vegetables. No reports are available regarding the effect of antenatal care and levels of serum magnesium in rural population in India. An attempt has been made to compare the levels of magnesium in relation to dietary intake, socioeconomic status, rural or urban origin of population and antenatal care.

MATERIALS AND METHODS

The present study was carried out in 100 pregnant women admitted in Obstetrics Ward of Postgraduate Institute of Medical Sciences, Rohtak who delivered preterm i.e. from 28 weeks to 36 weeks of gestation and 50 pregnant women who delivered at term served as control. Data regarding obstetric and dietary history, socioeconomic status, rural or urban background and antenatal care were recorded. Routine investigations were carried out. Informed consent was obtained from these women. 3 ml venous blood was collected by venepuncture at the time of delivery and serum was separated. Serum magnesium was estimated colorimetrically by precipitation of proteins with trichloroacetic acid

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and addition of Titan yellow as colouring agent (5). The data so obtained was statistically analysed using Student's t-test.

RESULTS

Serum magnesium levels in preterm labour were significantly lower (1.46 ± 0.25 mg%) as compared to term labour group (2.40 ± 0.44 mg%) ($p < 0.001$). On further analysis, according to period of gestation, no significant difference could be found in serum magnesium levels in these subgroups ($p > 0.01$). Also, serum magnesium levels decreased with advancing age in both the groups, but the difference was not statistically significant. Mean serum levels were lower in women who did not receive any antenatal care as compared to those who received antenatal care in both the groups, but the difference was insignificant ($p > 0.1$). No statistically significant difference in serum magnesium levels could be found between rural and urban population in both the groups (1.54 ± 0.28 vs. 1.50 ± 0.19 mg%). A highly significant fall in serum magnesium levels was observed in women belonging to low and middle socioeconomic strata as compared to those in high socioeconomic group in both the groups ($p < 0.001$) (Table 1). Non vegetarian women showed a highly significant increase in serum magnesium levels as compared to vegetarian women in both the groups ($p > 0.001$) (Table 1).

DISCUSSION

Approximately one-third of preterm births are the result of idiopathic preterm labour (6). There is growing evidence that a compromised magnesium nutritional status may be involved in several disorders that can occur during pregnancy namely, hypertension, premature delivery and intrauterine growth retardation (7,8). In the present study, women receiving antenatal care had higher magnesium levels as compared to women who did not receive any antenatal care. Although women of rural origin had slightly higher magnesium levels in both the groups, the difference was statistically insignificant. To our knowledge no study regarding

the effect of antenatal care, rural urban origin of population in India on serum magnesium levels is available in literature.

Magnesium nutrient density is less in the diet ingested by low income group women and in those who are vegetarian. Franz (9) has shown that diet low in magnesium nutrient density contains refined cereal grains, high amounts of fats and sugars, few fruits and vegetables. Also diet rich in protein increases magnesium absorption. Socioeconomic status affected serum magnesium levels significantly in term as well as preterm group, the values being lowest for women belonging to low socioeconomic status. These observations are similar to those reported by Franz (9) and Potnis et.al. (10). The vegetarian or non-vegetarian diet influenced the serum magnesium levels significantly, the values being lower in vegetarians than in non-vegetarians in both the groups. These observations are consistent with those reported earlier by others (10-12). Potnis et. al. (10) had attributed hypomagnesaemia in certain pregnant women to a high oral intake of calcium. Since calcium and magnesium share a common transport system, calcium may be absorbed at the cost of magnesium. Emphasis on balanced diet, diet rich in proteins, fruits, vegetables and cereals and diet low in fats will go a long way in improving serum magnesium levels and thus, preventing preterm labour.

Table 1: Influence of socioeconomic status on serum magnesium levels (mg%, mean $\pm$ SD)

	Term labour	Preterm labour
Diet		
Vegetarian	2.29 ± 0.39	1.42 ± 0.19
Non vegetarian	3.0 ± 0.15	1.79 ± 0.14
Socioeconomic status		
High	3.0 ± 0.17	1.84 ± 0.14
Middle	2.57 ± 0.35	1.51 ± 0.16
Low	2.00 ± 0.17	1.23 ± 0.08

Values are significant at all levels ($p < 0.001$)

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