STUDY OF PLACENTA, FOETUS AND NEW BORN IN UNDERWEIGHT, MALNOURISHED AND CHRONICALLY ILL PREGNANT WOMEN

by

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Undernutrition and malnutrition are responsible for abortion, premature labour, low birth weight, low vitality, poor physical condition, malformations of new born and still birth. It has been observed that the most common deficiency is of calories and protein (Jean *et al* 1955). On the other hand a careful study of placenta may yield information of prognostic significance.

Material and Method

The present study was carried out in 200 patients attending antenatal clinics of U.I.S.E. Maternity Hospital, attached to G.S.V.M. Medical College, Kanpur. Twenty-five normal pregnant women, 50 underweight, 80 malnourished and 45 chronically ill pregnant women were selected for study. A detailed history and complete examination was carried out. Relevant investigations were done. All the new born babies were weighed, crown to heel length and head circumference were measured by tape. Examination of placenta in detail was conducted soon after delivery. Diagnosis of placental hypertrophy was made when placental foetal ratio exceeded 0.18 (Little 1960). A detailed histological examination was done soon after Haematoxyline-eosin staining.

Observation and Comments

Premature birth and still birth in Malnourished Pregnant Women

Out of 80 malnourished, 75 (81.25%) had full term delivery. The still birth rate in full term infant was found to be (2.50%).

With the increase in dietary protein, there was a decrease in abortions, preterm deliveries and still births. Similar findings have been reported by (Antonov 1947; Smith 1947; Jean and Smith 1955; Thomson 1963).

Birth Weight, Length and Head Circumference of New born in Malnourished Women.

It was observed that there was a progressive increase in birth weight, length and head circumference with increase in

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TABLE I

Full Term, Preterm Deliveries and Mid-Trimester Abortions

	Full term				Pre-term				Mid trimester	
	Alive		Dead		Alive		Dead		Alive	Dead
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Control	14 (56%)	11 (44%)	—	—	—	—	—	—	—	—
Malnourished	36 (45%)	29 (36.25%)	1 (1.25%)	1 (1.25%)	4 (5%)	5 (6.25%)	1 (1.25%)	1 (1.25%)	—	1 (1.25%)
Chronically ill	17 (37.78%	13 (28.28%)	—	—	3 (6.67%)	5 (11.11%)	3 (6.67%)	3 (6.67%)	—	1 (2.23%)
Under weight	25 (50%)	19 (38%)	—	—	3 (6%)	3 (6%)	—	—	—	—

dietary protein. Intrauterine growth failure of new born in malnourished women was uniform, meaning thereby that birth weight, length and head circumference all were reduced (Table II).

had full term deliveries and 6 (12%) had preterm deliveries. Thomson *et al* (1963) reported that premature birth rate in under weight women was 9.6%. New borns of under weight women showed a

TABLE II

Effect of Protein Intake on Birth Weight, Birth Length and Head Circumference

Average total protein intake in gm/day	Birth weight	Birth length in cm.	Head circumference in cm.
25–35	2375.00	45.13	26.13
35–45	2600.00	46.40	27.04
45–55	2821.43	48.07	29.07
	B. CONTROL		
65–75	2750.00	50.00	29.5
75–85	3035.00	50.64	29.5
85 & above	2906.00	49.81	29.5

Burke *et al* (1943) also observed similar relationship between birth weight and birth length with total amount of protein consumed. In mothers consuming 35-55 gm. of protein, the foetal mortality was found to be 3 (5.0%), a finding in close confirmity with that of (Arnell *et al*, 1945).

All the malnourished mothers were found to be anaemic also.

Effect of Under Weight Women on New Born

Out of 50 underweight women 44 (88%) decrease in birth weight, birth length and head circumference.

Effect of Various Chronic Diseases in Pregnant Women and Foetal Outcome:

Effect of Maternal Diabetes on New born

Tables III and IV show foetal outcome in diabetic mothers.

Our series of diabetic mothers is small (only 10 women) but our results are in agreement with those of (Peel, 1961).

TABLE III
Effect of Various Chronic Diseases on New Born

	Full term				Preterm				Abortion	
	Alive		Dead		Alive		Dead		No.	%
	No.	%	No.	%	No.	%	No.	%		
Diabetes	8	80.00	—	—	2	20.00	—	—	—	—
Hypertension	4	66.66	—	—	2	33.33	—	—	—	—
Tuberculosis	12	70.59	—	—	2	11.77	2	11.77	1	5.88
Heart disease	6	50.00	—	—	2	16.66	4	33.33	—	—
Anaemia	65	81.25	2	2.50	9	11.25	2	2.50	2	2.50

TABLE IV
Weight in Gm of Fullterm Alive New Born

	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000		Mean above
Diabetes	—	—	2 (25%)	2 (25%)	2 (25%)	2 (25%)	2500.00
Hypertension	—	2 (50%)	2 (50%)	—	—	—	3500.00
Tuberculosis	—	6 (50%)	6 (50%)	—	—	—	2500.00
Heart disease	—	3 (50%)	3 (50%)	—	—	—	2500.00
Anaemia with malnourished	3 (4.61%)	31 (47.67%)	19 (28.27%)	7 (10.76%)	5 (7.60%)	—	2596.00

Effect of Maternal Heart Disease on New Born (Table III)

Cardiac failure leads to abortion, premature labour and foetal death by anoxia. In our 12 patients with heart disease, 6 (49.99%) had preterm deliveries. Bjquru Buemann (1964) reported a maximum prematurity rate of 60% in those patients whose functional capacity deteriorated from grade I to grade IV.

Effect of Maternal Hypertension on New Born (Table III and IV)

Out of 6 hypertensive women, 2 (33.33%) had preterm delivery. Mean birth weight was 2500 gm. Same was observed by (Ciblis, 1974).

Effect of Maternal Tuberculosis on Foetus (Table III)

One (5.88%) of the patients suffering from tuberculosis had abortion and 4 (23.54%) had preterm delivery.

It is evident from the above Table that mean placental weight in malnourished women was high as compared to normal average term placental weight.

In diabetes average placental coefficient was 0.226 and in anaemia it was 0.19 which is higher than normal.

Placenta of anaemic and malnourished women (Table IX)

In these cases the incidence of placental weight above 700 gm was (10%). Mean placental weight was 480.0 gm. These results are in comfirmity with the finding reported by Beischer (1968). Average placental coefficient in anaemia series was 0.192 (Normal Range 0.1—0.18 series was 0.192 (Normal Range 0.1-018 Little, 1960) in anaemic women.

TABLE V

Placental Weight in Control, Malnourished, Underweight and Chronically Ill Pregnant Women

Group	100-200	200-300	300-400	400-500	500-600	600-700	700 & above	Mean
Control	—	—	—	20 (80%)	5 (20%)	—	—	470.00
Malnourished	—	1 (1.25%)	7 (8.75%)	50 (60.25%)	12 (15.0%)	2 (2.50%)	8 (10.0%)	480.00
Underweight	—	—	4 (8.0%)	42 (84.0%)	4 (8.0%)	—	—	450.00
Chronically ill	2 (4.44%)	4 (8.89%)	7 (15.56%)	19 (42.22%)	5 (11.11%)	3 (6.67%)	5 (11.11%)	447.77

TABLE VI

Placental Coefficient in Various Groups

Groups	Range	Average
Control	0.14–0.18	0.166
Malnourished with anaemia	0.16–0.23	0.192
Underweight	0.16–0.21	0.18
Diabetes	0.21–0.24	0.226
Hypertension	0.15–0.18	0.16
Heart disease	0.16–0.18	0.17
Tuberculosis	0.16–0.18	0.17

TABLE VII

Macroscopic Findings of Placenta

	Control		Malnourished		Underweight		Chronically ill	
	No.	%	No.	%	No.	%	No.	%
Infarction	3	12	10	12.5	5	10	9	1.55
Perivillous fibrin deposition	2	8	5	6.25	3	6	5	5.55
Calcification	1	4	5	6.25	2	8	—	—
Attachment of cord								
—C.	10	40	30	37.50	15	30	15	33.33
—E.	15	60	50	62.50	35	70	30	66.66

TABLE VIII
Microscopic Findings of Placenta

Villous varient	Control		Malnourished		Underweight		Chronically ill	
	No.	%	No.	%	No.	%	No.	%
Increased regression of villi	2	8	16	20	8	16	16	35.5
Syncytial Knot —Increase	—	—	—	—	—	—	4	8.88
—Decrease	5	20	32	40	10	20	—	—
Proliferation of Langhans	4	16	24	30	7	14	6	13.33
Stromal–fibrosis	3	12	16	20	7	14	9	20.00
End arteritis obliterans	6	24	16	20	12	24	10	22.20
Mononuclear infiltration	—	—	—	—	—	—	4	8.88

TABLE IX
Gross and Histological Findings of Placenta in Chronically Ill Group

	Diabetes Total 10		Hypertension Total 6		Tubercu-losis Total 17		Heart Disease Total 12		Anaemia Total 80	
	No.	%	No.	%	No.	%	No.	%	No.	%
Infarction	2	20	4	66.66	1	5.88	2	16.66	10	12.5
Perivillous fibrin	3	30	—	—	1	5.88	1	8.33	5	6.25
Calcification	—	—	—	—	—	—	—	—	5	6.25
Increased regression of villi	8	80	4	66.66	4	23.53	—	—	16	20.00
Syncytial Knot Increase	—	—	4	66.66	—	—	—	—	—	—
Decrease	—	—	—	—	—	—	—	—	32	40.00
Proliferation of Langhans	4	40	2	33.33	—	—	—	—	24	30.00
Stromal fibrosis	4	40	4	66.66	2	11.77	—	—	16	20.00
End arteritis obliterans	4	40	3	50.00	2	11.77	1	1.83	6	24.00
Mononuclear infiltration	—	—	—	—	2	8.88	—	—	—	—

Placenta in Diabetic and Hypertensive Women

In diabetes mean placental weight was 680.00 gm and mean placental coefficient was 0.226. This finding is in accordance with Beischer *et al* (1968) who reported average P:F ratio to be 0.20 in diabetic women. Beischer *et al* (1968) and Srivas-

tava and Saihgal (1970) also reported same placental weight in their study.

Average weight of placenta in hypertensive women was 400.0 gm which is lower than normal and is in agreement with Ciblis (1974). In our series infarction was present in 4 (66.66%) hypertensive women which is in accordance with Mathew *et al* (1973).

Histological Features of Placenta of Diabetic Women (Table IX)

Proliferation of Langhans cell and increased regression of villi were present in placentae of diabetic women. Stromal fibrosis was present in 4 (40.00%) of placentae where as endarteritis obliterans was present in 4 (40.00%) of these placenta. Fox (1969) has reported an incidence of endarteritis obliterans in 23.5% cases only.

Histological Features of Placenta in Hypertensive Women (Table IX)

Langhans cell proliferation was present in 2 (33.33%) placentae as reported by Mukerji *et al* (1972) also. Mild to moderate degree of stromal fibrosis was present in 4 (66.66%) placenta, increased syncytial Knot was present in 4 (66.66%) placentae of our series, and end arteritis was present in 3 (50.00%) of our cases while Mathew *et al* (1973) have reported end arteritis in only 33.3% of their placental in hypertensive women.

Summary and Conclusions

1. There was high incidence of abortions, premature births and still births in malnourished women.

2. Women suffering from chronic illnesses also showed increased incidence of abortions, preterm deliveries and still birth.

3. Mean birth weight, birth length and head circumference of new born increased with increase in dietary protein intake in gm/day.

4. Mean birth weight of new born of diabetic women was higher while mean birth weight was low in anaemia, hypertension, tuberculosis and heart disease.

5. Mean placental weight of malnourished women and diabetic women was higher than control.

6. Placental coefficient was found to be more than normal (0.1-0.18) in anaemia and diabetes.

7. No significant change on gross examination could be demonstrated in placentae of malnourished and under weight women.

8. Placentae of hypertensive women showed increase in infarcted surface area.

9. Microscopic examination of placentae of hypertensive women showed increased regression of villi, increased syncytial Knot formation, increased langhans cell proliferation, and reduced vascularity.

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