A STUDY OF BIRTH WEIGHT IN DIFFERENT GESTATIONAL PERIODS WITH THE AIM TO FIND OUT LEVEL OF GROWTH RETARDATION OF THE LOCALITY*

by

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Introduction

Modern obstetrics aims at wellbeing of mother as well as of fetus. In the present day maternal salvage has reached a high level but unfortunately this is not so in the case of fetus. Of the several facets of determination of fetal growth "birth weight is the one most frequently used, being the simplest and least liable to error" (Willocks, 1971). To know if the baby is underweight one is to know the average weight of the fetus in relation to gestational period. "No international criteria of weight for gestation have been devised, nor would such criteria be of much use because of racial variations" (Willocks, 1971) not to speak of socio-economic conditions. Keeping this in mind the present study was undertaken. In the present study fetal weight in different gestational period and also its relation to parity of the mother and sex of the fetus was taken into consideration.

Material and Methods

All the cases were collected at random from Labour Room Register of Eden Hospital, Medical College, Calcutta.

While collecting the dates the following points were considered:

1. Only singleton live human babies.
2. Only those cases who had definite L.M.P.
3. Wt. of babies (with umbilical cord stump 3-4 cm long) were taken within 60 completed minutes of birth.
4. Wt. was taken in Kgs. correct upto 2nd place of decimal.
5. Age, Parity, L.M.P., E.D.D. and date of delivery of mother and birth weight and sex of baby were noted.

Period of Gestation = difference of weeks between date of Delivery and that of L.M.P.

Mean used here is Arithmetic Mean

Standard Deviation (S.D.) $= \sqrt{\dfrac{\Sigma (x-\bar{x})^2}{n-1}}$

Where X = weights in Kgs.

X = Arithmetic Mean in Kgs.

n = Total no. of cases.

Fetal Weight in Relation to Period of Gestation

Ir. the past information of fetal weight came from postmortem studies as done by Streeter (1920) and Scammon and Calkins (1920). Evidently the figures of Scammon and Calkins are lower for almost all ages than those found by others working with live features.

Table I shows Distribution of cases. As this series includes less number of cases in 26-37 weeks and 43 weeks onwards they will not be discussed. Cases between 38 and 42 wks will be considered in the present communication. Table II shows a gradual increase in fetal wt. till 40th wk. after which it forms a plateau. The rate of weight gain was more till 39th wk. after

which it flattens out (Fig. 1). When compared to findings of others workers it is seen that the curve that was obtained by Thomson et al (1968) is of similar nature running more or less parallel with that of the present one but forming a plateau after 41st week. Neligans (1965) curve on the other hand rose till 42nd wk. It is worth mentioning that the series of Thomson et al (1968) included 52,004 cases, about 5 times more than Neligans series hence is more close to truth. Hutchin's series (1980) included 10,896 cases and his curve is also of similar nature.

The absolute weight of the present study is far below the above mentioned cases because of Racial and Socio-econo-

TABLE I
Showing Distribution of Cases (5431)

Wks. of Gestation		26-35			36			37	
Sex of Foetus	M		F		M	F		M	F
	163		159		98	103		106	89
Total		322			201			195	
Wks. of Gestation	38		39		40		41		42
Sex of Foetus	M	F	M	F	M	F	M	F	M	F
	321	280	503	401	509	513	533	422	203	258
Total		601		104		1022		955		461
Wks. of Gestation		43			44			45+	
Sex of Foetus	M		F		M	F		M	F
	153		157		128	134		97	101
Total		310			262			198	

TABLE II
Showing weight of Foetus in Relation to Gestational Periods (5431 cases)

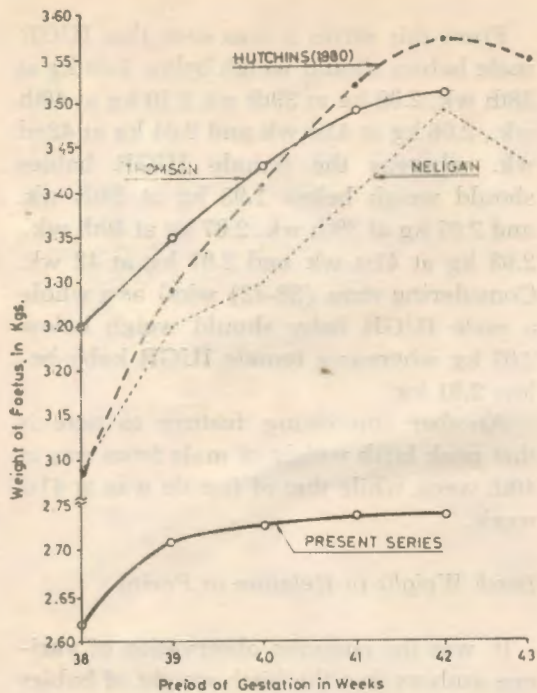| Weeks	38	39	40	41	42	Term 38-42 wks.
Mean Wt. of foetus (kgs.)	2.62	2.71	2.73	2.74	2.74	2.71
2 S.D.	0.63	0.63	0.65	0.67	0.68	0.65
I.U.G.R. (Kg)	1.99	2.08	2.08	2.07	2.06	2.06

Fig.I. Showing weight of Foetus in relation to Gestational period.

mic differences. Who can ignore that the average Indian (adult) weight is below the continental levels.

In the present study the average weight

at 38th, 39th, 40th, 41st, 42nd wks are gestation" (Butler and Alberman 1969) considering this an IUGR baby has to weigh 1.99 kg at 38th wk., 2.08 kg at 39th wk, 2.08 kg at 40th wk, 2.07 kg at 41st wk, and 2.06 kg at 42nd wk. Considering term as a whole (38-42 wk) the average infant weighs is 2.71 ± 0.65 kg and a term IUGR baby weighs below 2.06 kg. Hence our yardstick of calling a baby I.U.G.R. varies with that of Western authors.

Birth Weight in Relation to Sex

In the adult life the male is more robust and weighs more than the female so it will be interesting enough to observe its behaviour in different gestational periods.

Table III shows how the male and kg, 2.74 ± 0.67 kg and 2.74 ± 0.68 kg. respectively. So the average weight of a term baby in this observation between 38 to 42 wks was 2.71 ± 0.65 kg.

"A growth retarded infant is one with a birth weight falling below 2 standard Deviations from the mean of its week of 2.62 ± 0.63 kg, 2.71 ± 0.63 kg, 2.73 ± 0.65 female fetus weigh in different gestational

TABLE III

Showing Weight of Foetus in Relation to Sex (5431 cases)

Weeks	38		39		40	
Sex	M	F	M	F	M	F
Mean wt. of Foetus (Kgs.)	2.63	2.58	2.74	2.65	2.82	2.65
2 S.D.	0.64	0.60	0.65	0.58	0.72	0.53
I.U.G.R. (Kgs.)	1.99	1.98	2.09	2.07	2.10	2.07

Weeks	41		42		Term (38-42)	
Sex	M	F	M	F	M	F
Mean wt. of Foetus (Kgs.)	2.78	2.70	2.79	2.69	2.77	2.66
2 S.D.	0.72	0.62	0.75	0.62	0.70	0.65
I.U.G.R. (Kgs.)	2.06	2.08	2.04	2.07	2.07	2.01

periods. Looking at Fig. 2 it can be seen that there is a constant difference of wt. between the 2 sexes. Thomson (1968) noticed that birth weight by sex were practically identical at 32-33 weeks and then gradually diverged, males being about 150 grams heavier than females at term.
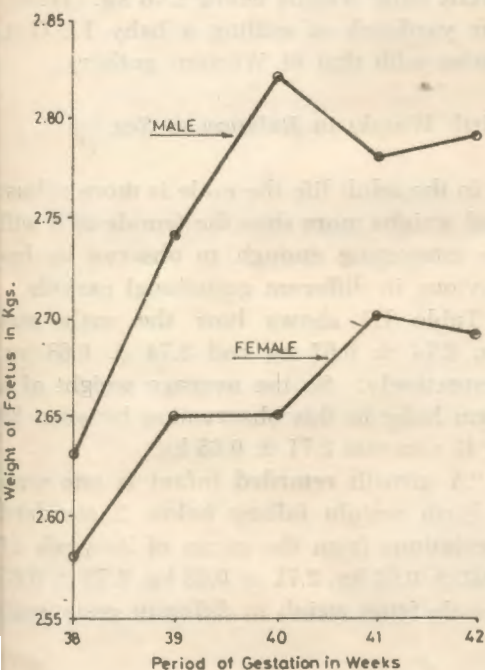

Fig.II. Showing weight of Foetus in relation to Sex.

In the present series there was also constant difference of weight between the 2 sexes being maximum at 40 weeks the difference being only 17 grams.

From this series it was seen that IUGR male babies should weigh below 1.99 kg at 38th wk, 2.09 kg at 39th wk 2.10 kg at 40th wk., 2.06 kg at 41st wk and 2.04 kg at 42nd wk. whereas the female IUGR babies should weigh below 1.98 kg at 38th wk. and 2.07 kg at 39th wk. 2.07 kg at 40th wk., 2.08 kg at 41st wk and 2.07 kg at 42 wk. Considering term (38-42) wks as a whole a male IUGR baby should weigh below 2.07 kg whereas a female IUGR baby below 2.01 kg.

Another interesting feature to note is that peak birth weight of male fetus was at 40th week while that of female was at 41st week.

Birth Weight in Relation to Parity

It was the common observation of various authors that the birth weight of babies went up in 2nd, 3rd and 4th pregnancies than the 1st one which was perhaps due to "more experienced" and more lax uterus and its better vascularity. After the 4th pregnancy the birth weight went down possibly due to impairement of local circulation due to fibrosis and increase in age of mother which predisposes to hypertension and other systemic diseases. Now let us see what happened in the present series.

The present series is shown in Table IV. Considering term as a whole (38-42 weeks) it is observed that there is a gradual rise in birth weight till 3rd

TABLE IV
Showing Weight of Foetus in Relation to Parity (4199 cases)

Gravida	1	2	3	4+
No. of cases	1921	1098	770	410
Mean wt. of Term (38-42) Foetus (kgs.)	2.69	2.73	2.75	2.65
2 S.D.	0.66	0.67	0.67	0.73
I.U.G.R. (Kgs.)	0.03	2.06	2.08	1.92

gravida, rising to 2.75 ± 0.67 kg from 2.69 ± 0.66 kg at 1st gravida, the birth weight falling thereafter.

"It was found that 2nd and subsequent babies grow faster than 1st babies" (Willocks, 1971) this is also the finding of the present study. "The difference of about 100 grams being fairly constant from 32nd weeks onwards" (Willocks, 1971). In this study the rise in weight being 40 grams between 1st and 2nd gravida, 30 gms between 2nd and 3rd gravida and fall in wight of 100 grams from 3rd to 4th gravida onwards.

From the present findings it appears that to call a term baby I.U.G.R. he has to weigh below 2.03 kg at 1st gravida, 2.06 kg. at 2nd gravida, 2.08 kg at 3rd gravida and 1.92 kg at 4th gravida onwards.

Conclusion

In case of a Term (38-42 wks.) Foetus

	Mean wt. in kgs.	I.U.G.R. in kgs.
In general	2.71	2.06
Male	2.77	2.07
Female	2.66	2.01
Gravida 1	2.69	2.03
Gravida 2	2.73	2.06
Gravida 3	2.75	2.08

It is evident that stamping a baby I.U.G.R. by mere gestational period will be erroneous as Birth Weight is influenced by sex of foetus and parity of mother: hence those factors should also be considered.

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