# PLASMA OXYTOCINASE LEVELS IN INDIAN PREGNANT WOMEN

by

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Oxytocinase is an enzyme of placental origin and is released into maternal circulation during pregnancy in increasing amount with advancing gestation Melander (1965). Making use of the ability of the enzyme to cleave cystine from 1 cystine-di-ß naphthylamide, a quantitative assay method has been developed to estimate plasma oxytocinase activity. In recent years, use of oxytocinase activity in the plasma of pregnant women is considered as an important tool in clinical evaluation of normal and complicated pregnancies (Titus *et al*, 1960; Hurry *et al*, 1972). Results of earlier investigations reported from this Institute had indicated that the concentrations of estriol and pregnanediol, both of which are elaborated from the placenta, are significantly lower in women belonging to the low socio-economic group as compared to women of the well-to-do group. Results of a study wherein the plasma levels of oxytocinase were determined in pregnant women belonging to different socio-economic groups and its possible relevance to foetal growth, are reported here.

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*Material and Methods*

Heparinized blood samples were obtained from 140 pregnant women belonging to the low socio-economic group (income Rs. 100-300 p.m.) attending Niloufer Hospital, Hyderabad, and from 114 women belonging to the upper socio-economic class (income Rs. 600-1200 p.m.), attending a private nursing home at different stages of gestation. Plasma was separated and stored at -20°C till analysed, which was usually done within a week of obtaining the samples.

In 10 women, blood samples were collected at different stages of labour to assess the effect of labour on plasma oxytocinase activity. The enzyme activity was also determined in 10 cord sera obtained at the time of delivery. Plasma oxytocinase was determined by the method of Baboona and Yenen, (1966) using 1 cystine-di-ß naphthylamide as substrate and the released ß-naphthylamine was measured colorimetrically. Enzyme activity was expressed as mg ß-naphthylamine, released per hour/100 ml plasma.

The results were analysed using student's 't' test to measure the difference in enzyme activity between the two socio-economic groups.

*Results*

Plasma oxytocinase activity showed a progressive increase with advancing

TABLE 1

*Plasma Oxytocinase Activity (mg β-naphthylamine Released/hour/100 ml Plasma) During Pregnancy in High and Low Income Group Mothers*

| Gestation age weeks: | 10 weeks | 10—20 | 21—30 | 31—36 | 37—40 |
|---|---|---|---|---|---|
| High income group | 0.85 ± 0.358 (9) | 0.94 ± 0.212 (16) | 2.78 ± 0.251 (22) | 4.99 ± 0.289 (35) | 6.55 ± 0.574 (25) |
| Low income group | 0.22 ± 0.133 (6) | 1.43 ± 0.230 (18) | 3.30 ± 0.291 (31) | 5.61 ± 0.280 (34) | 7.78 ± 0.397 (31) |

Values are means ± S.E. Ms.
( ) sample size.

gestation, with an activity of 0-2 mg in the first trimester (Table 1, Figure 1). The mean levels at term was 7.78 mg% and 6.55 mg%, respectively for the low and high socio-economic groups. Though the mean oxytocinase activity tended to be higher at term in the low socio-economic group, there were no real differences between the two groups at any gestational period. Cord sera did not show any oxytocinase activity. No correlation was seen between enzyme activity at term on the one hand and birth weight of the infant on the other. Enzyme activity did not appear to be related to the stage of labour. A wide scatter was seen in the individual values at different points of pregnancy (Fig. 2).

*Discussion*

The observation that the plasma oxytocinase activity showed a progressive increase with advancing gestation is similar to that reported by Ryden (1966), Hilton and Johnson (1959) and Melander (1965). Unlike earlier observations Iyengar (1968, 1970) in relation to estriol and pregnanediol, plasma oxytocinase activity did not show any difference between the two socio-economic groups of women indicating that the nutritional status of the mother had little effect on the enzyme concentration. The lack of correlation between the birth weight of infant and oxytocinase activity is similar to the observation of Josephides *et al* (1963), but dissimilar to that of Hurry *et al* (1972) who found a significant correlation between the two. The data presented here show that the enzyme activity cannot be used as an index of either fetal growth or placental function.

The functional significance of plasma oxytocinase activity in pregnancy is not clear. As labour progressed there was no

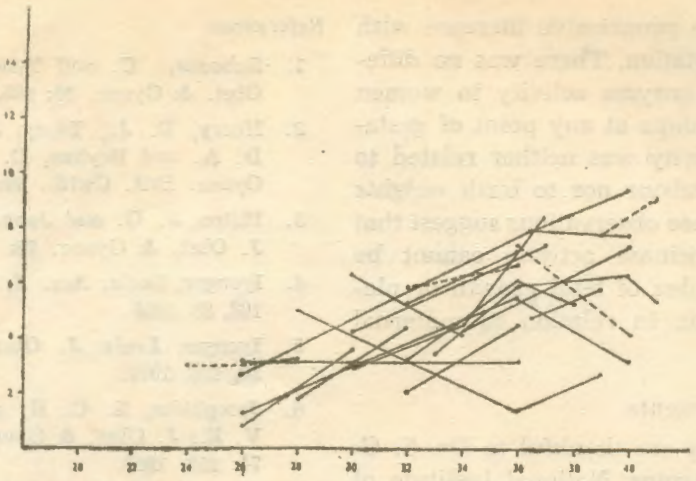

Fig. 1
Plasma oxytocinase activity in two socio-economic group in pregnancy.

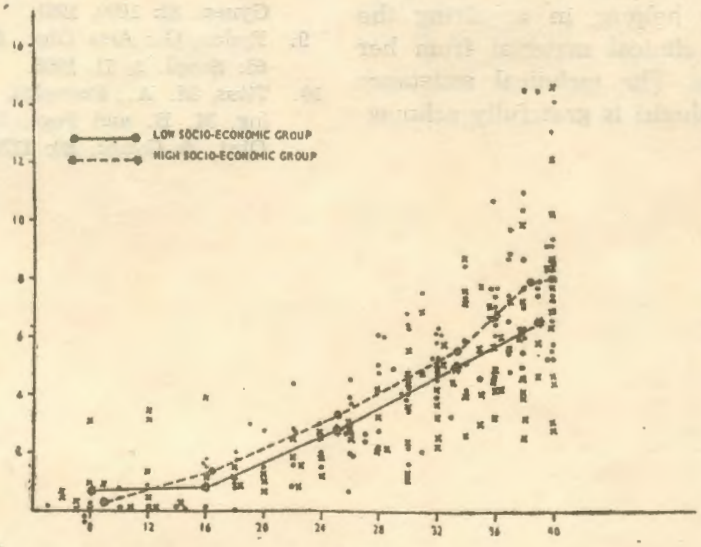


Fig. 2
Individual variation in plasma oxytocinase activity.

significant change in its activity, suggesting that it may not have a critical role in the inactivation of oxytocin, before delivery. Since oxytocin is known to cause vasoconstriction of placental blood vessels, the persisting high levels of oxytocinase during labour may have a protective effect, on the placental blood vessels, preventing hypoxia in placenta Ryden (1966).

*Summary*

The plasma oxytocinase activity was determined in pregnant women of two different socio-economic groups at different stages of gestation. The enzyme acti-

vity showed a progressive increase with advancing gestation. There was no difference in the enzyme activity in women of the two groups at any point of gestation. The activity was neither related to the onset of labour nor to birth weights of infants. These observations suggest that plasma oxytocinase activity cannot be used as an index of fetal growth or placental function in relation to maternal nutrition.

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