

# EFFECT OF MATERNAL PARITY AND PHYSICAL FACTORS ON THE FOETAL GROWTH AT MID TERM

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## SUMMARY

A study was conducted on selected 58 cases of mid term pregnant women (14-20 wks) who had M.T.P. done by abdominal hysterotomy. Physical parameters in mothers like age, parity, height and levels of Hb in blood were noted. The foetuses were studied for their sex, weight, crown heel length and crown rump length and these parameters were correlated with the physical parameters of the mothers. The results show the preponderance of males (58.6%), over females. The rate of increase in mean wt. at 14-16 wks was 29.7, 22.7 gm/wk in male and female foetuses which rose at 18-20 wks to 85.4 and 87.5 gm/wk respectively, showing exponential pattern of growth. Maternal age, parity and Hb did not show significant correlation with foetal wt. However, maternal height did affect wt, CHL and CRL of the mid term foetus significantly.

### Introduction

The knowledge of the pattern of normal foetal growth and the various factors affecting it, would help the clinician in proper assessment of antenatal cases. The recognition of intrauterine growth retardation during past decade has prompted a great spurt in the study of intrauterine foetal growth, its physiological variance along with foetal maturity. A number of factors are known to affect pre-

natal growth curves of the human foetus. Besides factors like ethnic groups, genetic constitution, geographical situation, socio-economic status, maternal factors like age, parity, size, nutrition and foetal gender differences, congenital anomalies are known to influence the foetal growth. Thus extremes of variability in foetal growth could be due to many maternal factors. Many workers have therefore correlated birth weight of full term babies with mother's age, parity, height and haemoglobin levels in blood, but a very few studies are available showing such effects of maternal factors on foetal growth at mid term. This may be due to difficulties in procuring foetuses before term. Since

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advent of the MTP Act (1971), we had a unique opportunity of studying growth parameters in normal mid term fetuses and working out their correlation if any with maternal factors.

#### Material and Methods

The subjects of this study included 58 selected cases carrying mid term pregnancy (14-20 wks). They were admitted in the ward for abdominal hysterotomy with or without ligation (under provision of MTP Act 1971). The detailed menstrual and obstetrical history was taken and period of gestation calculated by Naegele's rule. The cases having known gestational age with definite last menstrual period and past regular cycles were only selected. Those having family history of diabetes, hypertension and bad past obstetrical history like frequent abortions, intrauterine death, premature labour, prolonged labour and bad neonatal outcome, were excluded from the study.

A thorough clinical examination was done in each case. General physical condition, weight, blood pressure and presence of anaemia, oedema were noted. Height of the patient was recorded carefully with a metal scale graduated in mm. Abdominal examination was performed after emptying the bladder to note the exact height of the uterus, abdominal girth, lie, presentation and presence of foetal heart sounds. Condition of the cervix was assessed vaginally. Hb, Urine examination and other routine blood investigations were done pre-operatively. The type of operation and post-operative recovery was carefully recorded. Foetus was collected immediately after operation. A series of measurement in order to assess foetal growth were done in each case. All

the measurements were done within half an hour of operation. The following parameters of growth were noted in the foetus:

(i) Weight: Nude weight in gms was recorded with due precautions on the Detecto-Balance (Avery).

(ii) Crown-Heel Length (CHL): This was taken in cms. with a steel measuring scale with mm markings. The foetus was placed supine with legs completely stretched. The distance between the most prominent part of the head and heel was measured, after due positioning of the head (Ellis 1963; Puri *et al* 1977).

(iii) Crown Rump Length (Sitting height) (CRL): After proper positioning of the foetus with full flexion at hip joints, the distance between most prominent part of head and ischial spine was measured accurately.

The data thus obtained (of growth in foetus and physical parameters of mothers) were classified and analysed statistically and correlation if any among them worked out.

#### Results

Out of 58 fetuses delivered at mid term after hysterotomy, 34 were males and 24 females giving % of 58.6 and 41.4 respectively. Table I shows the average values of weight, CHL, CRL in male and female fetuses at 14, 16, 18, 20 weeks of gestation. The rate of increase in these parameters per week of gestation is also given. The values of average weight, CHL, CRL are usually higher in male fetuses than female at 14-20 weeks.

The distribution of foetal weight in

TABLE I  
Distribution of Mean, wt, CHL, CRL and Weekly Rate of Growth in Male and Female Foetuses at 14-20 Weeks of Gestation

Wk. of gestation	Mean Wt. (Gms ± SD)	Growth/ wk. (gms)	Mean CHL (Gms ± SD)	Growth/ wk. (cms)	Mean CRL (cms ± SD)	Growth/ wk. (cms)
14	53.13 ± 8.84	29.69	13.89 ± 1.45	1.53	9.18 ± 1.13	1.29
Female (n=10)	62.50 ± 17.68	22.92	13.65 ± 1.2	1.60	8.8 ± 0.85	1.47
16	112.50 ± 14.43	75	16.95 ± 0.71	2.45	11.75 ± 0.24	1.47
Female (n=10)	108.33 ± 12.41	70.84	16.85 ± 0.44	2.58	11.83 ± 0.52	1.56
18	262.50 ± 71.88	85.4	21.85 ± 2.01	3.18	14.68 ± 1.1	1.97
Female (n=30)	250.00 ± 54.6	87.5	22.01 ± 1.48	3.02	14.94 ± 0.94	1.86
20	433.33 ± 37.64	..	28.20 ± 0.95	..	18.62 ± 0.9	..
Male (n=8)	425.00 ± 35.36	..	28.05 ± 0.78	..	18.65 ± 1.63	..
Average	215.37 ± 169.9	63.37	22.22 ± 6.25	2.39	13.56 ± 4.05	1.57
at mid term	211.46 ± 163.2	60.47	20.14 ± 6.3	2.4	13.58 ± 4.18	1.63
Female						

three age groups of mother is given in Table II. Table III gives the average values of various physical parameters of the foetus at gestation of 14, 16, 18, 20 weeks in two groups of mothers having height below 150 cms and above 150 cms. It is observed that average foetal weight, CRL and CHL show proportionate increase with increase in maternal height, at different periods of gestation. Table IV gives the distribution of foetal weight at 14, 16, 18, 20 weeks of gestations in mothers having parity 0-2, 3-5 and 6 or more. The values of foetal weight in mothers having different levels of Hb. in their blood is given in Table V.

#### Discussion

The percentage of male to female foetuses delivered by hysterotomy was 58.6 and 41.4. Almost similar % is reported by other workers in India (Sarkar 1969; Madhavan and Taskar 1969). The mean weight at mid term (14-20 weeks) of male and female foetus did not differ significantly (Table I). The values of mean weight and CRL of mid term foetuses particularly at 16 weeks were comparable to values reported by Avery 1965, Hamilton and Mossman 1972. Similar increment was seen in CHL and CRL over the weeks, suggesting sex independent exponential foetal growth at mid term becoming sex dependant at term. The mean foetal weight at mid term did not show uniform pattern of variation due to maternal age (Table II), however increase in foetal weight with increase in age of mother upto upper limit of 25-35 years has been reported at full term (Salber 1954; Sen 1956; Dattabanik 1969; Puri *et al* 1977). So the observations made in the present study suggest that such effect might be establishing itself after 18-20 weeks of gestation, and

TABLE II

*Mean Foetal Weight in Gms at 14-20 Weeks of Gestation in Mothers of Different Age Groups*

Mother's Age (Yrs.)	Mean foetal weight in gms at gestation of			
	14 wks.	16 wks.	18 wks.	20 wks.
Upto 25	62.5 (n = 4)	62.5 (n = 4)	270 (n = 4)	420 (n = 2)
26-34	50 (n = 4)	108.3 (n = 6)	267.8 (n = 14)	441.2 (n = 16)
35 or more	50 (n = 2)	..	225 (n = 12)	..

TABLE III

*Values of Foetal Weight, CHL, CRL at 14-20 Weeks of Gestation in Two Groups of Mothers Having Different Heights*

Mother's Height (cms)	Period of gestation											
	14 weeks			16 weeks			18 weeks			20 weeks		
	Foetal wt. (gms)	CHL (cms)	CRL (cms)	Foetal wt. (gms)	CHL (cms)	CHL (cms)	Foetal wt. (gms)	CHL (cms)	CRL (cms)	Foetal wt. (gms)	CHL (cms)	CRL (cms)
Below 150	50 (n=6)	12.8	9.2	100 (n=6)	16.75	11.5	242 (n=13)	20.6	14.7	400 (n=3)	27.2	17.7
150 and above	62.5 (n=4)	14.5	9.5	116 (n=4)	17.4	12.0	260 (n=17)	22.8	15.2	462.5 (n=5)	29.6	19.5

TABLE IV  
Mean Foetal Weight at 14-20 Weeks of Gestation in Mothers Having Different Parity

Maternal parity	Mean Foetal wt. (gms) at period of gestation in weeks			
	14 weeks	16 weeks	18 weeks	20 weeks
0 to 2	50 (n = 4)	112.5 (n = 2)	266.6 (n = 12)	450 (n = 2)
3 to 5	75 (n = 2)	100 (n = 8)	240.6 (n = 16)	425 (n = 6)
6 or more	50 (n = 4)	..	250 (n = 2)	..

TABLE V  
Mean Foetal Weight at Gestation of 14-20 Weeks in the Mothers Having Different Hb Levels in Blood

Maternal Hb (gms%)	Mean foetal weight at gestation of			
	14 weeks	16 weeks	18 weeks	20 weeks
9.5 or less	50 (n = 4)	..	37.5 (n = 8)	427 (n = 2)
9.6 to 10.5	75 (n = 4)	106.3 (n = 6)	243.2 (n = 20)	416 (n = 4)
10.6 or more	50 (n = 2)	120 (n = 4)	275 (n = 2)	440 (n = 2)

markedly influencing birth weight at full term. The mean weight of fetuses of taller mothers was more than that of shorter mothers (Table III), P value being less than .05 at 18 weeks thus showing a linear increase with increase in maternal height. This shows that correlation between maternal height and foetal weight which is so well seen at full term, is established as early as 14 weeks of gestation. This is in agreement with reports of other workers (Walton and Hammond 1938; Baird 1945; Cawley *et al* 1954; Love and Kind 1965). Further, the present study showed that values of mean CHL and CRL of mid term fetuses increased with increase in maternal height (Table III). This was quite in agreement with Bolton's

(1959) data, further suggesting that such correlation which is so well seen at full term, (Madhawan and Taskar 1969) is initiated even as early as 14 weeks of gestation.

The relationship of parity and haemoglobin of the mothers with foetal weight is given in Tables IV and V. The maternal parity and Hb did not show any definite effect on foetal weight. This is in agreement with Brenner *et al* (1976) Ghosh *et al* (1976), Vulliamy (1967) and Dawn (1974) also observed that dietary deficiency or undernutrition does not produce any adverse effect on foetal growth in early month.

The results of the present study, therefore, give some idea about the timings of

the establishment of various maternal influences on the foetal growth at mid term. However, it would be interesting to work out sequential growth pattern of foetus in situ at different period throughout gestation and elucidate correlation between maternal factors on foetal growth.

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