ORIGINAL ARTICLE

Anthropometric Assessments in Term Neonate in a tertiary care center

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ABSTRACT

Aim: To estimate the mean anthropometric measures of term newborn.
Methods: This study was carried out at department of pediatrics Avicenna hospital from 1st July 2015 to 1st January 2016. One hundred newborns received in nursery were enrolled in this study.
Results: Mean weight at birth of newborns was 3.08kg, mean birth length was 52.04 cm and mean fronto-occipital diameter was 30.58 cm.
Conclusion: The newborns anthropometry measurements are slightly lower then the standard data.
Keywords: Anthropometry, birth weight, birth length, fronto-occipital diameter .

INTRODUCTION

An effective and frequently performed child health and nutrition screening procedure is anthropometry. The value of physical growth data depends on their accuracy of recording and follow up efforts made after identification of growth abnormality[1].

Anthropometric measurements can help in assessment of growth.If children are measured once, their growth status for age can be assessed by plotting this measurement on the appropriate reference chart, if serial measurements are taken, growth velocity can be obtained. Growth velocity is more valuable because they reflect change in growth and development[2].

For detection and prevention of disease, knowledge of normal growth and development of children is mandatory[3].

A child will grow and develop normally if mother is healthy and well nourished ,having normal genetic endowment, pregnancy and delivery are normal, appropriate nutrition and a supportive home environment is available for the family[4].

Genetic difference exists among races regarding growth and body composition[5]. The normal pattern of growth in children is traditionally described in an up to date ethnic specific growth charts. Growth references are valuable tools for assessing the health of individuals and for health planner to assess the wellbeing of populations[6].

A detailed physical examination of every neonate is established as good practice and is required as part of the child health surveillance program in the United Kingdom, this examination should be performed by an appropriately trained doctor or nurse and there is no optimal timing for examination but generally carried out between 6 to 72 hours[7].

It is acknowledgeduniversally thatbirth size is a major indicator of fetal and neonatal health. Birth weight particularly is strongly associated with fetal, neonatal and postnatal mortality and morbidity[8].

Children with low or very low birth weight (LBW) and small for gestation age (SGA) present high risk for brain maturation and failure of cognitive development. If head circumference is less then there is risk of intellectual disability and developmental delay[9].

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MATERIALS AND METHODS

This study was done in the Department of Pediatric Medicine, Avicenna Hospital Lahore.This study was completed in six months duration starting from 1st july 2015 to 1st January 2016. A total of 100 newborns were enrolled. Male & female newborns, delivered between gestation of 37–42 weeks presenting within 24 hrs of birth were studied. newborns with Gestation age below 37 weeks ,poor APGAR score (<7),obvious congenital anomalies (spinal deformity, limb deformity, anencephaly) were excluded from study.Newborns were enrolled in the study after taking informed consent from attendants/parents and were ensured of their confidentiality. Study was conducted after approval from Ethical Committee of the institution.

Physical examination of the babies for the anthropometric measurements regarding weight, length and fronto-occipital diameter were done. It included measurement of weight in kg (normal 3.2 kg), length in cm (normal 49 cm), fronto-occipital diameter in cm (normal 35 cm). For measurement of weight pan type pediatric scale was used. Fronto-occipital diameter was measured with flexible, non stretchable measuring tape. Length was measured with infantometer. All information were recorded on the proforma. I did all the procedures myself to eliminate bias effect. I noted the outcome variables of the study that is length, weight and fronto-occipital diameter on the proforma.

RESULTS

In present study, there were 100 term newborn babies of either sex. Gestational age was 37–39 weeks in 81 babies (81%) and 40 – 42 weeks in 24 babies (19%) as shown in Table 1.

There were 10 newborns (10%) having weight < 2.5 kg, 89 newborns (89%) were between 2.5–4.0 kg and 1 newborn (1%) having weight > 4.0 kg (Table 2).

There were 27 newborns (27%) having length between 45–48cm and 73 newborns (73%) had birth length between 49–52 cm as shown in Table 3.

96 newborns (96.0%) had fronto-occipital diameter ≤ 35 cm and 4 newborns (4.0%) had fronto-occipital diameter > 35 (Table 4). Mean weight at birth of newborns was 3.08 kg, mean length at birth was 52.04 cm and mean fronto-occipital diameter was 30.5 cm as shown in Table 5.

In total 54 newborn babies of gestational age 37–39 weeks, mean anthropometric measures were; mean weight 2.78±0.32 kg, mean birth length 48.24±1.23 cm and mean fronto-occipital diameter 33.32±1.05. In total 24 newborn babies of gestational age 40–42 weeks, mean anthropometric measures were; mean weight 2.95±0.55 kg, mean birth length 48.52±1.69 cm and mean fronto-occipital diameter 33.85±1.17 as shown in Table 8. Mean anthropometric measures were higher in case of increasing gestation (40-42 weeks) as compared to anthropometric measures at 37–39 weeks gestation.

Table 1: Gestational Age Distribution of the Term Newborn Babies (n=100)

Gestational Age	n	%age
37 – 39	81	81
40 – 42	19	19
Total	100	100%

Table 2: Weight Distribution of the Term Newborn Babies (n=100)

Weight (kg)	n	%age
< 2.5	10	10
2.5 – 4.0	89	89
> 4.0	1	1
Total	100	100.0

Table 3: Length Distribution of the Term Newborn Babies (n=100)

Length (cm)	n	%age
45 – 48	27	27
49 – 52	73	73
Total	100	100.0

Table 4: Fronto-Occipital Diameter Distribution of the Term Newborn Babies (n=100)

Fronto-Occipital Diameter	n	%age
≤ 35cm	96	96.0
> 35cm	4	4.0
Total	100	100.0

Table 5

Variable	Mean	Standard Deviation
Gestational age (weeks)	38.8	1.3
Weight (kg)	3.08	0.4
Length (cm)	52	1.4
Fronto-occipital diameter (cm)	30.5	1.1

DISCUSSION

Anthropometry is the most , inexpensive and appropriate method available to assess the growth parameters of human body. Measurements of newborns at birth particularly that of weight are not only reflective of how well a woman was looked after during the pregnancy along with the standards of health and health care but also determines the mortality and morbidity of the infants. It is acknowledged across the globe that size at birth is an important indicator of fetal and neonatal health, considering both individuals and populations.

There is a huge collection of data which supports that the worldwide problem of low birth weight (LBW) is amongst the largest determinants of infant mortality and morbidity.[10,11]Moreover birth weight also determines the ability of the neonate to adapt to extrauterine environment and its growth and development in later life.

Sohail Ashraf et al[12] estimated anthropometric measurements of newborns in urban Karachi population with regards to socioeconomic status. The mean birth weight of group A (born to families with income Rs > 5000/month) was 3.044 Kg and that of group B (born to families with income Rs < 5000 /month) was 2.736 Kg. The mean birth length and mean head circumference of group A was 48.55 cm and 34.33 cm respectively. Similarly, the length (mean) and head circumference (mean) of group B was 47.93 cm and 34.13 cm respectively. The boys were found to be heavier than the girls and were taller than the girls. There was no significant difference of mean head circumference value between male and female babies.

Hameed and Paracha[13] estimated anthropometric measures in rural area of North West Frontier Province Pakistan. They found birth-weight (kg) was 3.02±0.36 and height (cm) was 49.95±1.87.

Shabnam Iqbal Memon et al[14] evaluated anthropometric measurements at birth in babies born at Civil Hospital Karachi. They found birth weight of term newborns 3.12±0.45 kg, birth lengths 48.63±2.61 cm and front occipital circumferences 34.21±1.48 cm.

Muhammad Rafique and Associates[15] evaluated impact of socioeconomic status on birth weight and length of Newborns delivered at Services Hospital Lahore. The distribution of upper middle, middle and lower socioeconomic class families was 6%, 49% and 45% respectively. In these socioeconomic classes mean birth weight was 3.185 kg, 3.015 kg and 3.105 kg respectively and mean length at birth was 49.5 cm, 49.3 cm and 48.7 cm respectively. Male babies were found 1.27 kg heavier and 0.52 cm taller than female counterparts.

Lakho G R et al[16] have reported that mean weight at birth, length and head circumference (OFC) were 3.0±0.4 kg, 48.7±2.3 cms and 33.1±0.8 cms, respectively.

Meena Godhia et al[17] evaluated relationship between maternal nutritional pattern and the anthropometric measurements of their full-term and pre-term newborns. They found mean weight (gm) 2849.71±462.28, mean length (cm) 48.72±2.48 and mean head circumference (cm) 33.81±1.47 in term newborns. The authors concluded that there was a strong co-relation between maternal third trimester dietary pattern with birth weight, length, occipitofrontal diameter and chest circumference of term babies.

Rakhshan Shaheen Najmi[18] has reported distribution of birth weights of hospital born infants in Pakistan. Birth weights of the neonates under review ranged from 0.8 kg to 5.7kg. Of the 6142 neonates studied 4783(77.87%) weighed between 2.5 kg to 4 kg, 1156(18.82%) under 2.5 kg and 203(3.31%) above 4 kg. Birth weight of 156 (2.54%) babies was < 1.5 kg and of 17(0.28%) was < 1 kg. Mean birth weight of the whole study population was 2.91kg+0.735 grams, the corresponding figures for

normally weighed, low birth weight and macrosomic babies were 3.13kg±0.374 grams, 1.89 kg±0.504 grams and 4.49 kg±0.493 grams respectively.

In an Indian study, Parmar et al[19] studied anthropometric measurements in 2,360 singleton babies of Himachal Pradesh. The mean weight at birth , length and occipitofrontal circumference of term newborns were 2910±750 g, 49.2±4.2 cm and 33.9±3.2 cm respectively. The incidence of low birth weight was recorded to be 34.6%.

Bishnupada Dhar et al[20] assessed birth-weight measurement of newborns and its relationship with other anthropometric parameters in a public hospital in Dhaka, Bangladesh. They found mean birth-weight (g) 2889±468, mean chest circumference (cm) 31.7±2.1, mean head circumference (cm) 33.5±1.6, mean mid-upper arm circumference (cm) 10.4±1 and crown-heel length (cm) 47.9±2.4 in their study.

CONCLUSION

It is concluded that there is a deviation from standard term newborns anthropometry. The figures show mean birth weight 3.08 kg, mean birth length 52 cm and mean fronto-occipital diameter 30.5 cm in our study which are slightly less than the results quoted in local literature.

REFERENCES

1. Hamill PV, Drized TA, Johnson CL, Reed RB, Roche AF, Moore WM. Physical growth. National center for health statistics percentiles. Am J Clin Nutr. 1979;32:607-29.
2. Ronald EK. Assessment of nutritional status: anthropometry. In: Ronald EK, editor. Pediatric nutrition handbook. United States: American Academy of Paediatrics; 2004. p. 407-23.
3. Sulkes SB, Dosa NP. Developmental and behavioral pediatrics. In: Behrman RE, editor. Nelson essentials of pediatrics. Philadelphia: WB Saunders; 2002. p. 1-56.
4. Galea P, Ali SR, Bhutta ZA. Neonatal paediatrics. Fetal and neonatal medicine. In: Goel KM, Gupta DK, editors. Hutchison's paediatrics. Kundli: Replika Press Pvt. Ltd; 2009. p. 25-59.
5. Neyzi O, Saka HN. Anthropometric studies in Turkish children. Istanbul Medical Faculty Journal. 2002;65:221-8.
6. Low L. Growth and development assessment and monitoring of growth. In: Goel KM, Gupta DK, editors. Hutchison's Paediatrics. Kundli: Replika Press Pvt. Ltd.; 2009. p. 16-24.
7. Coutts J, Simpson JH, Heuchan AM. Fetal and neonatal medicine: assessment of the normal neonate. In: Beattie J, Carachi R, editors. Practical paediatric problems. New York: Arnold Press; 2005. p. 121-59.
8. WHO. The newborn infant. In: Report of a WHO expert committee. Physical status: The use and interpretation of anthropometry. Geneva: WHO technical Report Series; 1995. p. 121-60.
9. Kaufmann R, Straussberg R, Mandel H, Fattal-Valevski A, Ben-Zeev B, Naamati A. Infantile cerebral and cerebellar atrophy is associated with a mutation in the MED17 subunit of the transcription preinitiation mediator complex. Am J Hum Genet. 2010;87:667-70.
10. Elshibly EM, Schmalisch G. The effect of maternal anthropometric characteristics and social factors on gestational age and birth weight in Sudanese newborn infants. BMC Public Health. 2008;8:244-5.
11. Ashraf S, Abbas K, Rahman AJ. Anthropometric measurements; newborns in urban Karachi population. Professional Med J. 2012;19(2):150-4.
12. Hameed A, Paracha PI. Nutritional status and feeding practices of children from birth to 15 months in rural area of North West Frontier Province Pakistan. J Postgrad Med Inst. 1999;13(1):35-45.
13. Rafique M, Zia S, Ubaidullah, Sultan MA. Impact of socioeconomic status on birth weight and length of Newborns delivered at Services Hospital Lahore. Pak Paed J. 2008;32(2): 94-100.
14. Memon SI, Jamal A, Memon I. Anthropometric measurements at birth in babies born at Civil Hospital Karachi. Pak Paed J. 2009;33(3):185-90.
15. Lakho GR, Haq Z, Chundrigar T, Nazir K, Qureshi MA. Cord blood leptin levels in Pakistani newborns: relationship with birth weight, length and occipitofrontal circumference. J Coll Physicians Surg Pak. 2006;16(6):393-5.
16. Godhia M, Nigudkar M, Desai R. Associations between maternal nutritional characteristics and the anthropometric indices of their full-term and pre-term newborns. PJN. 2012; 11(4):343-9.
17. Najmi RS. Distribution of birthweights of hospital born Pakistani infants. JPMA. 2000;50:121-2:
18. Parmar VR, Bhal L, Sood KK, Randhawa I. Anthropometric measurements and prevalence of LBW in Himachal Pradesh. Indian Pediatr. 1987;24:561-5.
19. Malla K, Mall T, Rao S, Gauchan E, Basnet S, Koirala DP. Anthropometric measurements in different ethnic groups of Nepalese newborns. J Nepal Paediatr Soc. 2012;32(1):1-8.
20. Dhar B, Mowlah G, Nahar S, Islam N. Birth-weight status of newborns and its relationship with other anthropometric parameters in a public maternity hospital in Dhaka, Bangladesh. J Health Popul Nutr. 2002;20(1):36-41.