The Study of Relationship of Birth Weight with Other Anthropometric Parameters in South Indian Newborn Babies

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Research Article

Abstract: Anthropometric measurements of newborn infants determine the overall foetal development and indicate the influence of various factors affecting it. One such important factor is the birth weight of the foetus. Birth weight is an important indicator of survival, future growth and overall development of the child. The present study conducted in 200 newborn babies to evaluate the relationship of birth weight with the anthropometric measurements of newborn babies showed an increase in the mean values of all the parameters with the increase in birth weight with statistically significant value from which low birth weight babies could be identified reliably and managed accordingly.

Keywords: Anthropometric parameters, birth weight, newborns.

Introduction

Anthropometric measurements of newborn infants determine the overall foetal development. The dimensions of newborn's body can be basis for all changes in anthropometric measurements which may be due to various maternal and infantile variables influencing foetal growth (1). Among the various physiological and pathological factors influencing the anthropometric parameters of newborns, one of the clinically important factors is the birth weight of the baby. It is the most widely used anthropometric indicator. Birth weight is the reflection of health and nutritional status of mother and also useful parameter in predicting the future growth [2]. In a study conducted in the newborns of Dhaka, Bangladesh by Dhar B *et al*. (2002) [3] have identified significant correlation of birth weight with all the key anthropometric parameters. An attempt has been made through this study to provide more information regarding the relationship of birth weight with that of the various anthropometric measurements of newborns.

Materials and methods

Source of data

The present study was undertaken on 200 live newborn infants from the Department of Obstetrics and Gynaecology, Cheluvamba hospital for children and women, MMC and RI, Mysore. The subjects were considered for study irrespective of gestational age at birth, sex and maternal illness

Instruments

1. Electronic weighing scale with graduations of 25gm
2. Non-stretchable, flexible measuring tape
3. Infantometer

Data collection

Relevant history and informed consent was taken from the mother for measuring the anthropometric parameters of newborns.

The following anthropometric measurements were recorded in the newborn within 24 hours of birth except head circumference,

a. Birth weight: By using electronic weighing scale to the nearest of 20 gram.(figure 1)
b. Crown heel length: By using infantometer to the nearest of 0.1 cm, in supine position with knees fully extended.(figure 2)

The following measurements were recorded by using measuring tape to the nearest of 0.1cm,

c. Head circumference was recorded 24 hours after birth to avoid the effect of head moulding and oedema. It was measured at the level of occipital protuberance, above supraorbital ridges and the ears.(figure 3)
d. Chest circumference: At the level of the nipple in a plane at right angle to the spine and recorded the measurement in mid respiration.(figure 4)
e. Abdominal circumference: It is recorded just above the umbilical cord.(figure 5)
f. Mid-arm circumference: At the midpoint between the tip of the acromion and the olecranon process.(figure 6)

g. Thigh circumference: At the level of the lowest gluteal furrow of the thigh in supine position perpendicular to the long axis of the limb.(figure 7)

h. Calf circumference: At the most prominent point in semi flexed position of leg. Calf circumference: At the most prominent point in semi flexed position of leg. (figure 8)

Figure 1: Measurement of birth weight

Figure 2: Measurement of crown heel length

Figure 3: Measurement of head circumference

Figure 4: Measurement of chest circumference

Figure 5: Measurement of abdominal circumference

Figure 6: Measurement of mid arm circumference

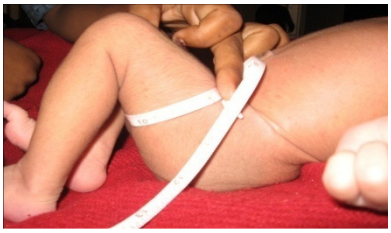

Figure 7: Measurement of thigh circumference

Figure 8: Measurement of calf circumference

Observation and Result

In the present study conducted on 200 newborn babies, the mean values of anthropometric parameters of newborns and their p-values with respect to different range of birth weights have been shown in the table and the bar diagrams (figure 1 and 2).

Birth weight (Kg)	**Anthropometric parameters**						
	CHL	**HC**	**CC**	**AC**	**MAC**	**TC**	**CAC**
<2	42.20±1.87	28.81±2.19	26.30 ±2.20	24.56±1.9	7.26±1.40	11.30±2.23	7.50±1.35
2 – 2.5	46.12±2.26	31.39±1.22	29.67±1.20	27.69±1.00	8.88±0.76	14.43±1.13	9.24±0.68
2.5 – 3	46.76±2.51	33.38±1.32	31.02±1.34	29.12±1.26	9.77±0.57	15.87±0.81	10.13±0.54
3 – 3.5	49.48±1.58	34.90±1.22	32.75±1.18	30.45±0.88	10.53±0.65	16.83±1.03	10.9±0.52
>3.5	50.4±1.83	35.45±0.76	33.15±1.02	31.5±0.94	11.22±0.62	17.80±1.37	11.32±0.81
P- value	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Legend

BW: Birth Weight, CHL: Crown Heel Length, HC: Head Circumference, CC: Chest Circumference, AC: Abdominal Circumference, MAC: Mid-Arm Circumference, TC: Thigh Circumference, CAC: Calf Circumference

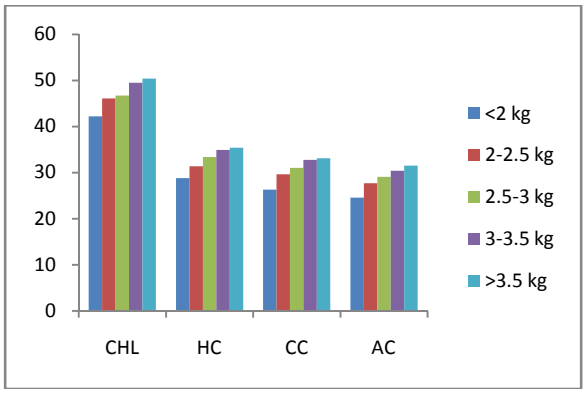

Figure 1: Anthropometric parameters (CHL, HC, CC, AC) with respect to birth weight

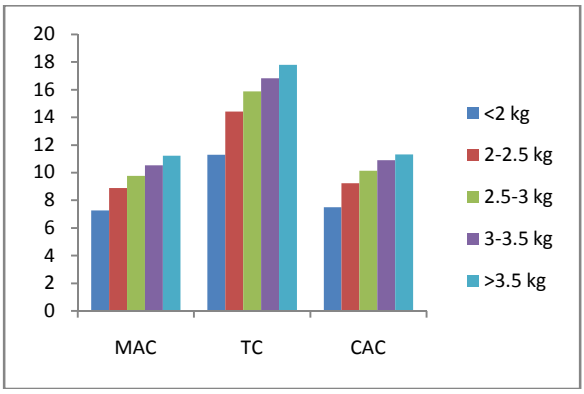

Figure 2: Anthropometric parameters (MAC, TC, CAC) with respect to birth weight

Discussion

Amongst the various facets of neonatology, the establishment of "norms" of various physical parameters of the newborn is being given more and more importance because such studies aid in determining the baseline of physical and mental parameters of newborn and the maternal factors influencing it which help in the management of subnormal and abnormal neonates [4]. Birth weight of newborn has been associated with socio-demographic, clinical, racial, hereditary, personal and even seasonal and geographical factors [5]. The present study has focused on the relationship of birth weight on other key anthropometric parameters of newborns which is clinically important particularly in low birth weight babies. Low birth weight is associated with a very high neonatal mortality, mainly due to susceptibility to adverse environmental influences, proneness of infections and difficulties in maintaining adequate nutrition [6]. In the present study, there was an increase in the mean values of all the anthropometric parameters of newborns with increase in the birth weight with all the values being statistically significant. This correlates well with the study conducted by Singh R and Venkatachalam PS (1962) [7] ,Sarman G and Arisoy A E(1995) [8] and Dhar B *et al*.(2002) [3] each of the studies taking different parameters into consideration to correlate with birth weight of the newborns.

Conclusion

The birth weight of the newborn is one of the important infantile factors influencing the physical parameters of the newborn which in turn affects the future survival and overall development. The anthropometric approach to the heterogeneity of the intrauterine growth seems to be a simple and very useful tool in somatic classification and evaluation of the newborn infant. The present study undertaken with an aim to determine the relationship of birth weight on the other key anthropometric parameters of newborns showed an increase in mean values of all the parameters with increase in birth weight with statistical significance which is in conformity with the previous studies. Thus the variations in body proportions with respect to various physiological and pathological conditions can be evaluated successfully through this anthropometric study.

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