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RESEARCH ARTICLE

An Anthropometric Study of Normal Full Term Newborns at Birth in Western Rajasthan

Sushama K Kataria[1], Samta Gaur[2]

1: Professor & Head, Anatomy Department, Dr. S.N. Medical College Jodhpur, Rajasthan, India.

2: Senior Demonstrator, Anatomy Department, Dr. S.N. Medical College Jodhpur, Rajasthan, India.

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Corresponding Author

Samta Gaur
K- 29 Pratap Nagar,
Jodhpur,
Rajasthan, India.

Abstract

Background: All health personnel working in child health care should be familiar with normal patterns of growth, so that they can recognize any deviations from the normal range and try to deal with the underlying disorders which could be nutritional, socio economic or infectious diseases.

Aims & Objectives: The aim of present study to find some anthropometric measurements like length, weight and head and chest circumference of normal healthy neonates at birth which can be used in future to draw a growth chart of Western Rajasthan.

Methods: The Study carried out from 1st of January 2014 to30th of June 20014 at Ummed Hospital, Dr. Sampurnanand Medical College Jodhpur, and Rajasthan. The study was performed on 190 live born neonates with gestational age (37-42 week) all were born in Ummed Hospital, Jodhpur. Babies of mothers with risk factors: gestational hypertension, gestational diabetes mellitus, cigarette smoking premature, and malformed babies were all excluded.

The study was performed by measuring the length, weight head circumference (HC) and chest circumference (CtC).

Results: The results showed that mean birth weight (male & female) was 2.92(+/-0.3924) kg, male: female was 2.92 (+/-0.3924) kg: 2.92(+/-0.3896) kg respectively. The mean length at birth (male & female) was 47.95 (+/- 1.1004) cm, male: female was 47.87 cm (+/- 5.1758): 47.94 cm (+/_5.2045) respectively. The mean head circumference (male & female) was 36.55(+/-1.189) cm, male: female was 36.57(+/- 4.6046) cm: 36.54(+/- 4.6767)cm respectively. The mean chest circumference (male & female) was 31.77(+/-1.189) cm, male: female, 31.79 (+/- 5.0353) cm: 31.76 (+/- 5.4025) cm respectively.

Introduction

Anthropometric studies in children are important: the periodic measurement of anthropometric variables in different populations and regions of a country reflect changes in children's nutrition and health status and are a reliable tool to evaluate social health [*1, 2*]. Fetal, maternal, placental and environmental factors may all influence fetal growth [*3, 4*]. Among the environmental factors, geographic location also plays a role. For example, infants born in New Guinea have an average birth weight of 2400 g, compared with 3800 g in the West Indies and 3238 g in Israel [*4, 5*]. The need for population specific curves of fetal growth and locally-based, periodically updated, birth weight data is emphasized in many studies [*6*]. Although the World Health Organization (WHO) advises a single international

growth standard for developing countries, the ideal is to establish local national growth charts reflecting each country's own genetic characteristics, and prepared according to the features outlined by WHO [*7,8*].
The aim of our study was to measure the birth weight, length, head circumference (HC) and chest circumference (CtC). All health personnel having responsibility for the care of children should be sufficiently familiar with the normal patterns of growth and milestones so that they can recognize overt deviations from the normal range as early as possible, in order for underlying disorders to be identified and given appropriate attention(1) .

MATERIALS AND METHODS:

Present study was conducted at department of Anatomy, Dr. Sampurnanand Medical College Jodhpur, and Rajasthan. The Study carried out from 1st of January 2014 to 30th of June 2014 at Ummed Hospital. It was performed on 190 live born neonates with gestational age (37-42 week) all were born in Ummed Hospital, Jodhpur. All live born term neonates born in the above hospital were included in the study. Babies of mothers with risk factors: gestational hypertension, gestational diabetes mellitus, cigarette smoking, premature and post term neonates, newborns with congenital malformations, neonates admitted to the neonatal unit, multiple births neonates were excluded from the study.
The study was performed by measuring the length, weight, head circumference (HC) and chest circumference (CtC) of the term normal neonates. Birth weight with naked neonate in supine position was obtained soon after birth by digital scale with 10 gram subdivision. Other anthropometric variable including chest, head circumferences were measured by non extendable measuring tape, with a width of 1.0 cm and subdivisions of 0.1 cm. and birth length was measured by somatometer, head circumference was obtained by placing tape along the largest occipito-frontal diameter along over the occiput and eyebrow. The chest circumference was measured by placing measuring tape along the point of nipples. The length was measured with the newborn in supine position with full extension of knee and distance between top of head and heel when pressed against a vertical surface and role on a stabilizing board was measured. Independent sample t test were applied to find significant difference between different parameter of male and female.
Ethical clearance and approval for conducting this study was obtained from the ethical committee of the Rajasthan University of Medical Sciences and correspondent hospital's ethical board committees. Prior informed consent was obtained from the mothers participating in this study after full explanation of the study.

RESULTS:

Present study conducted on 190 newborns, 122 (64.21%) of them were normal newborn, 54 (28.42%) were low birth weight and 14(7.36%) were very low birth weight newborn (Table 1). Out of 122 normal newborns 73(59.83%) were male and 49 (40.16%) female newborn; out of 54 low birth weight newborns 37 (68.51%) were male and 17 (31.48%) female newborns; out of 14 very low birth weight newborns 10 (71.42%) were male and 4 (28.57%) female newborns(Table 2).
The results showed that mean birth weight (male & female) was 2.92(+/-0.3924) kg, male: female was 2.92(+/-0.3924) kg: 2.92(+/-0.3896) kg respectively. The mean length at birth (male & female) was 47.95 (+/- 1.1004) cm, male: female was 47.87 cm (+/- 5.1758): 47.94 cm (+/-5.2045) respectively. The mean HC (male & female) was 36.55(+/-1.189) cm male: female, 36.57(+/- 4.6046) cm: 36.54(+/-4.6767) cm respectively. The mean chest circumference (male & female) was 31.77(+/-1.189) cm, male: female, 31.79(+/- 5.0353) cm: 31.76(+/-5.4025) cm respectively. The study shows that the minimum values for male birth weight was 2.5kg, length was 41cm, HC was 30 cm and chest circumference was 25 cm. The maximum value of male birth weight was 4.2 kg, length was 60 cm HC was 50 cm and chest circumference was 46cm. The minimum values for female birth weight was 2.5kg, length was 41cm, HC was 30 cm and chest circumference was 20 cm. The maximum value of male birth weight was 4.2 kg, length was 60 cm HC was 50 cm and chest circumference was 46 cm (Table 3).
Independent sample t test were applied to find significant difference between different parameter of male and female. There was significant difference between mean length, head circumference of males and females newbornons ($P<0.05$). (Tabe:4)

Table 1: Showing the distribution of newborn:

S. No.	Newborn distribution	Number	Percentage
1	Normal birth weight	122	64.21
2	Low birth weight	54	28.42
3	Very low birth weight	14	7.36
	Total	190	100

Table 2: Showing the percentage of male and female newborn in distribution.

Distribution of newborn	Normal(n=122)		Low Birth Weight(n=54)		Very Low Birth Weight(n=14)	
Gender	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
No. Of Newborn	**73**	**49**	**37**	**17**	**10**	**4**
Percentage	**59.83**	**40.16**	**68.51**	**31.48**	**71.42**	**28.57**

Table 3: Showing the mean, range, standard deviation (SD) of full term Newborn:

S. No	Parameter	Male			Female			Total
		Mean	Range	SD	Mean	Range	SD	Mean
1.	Weight (kg)	2.92	4.2-2.5	0.3924	2.92	4.2-2.5	0.3896	2.92
2.	Length (cm)	47.87	60-41	5.1758	47.94	60-41	5.2045	47.95
3.	HC(cm)	36.57	50-30	4.6046	36.54	50-30	4.6767	36.55
4.	CtC(cm)	31.79	46-25	5.0353	31.76	46-20	5.4025	10.36

Table 4: Showing the mean, p value of full term Newborn:

Parameter	Male	Female	P value	Significance
	Mean	Mean		
Weight (kg)	**2.92**	**2.92**	**0.88**	**Not Significant**
Length (cm)	**47.87**	**47.94**	**0.00**	**Significant**
HC (cm)	**36.57**	**36.54**	**0.00**	**Significant**
Ct C (cm)	**31.76**	**31.79**	**0.97**	**Not Significant**

DISCUSSIONS:

Genetic differences exist among races regarding growth and body composition. In a population the most important factors affecting growth of children are the frequency of nutritional and infectious disorders and environmental status [*2*]. Data on birth weight clearly indicate the important role of geographic location as an environmental factor on fetal growth [*4*]. For this reason the ideal way to evaluate the growth status of a population's children is to organize regional individualized growth charts for each population. Regional national growth charts prepared according to the features advised by WHO would create ideal references for every country [*7*]. The first standard WHO advises for the growth indexes is that the population chosen should be composed of "normal" children who have good nutritional status and grow in "optimal" conditions [*8*].

The mean birth weight of male and female newborn in the present study was 2.92 kg, closely similar with the Ghosh (1974) study. He found that the mean birth weight 2.84 kg in India. The result of present study was also similar with Dhar B (2008) that was 2.8 kg and Sohail (2011) Karachi that was 2.89 Kg. Akaram (1991), Somiran B (2009) found mean birth weight 2.83 kg in Pak and 2.50kg in Kolkata respectively. That was lower than present study. N Sajjadian (2011) and Elshibly (2008) found mean birth weight 3.19kg in Iran, 3.02kg at Sudan that is higher than present study.

Present study show that the mean birth weight of male: female newborns was 2.92kg: 2.92kg, as we compare with other similar studies that was lower, these studies were conducted by Abdelmoneium Sudan (2013), N. Sajjadian Iran (2011), B Telar Turkey (2009) , Kholod Bagdad (2008), Fokt China (2003), Robert Australia(1999) that was 3.16kg:3.11kg, 3.26kg:3.11kg , 3.88kg:3.27kg, 3.30:3.28 kg , 3.41:3.27 kg , 3.41kg:3.41kg respectively.

Present study shows that the length of male and female newborns was 47.95 cm which is higher than the result of Somiran Kolkata (2009) 47.3 cm, Akaram Pak 46.8 cm and lower than the result of Sohail Karachi (2011) that was 48.24cm and N.Sajjadi Iran (2011) that was 50.48cm. Present study show the mean length of male and female newborns was 47.87cm: 47.94cm which was lower than the other similar studies that were conducted by AbdelmenimKhartoun Sudan (2013), N.sajjadian Iran (2011), B Telar Turkey (2009), Kholod Bagdad (2008) and Fokt China (2003). They were found 48.91cm: 48.9cm, 50.81cm: 50.01cm, 48.6:47.95cm, 51:50.72cm and 50.6:50.6cm respectively. Sohail Karachi (2011) found 48.77cm mean length value for male that is higher from present study but 47.48cm for female which is slightly lower and similar with the present study.

Present study show the mean head circumference of male and female was 36.55 that is higher than similar studies conducted by Somiran B Kolkata (32.6cm), Sohail Karachi (34.23), N Sajjadian Iran (34.67 cm) and Akaram Pak (33.4cm). Our result shows that mean head circumference of male: female was 36.57cm: 36.54cm respectively that

was greater than other similar studies that were AbdelmeneimKhartoun Sudan (2013), N Sajjadian Iran (2011) 35.01:34.29cm B Telar Turkey (2009), Sohail Karachi (2011), Kholod Bagdad (2008), Fokt China (2003). They were found 34.74cm: 34.16cm, 35.01cm: 34.29cm, 34.6cm: 34.1cm, 34.31cm: 34.11cm, 34.71cm: 34.62 cm and 34.7cm: 34.0 cm respectively.

Present study show that mean chest circumference of male and female newborns was 31.77cm. It was higher than the result of Somiran B Kolkata (2009) that was 27.7cm and lower than the result of N.Sajjadian Iran that was 32.78cm. The result of present study shows that the mean value of chest circumference of male and female newborn was 31.79cm: 37.76 cm respectively. That was lower than the result of other similar studies that were 33.9:32.43cm by N.Sajjandian Iran (2011) and 32.9:32.6cm by B Telar Turkey (2009).

CONCLUSION:

The study concluded that the mean weight at birth (male & female) full term newborns was 2.92 (+/- 1.1004) kg, the mean length (male & female) was 53.97(+/-1.189) cm, the mean birth HC (male & female) was 34.0(+/-0.346) kg and the mean birth CtC (male & female) was 31.77(+/-0.346) cm. There was significant difference between mean length, head circumference of males and females newbornons ($P<0.05$).

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