RESEARCH ARTICLE

THE ANTHROPOMETRIC MEASUREMENTS IN FULL TERM NEONATES IN BAGHDAD

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ARTICLE INFO	ABSTRACT
	Determination of newborn growth parameters are necessary in each population for planning their subsequent children growth charts and early detection of diseases. To determine the normal standards of anthropometric measurements for full term neonates in Baghdad. Compare them with WHO standards, And to study different factors that may have effect on the anthropometric measurements. Three thousand and sixty normal singleton full term neonates (1377 males and 1683 females) were enrolled randomly in a descriptive study during the period from 1st of January to 31 of December 2016 in AL-yarmok teaching hospital in Baghdad gender, parity, mode of delivery The ante natal care, Socioeconomic status (SES=high, moderate and low). The measurements included: Weight, Length and the occipito-frontal circumference (OFC). The male to female ratio was 0.8:1, and newborn of male gender to multigravida, vaginally delivered, regular ante-natal care, high socioeconomic status (SES) and middle age group mothers have a significantly higher weight and OFC than females.

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INTRODUCTION

Anthropometry is the measurement of physical dimensions of the human body at different ages [1]. Anthropometry is derived from Greek (*anthropos*, "man" and *metron*, "measure") for the purposes of understanding human physical variation,in various attempts to correlate physical with racial and psychological traits [22], If children are measured more than once, growth velocity data are obtained that can be more valuable because they reflect change in growth and development [3]. Knowledge of the normal growth and development of children is essential for preventing and detecting disease by recognizing overt deviation from normal patterns [5]. There is growing evidence supporting the roles of certain candidates' genes in influencing size at birth [6]. Genetic difference exists among races regarding growth and body composition [8]. In May 2000 the United states center for disease control (CDC) released growth charts, which are based on five nationally representative surveys conducted between 1963 and 1994[12]. The WHO is conducting the Multicenter growth reference study (MGRS) to develop growth curves that can be used for assessing early growth among children from around the world [15]. , for anthropometric data, the percentile cutoffs can be calculated from the mean and standard deviation.

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The 5th, 10th and 25th percentile correspond to (1.6) standard deviation,(1.3) standard deviation and (0.7) standard deviation respectively [18]. Normal growth customarily falls between the10th and 90th percentile when plotted on growth chart to facilitate comparison to established norms; this can help to identify special needs [19], High risk pregnancies (10-20 %) are those that increase the likelihood of abortion, fetal death, IUGR, poor cardiopulmonary or metabolic transitioning at birth, fetal or neonatal disease, or other handicaps [20] .The neonatal period is a highly vulnerable time for an infant. The high neonatal morbidity and mortality rates due to the fragility of life during this period; [21]. Ante natal care(ANC) is considered regular if first visit is in first or second trimester or number of visits 4-5 during the whole pregnancy [25]. Mothers in deprived socioeconomic conditions frequently have growth retarded infant, [26]. Maternal parity exert a modest effect on birth, first born infant tend to be smaller and often categorized as IUGR. [28].. The incidence of LBW in nulliparus teenagers are higher [30].Also, increase in maternal age (> 35 years) show increase in the incidence of LBW compared with younger age [31].Maternal infections increase the risk of delivery of LBW [33]. The average term newborn weighs approximately 3.4 Kg, boys are slightly heavier than girls, and the average length and head circumference are about 50 cm and 35cm respectively, [34]. The birth weight of a newborn is a significant determinant of neonatal and postnatal infant mortality [35]. Body length tends to be a better gauge of gestational age than body weight in under grown neonates with chromosomal abnormalities or

congenital Rubella [37]. Head size attracts particular attention in infancy; the OFC of the skull is measured soon after birth, not only to ensure that the baby does not have microcephaly, reflecting poor brain growth in utero, [39]. Several studies have led to the conclusion that the newborns nutritional status is more important than birth weight alone for identifying perinatal risk[42,43]. Significant variation exists in mid-arm circumference and mid-thigh circumference values among different populations, due to several factors, including genetic characteristics and nutritional status[46]. The periodic measurement of anthropometric variables in different population and regions of a country reflect changes in children nutrition and health status and are a reliable tool to evaluate social health [47]. The main advantages of the measurements described above are practical, simple, non invasive, inexpensive, portable and highly suitable for pediatric use in the ward, clinic or community [48].

Aim of the Study

To determine the normal standards of anthropometric measurements (birth weight, length, head circumference) for full term neonates in Baghdad. And compare them with WHO standards, And study different factors that may have effect on the anthropometric measurements.

Patients and methods

Three thousand and sixty normal singleton full term neonates (1377males and 1683 females) were enrolled randomly in a descriptive, observational study during the period from 1st of January to 31 of December 2016 in AL-yarmok teaching hospital in Baghdad . The exclusion criteria include (neonates of high risk or complicated pregnancies, neonates with visible congenital anomaly, Preterm, multiple gestations). The above criteria were excluded by history and clinical examination, the data collection were taken by direct interview with the mothers and relatives and measurements were taken for their newborns by the researcher during the first day of life. The studied variables were gender, parity (primipara and multipara), mode of delivery (vaginal delivery and caesarean section), The ante natal care (ANC was considered regular if first visit is in the first or second trimester or number of visits 4-5 during the whole pregnancy) (25). Socioeconomic status (SES=high, moderate and low). The studied measurements included: Weight (was measured in kilograms on naked neonates by an accurate electronic scale (SECA, Germany made, maximum Wt was 16 kg). Length (was measured by laying the baby supine on a table with one leg fully extended at hip and knee and making two labels, one of the crown and the other of the heel . The distance between these two labels was measured in centimeters). The occipito-frontal circumference (OFC was determined using a non-stretchable plastic tape which was pulled lightly around the head at a level just above the supra orbital ridges at the front, the level of the tape was the same on left and right sides of the head and posterior part of the tape was aligned on the most prominent point of the occiput that leads to the largest possible measurement, It was measured in centimeters for at least 3 times) The data analyzed by the statistical package for the social sciences (SPSS- version 20) and Microsoft office Excel programs (2007) for mean, standard deviation and p-value. A significant statistical difference of variables was considered when p-value≤0.05.

RESULTS

The male to female ratio was 0.8 : 1, and the males have a significantly higher weight and OFC than females, while there is no significant difference in length. As shown in table -1.

Table 1. Relation between sex of neonates and anthropometrics measurements

Measurements	Male (1377) Mean ±SD	Female (1683) Mean ±SD	p-value
Weight (kg)	3.24 ±0.39	3.17 ±0.46	0.045
Length (cm)	50 ±2.26	49.8 ±1.66	0.416
OFC (cm)	34.4 ±1.16	34.2 ±1.79	0.039

The neonates of Multigravida mothers have a significantly higher length and OFC compared to Primigravida, while there is no difference in weight. As shown in Table 2.

Table 2. The relation between parity of mother and the anthropometric measurements

Measurements	Primigravida (1194) Mean ±SD	Multigravida (1866) Mean ±SD	p-value
Weight (kg)	3.23 ±0.40	3.26 ±0.45	0.297
Length (cm)	49.1 ±0.83	50.5 ±2.35	<0.001
OFC (cm)	34.0 ±0.86	34.5 ±1.63	<0.001

The vaginally delivered neonates have a significantly higher weight, length and OFC than neonates delivered by cesarean section. As shown in Table 3

Table 3. The relation between mode of delivery and the anthropometric measurements

Measurements	Vaginal delivery Total (1071) Mean ±SD	Cesarean section Total (1989) Mean ±SD	p-value
Weight (kg)	3.31 ±0.57	3.22±0.37	0.003
Length (cm)	50.6 ±2.13	49.7 ±2.26	<0.001
OFC (cm)	34.7 ±1.60	34.07 ±1.25	<0.001

There were a significantly higher weight, length and OFC measurements among neonates whose mothers had regular ante-natal care than irregular care mothers. As shown in table -4

Table 4. The relation between the regularity of antenatal care and the anthropometric measurements

Measurements	Regular Total (1224) Mean ±SD	Irregular Total (1836) Mean ±SD	p-value
Weight (kg)	3.39 ±0.51	3.16 ±0.37	<0.001
Length (cm)	50.8 ±2.29	49.7 ±2.06	<0.001
OFC (cm)	34.7 ±0.66	34.1 ±1.50	<0.001

The neonates of high socioeconomic status (SES) mothers had higher weight, length and OFC than moderate and low SES mothers. as shown in Table-5. The neonates of the middle age group mothers (26-35) years old had a higher weight, length and OFC measurements compared to other age groups. as shown in Table 6.

Table 5. The relation between the socioeconomic status and the anthropometric measurements

Measurements	(1) High Total (765) Mean ±SD	(2) Moderate Total (818) Mean ±SD	(3) Low Total (1377) Mean ±SD	p-value
Weight (kg)	3.38 ±0.50	3.29 ±0.51	3.14 ±0.37	0.068
Length (cm)	50.4 ±2.70	50.4 ±2.81	49.6 ±1.50	1.000
OFC (cm)	34.6 ±1.34	34.5 ±1.64	34.1 ±1.28	0.436

Table 6. Relation between age of mother and the anthropometric measurements

Measurements	16-25 year Mean ±SD	26-35year Mean ±SD	36-45year Mean ±SD	p-value
Weight (kg)	3.22 ±0.44	3.28 ±0.47	3.15 ±0.14	0.091
Length (cm)	49.2 ±1.98	50.4 ±2.00	49 ±1.41	<0.001
OFC (cm)	33.6 ±1.33	34.2 ±1.00	33.4 ±0.70	<0.001

DISCUSSION

The mean birth (weight, length and OFC) were (3.2 kg, 49.9 cm and 34.3 cm) respectively, which were lower than NCHS means (3.4 k g, 50cm and 35cm)[15]the difference may be due to size of study and nutritional habits of Iraqi pregnant mother. regarding the sex the current study shows that males have higher weight and OFC and length than females, which in agreement with Telater B. study in Istanbul 2009 [50], Nickavar A. study in Tehran 2007 [51]. Regarding parity, the neonates of a multigravida have significantly higher values of length and OFC than primigravida, which disagree with Phung et al study in Europe [53] and with other studies [54, 55] .this may be due to effects of nausea and vomiting getting less while appetite getting better with subsequent pregnancies. the newborns delivered by normal vaginal delivery are significantly higher than those delivered by cesarean section, which is in agreement with other study [67]. according to the regularity of ANC, it was clear that all measurements were higher in those with regular ANC, this correlates well with other studies[52,56]. comparison according to the family SES, the weight, length and OFC values were significantly higher in newborns of high SES families followed by moderate and low SES group, this agree with Jaya D.S, an Indian study conducted in 1993[57], according to the age of the mother with significantly higher measurements of weight, length and OFC among the (26-35 years) age group,which is less than NCHS[15],Telatar B.study[50] and Nickavar A. study[51], and this could be attributed to the better education and the more experience regarding the health care during pregnancy than the younger age group in addition to lower health risks and pregnancy complications compared to the older age group.

Conclusion

The gender, age of mother, parity, mode of delivery, antenatal care and socioeconomic status of mother, all have a significant effects on newborn growth measurements. And the Iraqi newborn measurements is still equal to WHO standard values.

Recommendation

We advise to perform a larger size study in different governorates including other growth parameters like chest circumference, mid-arm circumference (MAC) mid-thigh circumference at different age groups to establish a standard anthropometric measurements for Iraqi newborn. Encourgment of regular antenatal care associated with high standard health support and healthy nutrition to improve the fetal growth and maternal health and ultimately the neonatal health.

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