

BIRTH WEIGHT AND ITS RELATIONSHIP TO GESTATION TIME, MATERNAL AGE AND PARITY

BY

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It is a well known fact that the birth weight of the infant is related to the period of gestation and the age of the mother. With a view to determine these relationships, 2,043 infants born in the Government Hospital for Women and Children, Egmore, Madras, were studied in the following manner.

- (1) Influence of age on parity of the mother and upper age limit of parturition.
- (2) Average period of gestation in different parity groups.
- (3) Relationship of period of gestation to the sex of infants born in different parity groups.
- (4) Relation of birth weight to period of gestation.
- (5) Relation of birth weight to parity.
- (6) Relation of birth weight to age of mother (Primiparae).
- (7) Average birth weight of male and female infants.

The majority of the patients were of the lower income group and so could be regarded as belonging to the

lower standard of nutrition. Only patients intelligent enough to give the exact date of the last menstrual period were taken up for study. The period of gestation was calculated from the first day of the last menstrual period.

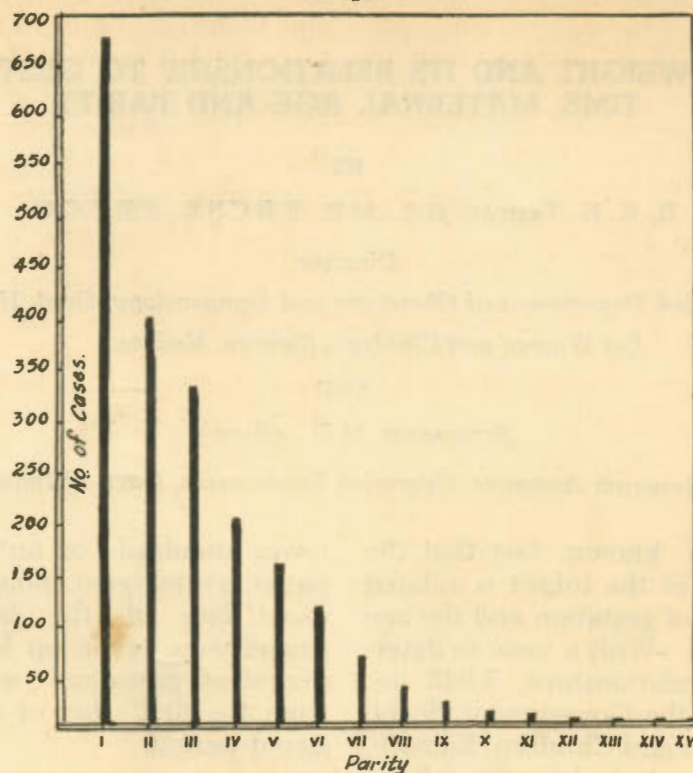
1. Influence of Age on Parity and Upper Age Limit of Parturition:

In this series the upper age limit of parturition was 44 years in contrast to Greenhill's figure of 52 years. The present study shows that there is a progressive decline in the number of women in each category as the parity increases. The maximum percentage of mothers (68%) was in paras I, II and III groups (Tab. I, Graph I).

2. Period of Gestation:

It is difficult to calculate the exact period of gestation as the date of fertilization of the ovum cannot be known accurately. There are various methods employed to determine the

Graph I



period of gestation. Before the birth of foetus, it is determined by:

1. Calculating the number of days from the first day of last menstrual period to the day of delivery of the infant.

2. Using basal temperature chart. This shows an elevation of temperature on the day of ovulation. This elevation is maintained if fertilization of the ovum occurs.

3. Date of fixation of the presenting part.

4. The use of radiological methods.

5. Length of foetal spine.

6. Foetal head mensuration.

7. Appearance of ossification centres in semicircular canals, calcaneum, cuboid, distal epiphysis of

femur, proximal epiphysis of tibia.

8. Degree of flexion angle of the chin to the chest.

9. From the day of quickening.

10. By measuring the height of the uterus.

After the birth of the foetus it is determined by,

(a) Measuring the length of the child.

(b) Development of finger nails.

(c) Presence of vernix caseosa.

(d) Amount of subcutaneous fat.

All the above methods have their limitations.

In the present study the period of gestation was calculated from the first day of last menstrual period. Maximum number of deliveries occurred between 271 and 276 days of gesta-

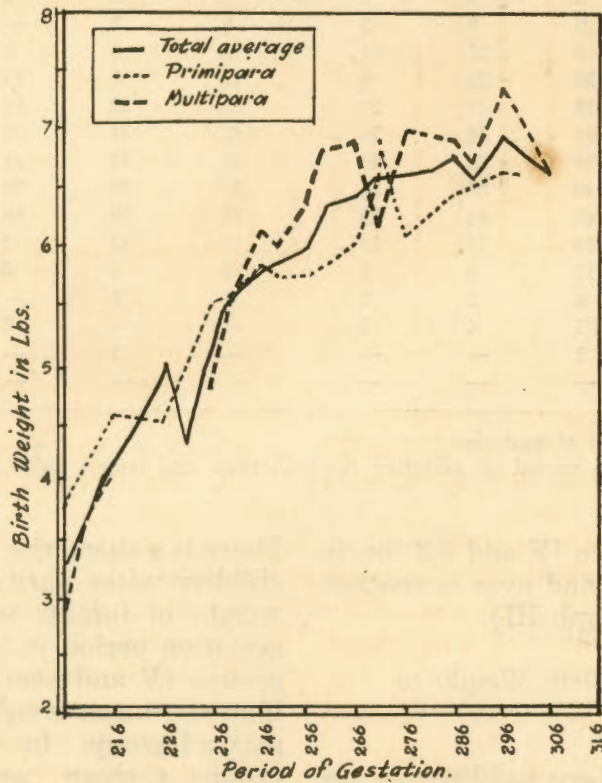
tion which shows a mean difference of 6.5 days of 280 days. In no case did the period of gestation go beyond 315 days. This is within the accepted period allowable for gestation to continue with the birth of a living child. Greenhill says, 'It is improbable that the period of gestation can go upto 360 days and a living child be born. The maximum number of deliveries in primiparous women were in 271 days of gestation period and in 276 days in multiparous women. (Table II, Graph II).

were born in 276 days of gestation and male infants in 271 days of gestation. A similar difference in the days of gestational period was not seen in the multiparous group (Table III).

4. Relation of Birth Weight to Period of Gestation:

It is generally accepted that a normal viable foetus may be born as early as 240 days and as late as 331 days of gestation. The present study shows that there is a linear weight

Graph II



3. Relation of Period of Gestation to Sex of Infants:

In the group of primiparae the maximum number of female infants

increment upto 286 days of gestation for the whole group. In primiparous women a maximum birth weight of 6.9 lbs. is reached in 271 days. Maximum birth weight of 6.85 lbs. in

TABLE III

Period of Gestation according to the Sex of Baby

Days.	Primipara		Parity II		Parity III		Parity IV	
	Female	Male	Female	Male	Female	Male	Female	Male
Under								
210	—	—	1	—	—	—	—	—
210	1	—	—	1	—	—	1	—
216	1	4	1	—	1	—	—	—
221	—	—	—	—	—	—	—	—
226	1	2	1	—	—	—	—	2
231	1	2	—	1	2	1	—	—
236	2	2	—	1	2	—	2	2
241	3	6	—	4	2	1	1	2
246	5	3	2	2	1	2	3	1
251	9	9	3	8	3	—	4	1
256	9	11	11	6	3	5	2	4
261	28	23	8	11	7	13	2	7
266	28	47	17	28	20	13	10	12
271	61	68	35	43	31	36	22	13
276	66	52	40	47	42	44	21	24
281	48	36	21	32	28	20	10	16
286	40	44	23	18	19	10	9	16
291	16	14	10	7	12	3	6	4
296	12	4	2	5	5	5	2	4
301	6	1	1	5	1	—	2	—
306	1	4	1	—	—	2	2	1
311	1	—	—	—	1	—	—	—
317	—	—	—	—	—	—	1*	—

* Maximum period of gestation.

In multiparae the period of gestation for both male and female babies appear to be the same.

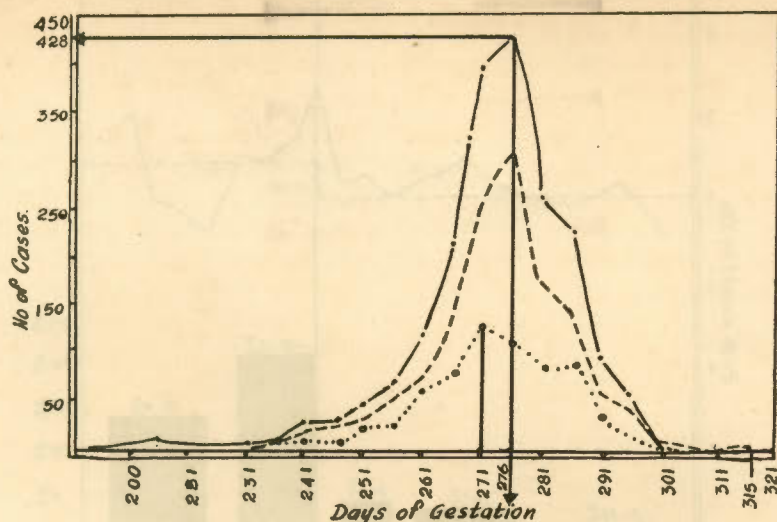
parity groups II to IV and 7.3 lbs. in parity groups V and over is reached in 296 days. (Graph III).

5. Relation of Birth Weight to Parity:

According to Karn and Penrose, for high parities (8 and over) the mean weight of infants was almost 1 lb. more than the mean of the first born children. In the present study, there is not an appreciable difference in the weights of infants upto parity IV.

There is a sharp rise in the weights of children after parity V. The mean weight of infants with 276 days of gestation period in the higher parity groups (V and over) is 0.8 lb. more than the mean weight of children in parity I group. In the higher parity groups, a mean weight of 6 lbs. is gained as early as 246 days of gestation. This confirms the findings of Karn and Penrose, that infants born in higher parity groups have a general tendency to be heavier (Table IV).

Graph III



6. Relation of Birth Weight to Age of the Mother (Primiparae).

An elderly primipara according to the standards in India is one who is 28 years of age and over, at the time of confinement. These women have uterine inertia, slow dilatation of the cervix, rigid soft parts and prolonged labour. Added to these the infants are heavier, which makes instrumental deliveries more common. This is shown in Table V and Graph IV. It will be seen that the birth weight does not show great variation up to the age of 27 years, the average for the group being 6.05 lbs. The birth weight in the age group 28 years and over shows a gradual increase, the average for the group being 6.48 lbs. This shows that infants in the higher age group are 0.43 lbs. heavier than infants in the younger age group.

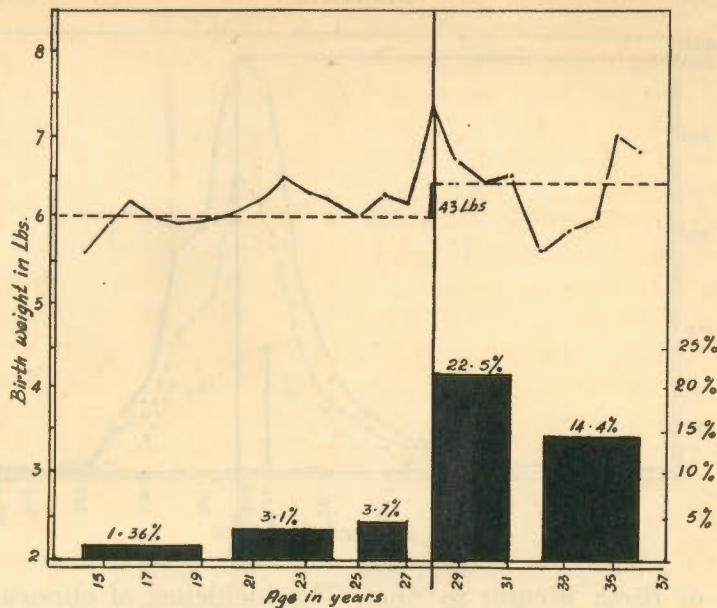
The increase in birth weight has been responsible for the greater incidence of instrumental deliveries.

The incidence of abnormal deliveries was 23.6% in the age group up to 27 years, and 51.4% in the group 28 years and over. The difference in incidence was 27.8. The caesarean section rate has also shown a very great increase as the age of the mother advances, being 1.36% in the age group 14 to 19 years, 3.1% in the age group 20 to 24 years, 3.7% in the age group 25 to 27 years, 22.5% in the age group 28 to 31 years and 14.4% in the age group 32 to 36 years. The increased size and weight of the foetus is also a possible factor. (Table V, Graph IV).

7. Average Birth Weight of Male and Female Infants:

The birth weights of female and male babies, in the first four parity groups, were analysed from 271 days to 286 days of gestation. The average birth weight of female babies was 6.49 lbs. and male babies 6.54 lbs. The average birth weight of male in-

Graph IV



fants is slightly more than the average birth weight of female infants, which being only 0.05 lbs. is not significant. (Table VI).

Conclusions:

1. The number of women pregnant after the VI parity shows a sharp drop, the maximum number of pregnant women being in I, II and III para groups. This is probably due to advancing age of the mother. The upper age limit of parturition in this group was 44 years.

2. The majority of women delivered between 271 and 276 days with a mean of 273.5 days. This is 6.5 days of the accepted period of gestation, viz. 280 days. There was no significant relationship between the period of gestation and the sex of infants born.

3. The birth weight shows a progressive increase with the advance of

gestation time in the whole series. A maximum birth weight of 6.9 lbs. is reached in 271 days of gestation in primiparae. A maximum birth weight of 6.85 lbs. in parity group II to IV and 7.3 lbs. in parity group V and over is reached in 286 days of gestation.

4. There is no marked difference in the birth weight of infants in the first four parity groups. In the group parity V and over, the infants have an increased birth weight. A weight of 6 lbs. is reached as early as 246 days of gestation. This observation is significant as it shows that termination of pregnancy, when indicated, could be performed as early as 246 days of gestation in the higher parity groups, and a foetus of normal weight could be delivered.

5. The mean birth weight of infants with 276 days of gestation period in the higher parity group (V and over) is 0.8 lb. more than the

mean weight of children in para I group.

6. The birth weight of infants born in the group 28 years and over, in primiparae, shows a tendency to be heavier than in the younger age group. The mean birth weight in the younger age group (up to 27 years) is 6.048 lbs. and that in the older age group (28 years and over) the mean birth weight is 6.48 lbs.

7. The incidence of abnormal deliveries, especially caesarean section in the age group 28 years and over shows an increase by 17.5% as compared to the younger age group (27 years and under).

8. There is no significant difference

in the birth weights of male and female infants.

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TABLE I
Distribution of Parity

Parity	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	Total
No. of cases	670	395	335	209	161	119	74	38	23	6	7	3	1	1	1	2043 Cases

TABLE II
Period of Gestation in Different Parity Groups

Days	Under																				
	210	216	221	226	231	236	241	246	251	256	261	266	271	276	281	286	291	296	301	306	317
Primipara	—	1	5	3	3	4	9	8	18	20	51	75	129	118	84	24	30	16	7	5	—
Parity II to IV	1	2	—	3	4	7	10	11	19	31	48	100	180	218	127	95	42	23	9	6	1
Parity V & over	3	4	1	2	3	3	7	8	6	15	21	41	77	95	45	49	18	23	5	5	—
Total	4	6	11	8	10	14	26	27	43	66	120	216	386	431	256	228	90	62	21	16	1

TABLE IV
Distribution of Birth Weight according to Period of Gestation and Parity.

Parity	Under																				
	210	216	221	226	231	236	241	246	251	256	261	266	271	276	281	286	291	296	301-306 & over		
Primipara	..	3.75	—	4.65	—	4.5	5	5.5	5.53	5.84	5.7	5.725	5.8	6.04	6.90	6.18	6.24	6.43	6.47	6.55	6.55
II to IV	..	3.00	—	4.12	—	4.2	3.7	5.18	5.45	5.31	5.92	5.79	6.4	6.32	6.51	6.59	6.66	6.80	6.41	6.85	6.65
V to XV	..	2.9	3.6	4.0	5.6	6.375	—	4.75	5.525	6.1	5.95	6.32	6.8	6.89	6.15	6.99	6.92	6.83	6.61	7.3	6.55
Average	..	3.21	3.6	4.12	5.6	5.02	4.3	5.14	5.5	5.75	5.85	5.94	6.3	6.4	6.52	6.58	6.6	6.68	6.49	6.9	6.58

