

Somatic Growth of Rural Neonates in Haryana

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INTRODUCTION

The moment of birth brings enormous changes for the infant. After being in a protective, quiet, relatively unchanging environment, the infant is suddenly thrust into a world of change. Changes in noise and light and experiences of hunger, heat, cold and pain. No longer are the infant's biological needs automatically taken care of. During the first 5-7 days of life the baby is recovering from the physical ordeal of birth and is beginning to sense the sound of sights, sounds and smells that is so different from the protected environment of the uterus. A child's personal development is affected by his body. If he is strong, healthy and active, he will be competent in physical activities and socially attractive to others. Somatic growth includes such things as length of arms and legs, size of chest and abdomen, weight, height and width of shoulders and hips. Somatic growth is rapid during infancy. Children always seem to be changing in size, particularly in height or weight but there are periods of negative growth as well as positive growth. The somatic growth is rapid at first then declines during infancy and a second rapid-growth period occurs during puberty. Usually three measures of growth are commonly taken: weight (a three dimensional measure), body area (a two dimensional measure) and length (a one dimensional measure). All three scores have been found to show similar growth trends.

MATERIAL AND METHODS

The longitudinal sample for the present study was drawn from the rural areas of Hisar district of Haryana. From the Hisar district, two clusters of villages viz. Ladwa (Hisar I) and Rawalwas (Hisar II) which were easily approachable and on the main road were selected randomly. From these two clusters, 14 villages were selected further in order to meet the sample size. The principle of contiguity was observed while selecting the villages (Table 1). A total of 200 women, who were

in the last trimester of pregnancy were identified and selected in order to have minimum of 100 children for longitudinal sample. At the time of birth, out of 200 expectant mothers, 18 gave birth (2 males and 6 females) to still born babies and among the rest were 98 males and 94 females.

Height, weight and head, chest and arm circumferences of neonates were recorded with the help of baby weighing scale, infantometer and fibre glass tape.

RESULTS AND DISCUSSION

One hundred and ninety two children were followed up to 1 month for the longitudinal study. Each neonate (birth to one month) was visited once a week and the calculated mean anthropometric measurements are presented in Table 2.

Height: The results elucidate that male neonates were found to be slightly taller than the female neonates in all the age group. The body composition of sexes differs, with infant girls having proportionately more fat and less water than boys. Girls have less muscle tissue and are generally shorter than boys (Mussen, 1980). The gap between height of males and females increased gradually as height of neonates increased with the age increment. On an average, there was an increase of one cm in length per week, up to one month of age. The mean height during first week was recorded 48.55 cm and

Table 1: Village-wise distribution of sample (Expectant mothers)

S.No.	Hisar-I		Hisar-II	
	Village	N	Village	N
1.	Ladwa	44	Tokas	07
2.	Mirkan	14	Patan	15
3.	Bhojraj	10	Dhianwas	19
4.	Dahima	11	Rawalwas	17
5.	Mangali	09	Siswala	13
6.	Bada	07	Kirtan	12
7.	Daya	09	Shahpur	13
	Total	104		96
	Total Sample	200		

47.99 cm in both male and female neonates respectively. But at the time of one month the height was recorded 51.83 cm for males and 50.99 cm for females. Table 2.1 further elaborates that deviation in height was more in case of females while it was found less in their counterparts at all ages. Significant differences were found between males and females as 't' calculated value was found greater than the tabulated value at all ages.

Weight: Weight at birth varies from one ethnic group to another, with geography, location, economic status and food habits. Birth weight is related to the weight of the mother and even more to the mother's birth weight, but not to the weight of father (Ounsted, 1971). Further persuasion of results in table 2.2 represents that the mean weight of male and female neonates was found 2.70 kg and 2.57 kg respectively at the age of one week. As the age increases the weight was also found to be increasing. At all the ages the weight of females were lower than their male counterparts. Munsinger (1971) too indicated that there are systematic differences in birth weight which favour males; they are about 4 per cent heavier, 2 per cent longer than their female peers. On an average, there was an increase of

Table 2.1. Age and sex-wise height (cm) of Neonates

S. No.	Age (wk)	Male N-98		Female N-94		t-value
		Mean	S.D.	Mean	S.D.	
1.	One	48.55	1.69	47.99	2.23	3.17*
2.	Two	48.69	1.95	48.88	2.25	2.88*
3.	Three	50.96	1.87	49.96	2.16	2.16*
4.	Four	51.83	1.87	50.99	2.11	2.92*

*Significant at 5% level of significance

200 gm in weight per week, upto one month of age in the neonates of both the sexes. The maximum deviation in weight was found at one week of age in case of females followed by males at the age of four week. Significant differences were observed at one and three months of age between the sexes.

Head Circumference: Results pertaining to the head circumference show that as in table 3.1 the male neonates were slightly better than the females in all the age groups. The gap between the head circumference of males and females increased gradually upto one month of age. The

head circumference during first week was recorded 33.70 cm in males and 33.20 cm for females. But at the age of one month the head circumference of neonates was found 35.78 cm and 35.20 cm for males and females respectively. On an average, there was an increase of 0.65 cm in head circumference per week, up to one month of age. Deviation in head circumference was almost equal in case of male and female neonates at all ages. Head circumference at two months and three months of age differ significantly as

Table 2.2. Age and sex-wise weight (cm) of Neonates

S. No.	Age (wk)	Male N-98		Female N-94		t-value
		Mean	S.D.	Mean	S.D.	
1.	One	2.70	0.46	2.57	2.10	1.73*
2.	Two	2.90	0.51	2.77	0.41	0.76
3.	Three	3.14	0.52	2.94	0.48	2.38*
4.	Four	3.38	1.12	3.14	0.50	0.88

*Significant at 5% level of significance

revealed by 't' tabulated ratio.

Chest Circumference: The results in table 3.2 pinpointed that the males were found to be slightly better in respect to chest circumference, when compared with their female counterparts at all the age groups (from birth to one month). The chest circumference of males and females at the age of one week was 30.88 cm and 30.81 cm respectively. And at the age of four week it was found 33.63 in males and 33.13 cm in females. The deviation in circumference was found almost equal at all ages in both the sexes except at two week. At the age of two week, deviation was more in males when compared with the female neonates. At two weeks and three weeks of age, significant differences were found in chest circumference.

Arm Circumference: Arm circumference of female neonates was observed to be slightly

Table 3.1: Age and sex-wise head circumferences (cm) of Neonates

S. No.	Age (wk)	Male N-98		Female N-94		t-value
		Mean	S.D.	Mean	S.D.	
1.	One	33.70	1.37	33.20	1.53	0.68*
2.	Two	34.48	1.32	33.89	1.32	2.21*
3.	Three	35.20	1.27	34.66	1.34	1.67*
4.	Four	35.78	1.12	35.20	1.23	0.92

*Significant at 5% level of significance

lower than that of male neonates in all the age groups as shown in table 3.3. The mean arm circumference was 9.08 cm and 8.90 cm of males and females respectively at the age of one week. It was found 10.22 cm and 9.95 cm for males and females respectively at the age of four weeks. On an average, there was an increase of 0.34 cm per week in both the sexes upto one month of age. Significant differences were observed at 1st and 4th weeks of life between male and female neonates.

The main findings emanated from this study are that anthropometric measurements showed weekly increment in both the sexes though greater in males. Significant gender differences were observed in weight at all ages and at certain ages in

Table 3.2: Age and sex-wise arm circumferences (cm) of Neonates

S. No.	Age (wk)	Male N-98		Female N-94		t-value
		Mean	S.D.	Mean	S.D.	
1.	One	9.08	0.87	8.90	0.85	2.46*
2.	Two	9.38	1.00	9.20	2.54	0.74
3.	Three	9.79	1.01	9.57	0.96	1.13
4.	Four	10.22	0.94	9.95	0.85	2.11*

*Significant at 5% level of significance

portant. It is even possible that severe malnutrition during this period will have an adverse effect on the child's later intellectual capabilities while interfering with the development of brain cells.

KEY WORDS Anthropometric Measurements, Longitudinal Growth, Rural Population.

Table 3.2: Age and sex-wise chest circumferences (cm) of Neonates

S. No.	Age (wk)	Male N-98		Female N-94		t-value
		Mean	S.D.	Mean	S.D.	
1.	One	30.88	2.02	30.81	2.00	1.32*
2.	Two	32.04	2.48	31.59	1.88	2.69*
3.	Three	32.99	2.21	32.85	2.13	2.46*
4.	Four	33.63	4.39	33.13	4.17	0.93

*Significant at 5% level of significance

rest of the parameters of physical development. There are consistent sex differences in growth patterns. The results of Mussen et al. (1980) are also in consonance with the findings of present study. They pointed out that the average full term male baby, who is slightly larger in all body dimensions than a female. Girls have less muscle tissue and are generally lighter and shorter than boys. Physical growth during gestation and early infancy is im-

ABSTRACT The present longitudinal study was undertaken from rural areas of Hisar district. A total of fourteen villages from Hisar I Hisar II block were selected randomly in order to meet the sample size. Two hundred women who were in the last trimester of pregnancy were identified as a sample in order to have a minimum of 100 children for longitudinal sample. The somatic growth of the children born to these was measured weekly by taking their height, weight and head, chest and arm circumference. The results revealed that significant differences were found between males and females as far as their physical development was concerned. Anthropometric measurements showed weekly increments in both the sexes. Females were found to have less muscle tissues as compared to males.

REFERENCES

- Munsinger, H.: *Foundations of Child Development*. Holt, Rinehart and Winston, Inc. (1971).
- Mussen, P.H., Conger, J.J., Kagan: *Essentials of Child Development and Personality*. Harper Row Publishers, New York (1980).
- Ounsted, M.: *Fetal Growth. Recent Advances in Pediatrics*. London Church Hill (1971).

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