

## Some Anthropometric Measurements of Normal Full Term Neonborns at Birth

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### 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.

#### OBJECTIVES:

I undertook this study to find some anthropometric measurements like length, weight and occipitofrontal circumference of normal healthy Iraqi neonates at birth which can be used in future to draw an Iraqi growth chart.

#### METHODS:

The Study carried out from 1<sup>st</sup> of May 2005 to 30<sup>th</sup> of April 2006 at Fatema AL-Zahra Teaching Hospital. The study was performed on 1001 live born neonates with gestational age (37-42 week) were all born in Fatema AL-Zahra teaching hospital in Baghdad. Babies of mothers with risk factors (gestational hypertension, gestational diabetes mellitus, cigarette smoking and multiple gestation ,number of party more than 5, mother age less than 17 years, or more than 35 years, mother body weight less than 45kilogram(kg) or more than 90 kg, mother height less than 150 centimeter(cm)), premature, and malformed babies were all excluded. The study was performed by measuring the length, weight and (&) occipitofrontal circumference (OFC ) of these babies.

#### RESULTS:

The Results showed that the mean length at birth(male & female) was 50.888 (+/- 1.1004) cm ,(male ; female was 51 cm(+/- 1.055) ; 50.72 cm (+/- 0.953)). The mean OFC(male & female) was 34.678(+/- 1.189) cm ( male ;female ,34.719(+/- 1.1305) cm ; 34.621(+/-1.074)cm ). The mean birth weight (male & female) was 3.291 (+/-0.346)kg (male ; female was 3.30(+/-0.356) kg ; 3.28(+/-0.336)kg ).

#### CONCLUSION:

The study concluded that the mean length at birth(male & female) was 50.888 (+/- 1.1004) , The mean OFC(male & female) was 34.678(+/-1.189) cm . The mean birth weight (male & female) was 3.291(+/-0.346) kg.

**KEY WORDS:** birth weight, occipitofrontal circumference, length, maternal risk factors.

### INTRODUCTION:

The basic science of pediatric is growth and development. 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<sup>(1)</sup> . Growth principally implies changes in size of body as a whole or of its separate parts The process through which a fetus achieves biological potential is the consequences of many interrelated factors:-

1. Genetic Factors.
2. Physical trauma which it may be :-
  - a- Prenatal.
  - b- Postnatal.
  - c- Nutritional.
  - d- Chemical.

e- Residual from infection.

f- Immunologic.

3. Socioeconomic.

The birth size is the result of fetal growth<sup>(1)</sup>. The fetal growth which commences shortly after conception is largely determined genetically with the modification of this genetic process by the environment<sup>(2,3,4)</sup> . Familial trends in birth weight (which correlates well with occipito-frontal circumference) have also been observed<sup>(5)</sup>. Environmental factors with a known association with birth size are nutrition, smoking, maternal illnesses and congenital infection (6-13) .The Other risk factors for low birth weight babies such as maternal age, although not themselves environmental factors are strongly influenced by the social environment<sup>(6)</sup> .Measurements of weight, height and OFC at any given time will indicate the status of a child with respect to other children of the same age. Sequential measurements will indicate the quality of the process through which

each child is achieving his or her growth potential.<sup>(1)</sup> The growth curves of each healthy child at his or her appropriate percentile point in the normal distribution are sufficiently smooth so that any substantial perturbations of the growth line are likely to reflect physical illness, nutritional disturbances or psycho social difficulties.<sup>(1)</sup> We made this limitation of selection of babies in order to limit the external causes which affect the fetal growth, so we can know the normal values of OFC ,birth weight ,and length of normal neonates because many studies showed that; There is a tendency of birth weight to increase with increased party<sup>(13)</sup> ,advancing mother age<sup>(9)</sup> ,advancing maternal weight(more than 90 kg ) , housewives, & mothers with gestational diabetes mellitus<sup>(14,15,16,17)</sup> . And there is a tendency of birth weight to decrease in women who weigh less than 45 kg when not pregnant ,women height under 150 cm , the skilled & unskilled workers<sup>(11,16)</sup> . Infants who were delivered to mothers with essential hypertension, pregnancy associated hypertension, chronic renal disease , or heart disease are mostly small for gestational age infants<sup>(7, 12)</sup> .

## PATIENTS AND METHODS:

This study was carried out from 1<sup>st</sup> of May 2005 to 30<sup>th</sup> of April 2006 at Fatema AL-Zahra Teaching Hospital .The study was done on 1001 live born neonates .All newborn infants were term babies (gestational age 37-42 weeks) . Babies of mothers with risk factors ,premature, and malformed babies were all excluded. Maternal medical and obstetrical history was obtained; name, age(years), parity number, mother's occupation(house wife or employer), Measurements for height and weight of mothers were taken within 24 hours of birth, using the Seca scale instrument of weight and height measurements for adults, sensitive to 100gm and 1mm respectively. Neonatal birth weight and occipito-frontal head circumference(OFC) measurements for neonates were measured soon after delivery by using a Seca scale instrument for weight and a non-stretchable measuring tape sensitive to 10gm and 1mm respectively. Length was measured by Rolb metre(Raven equipment limited) in lying position. Those babies with less than 2.5Kg body weight were considered low birth weight<sup>(1)</sup> . All results were expressed in numbers and percentages; the statistical analysis was done using T Test.

## RESULTS:

we study 1001 newborns , 542 of them were male newborn and 459 were female newborn. As shown in table 1 .The male: female ratio was 1.18 :1 . The Results showed that the mean length at birth (male & female) was 50.888 (+/- 1.1004) cm ,(male:

female was 51 cm(+/- 1.055) : 50.72 cm (+/-0.953)) respectively. The mean OFC (male & female) was 34.678(+/-1.189) cm ( male : female ,34.719(+/- 1.1305) cm : 34.621(+/-1.074)cm ) respectively .The mean birth weight (male & female) was 3.291(+/-0.346)kg (male : female was 3.301(+/-0.356) kg: 3.283(+/-0.336)kg ) respectively. The study shows that the minimum values for male birth weight was 2.5kg, length was 48cm and OFC was 31 cm . The maximum values of male birth weight was 4.9 kg , length was 57cm and OFC . was 37.5cm . The mean values for male birth weight was 3.301kg, length was 51.05cm and OFC . was 34.75cm.. The study shows also that the minimum values for female length was 47.cm ,OFC. was 32.cm & birth weight was 2.5kg .The maximum values of female length was 55.cm, OFC 37cm and female birth weight maximum value was 4.5kg. The mean values for female length was 50.7 cm, OFC was 34.6cm and birth weight mean value was 3.283 kg . as shown in table 2, The male length at birth was significantly longer than the female length at birth(the p value was<0.5 ) .but the differences between male OFC & birth weight and female OFC & birth weight weren't significant (the p value >0.5). As shown in figure ( 1), the most common value of male length was 51 cm which was seen in 245 infants(45.2%) ,followed by 52 cm which was seen in 126 infants(23.2%) and then 50 cm which was seen in 121 infants(22.3%) . The most common OFC value in male infants was 35cm which was seen in 224 infants(41.3%) , followed by 34 cm which was seen in 131 infants(24.1%) and then 36 cm which was seen in 85 infants(15.6%) .as seen in figure( 2) . Figure( 3) , shows that The most common birth weight value in male infants was 3 kg which was seen in 141 infants(26%) , followed by 3.5 kg which was seen in 87 infants(16%) and then 3.2 kg which was seen in 65 infants(11.9) . Figure(4), shows that the most common value of female length was 51 cm which was seen in 212 infants(46.18%),followed by 50 cm which was seen in 136 infants(29.6%) and then 52 cm which was seen in 62 infants(13.5%) . As seen in figure( 5), the most common OFC value in female infants was 35cm which was seen in 182 infants(39.6%), followed by 34 cm which was seen in 131 infants (28.5%)and then 36 cm which was seen in 92 infants(20%) . Figure( 6), shows that The most common birth weight value in female infants was 3 kg which was seen in 141 infants(30.7%) , followed by 3.5kg which was seen in 71 infants(15.4%) and then 3.2 kg which was seen in 69 infants(15%) .

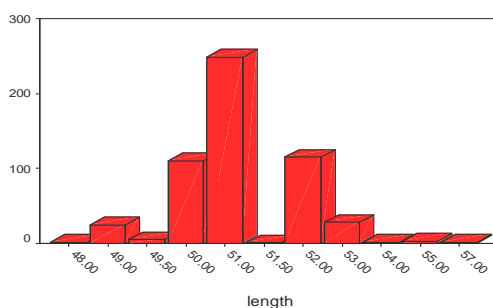
## ANTHROPOMETRIC MEASUREMENTS

**Table 1:Shows male and female Percentages;**

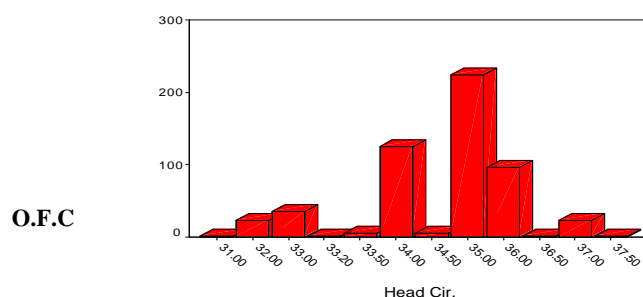
Baby sex	Frequency	Percent
male	542	54.1%
Female	459	45.9%
Total	1001	100.0%

**Table 2: The descriptive statistics of length, OFC ,and birth weight for male and female babies who were examined in the study.**

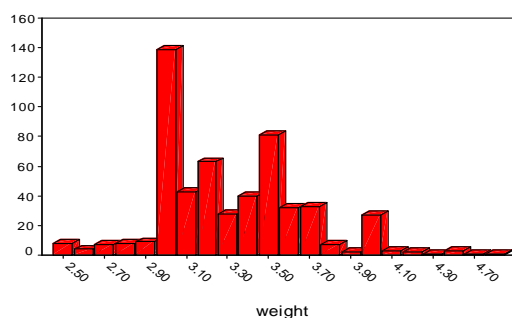
Baby sex	Growth parameters	Minimum	Maximum	Mean	Std. deviation
male	Length cm	48	57	51.0517	1.0558
	OFC. cm	31	37.5	34.7522	1.1130
	Weight kg	2.5	4.9	3.3015	0.3566
Female	Length cm	47	55	50.7266	0.9530
	OFC. cm	32	37	34.6220	1.0749
	Weight kg	2.5	4.5	3.2832	0.336



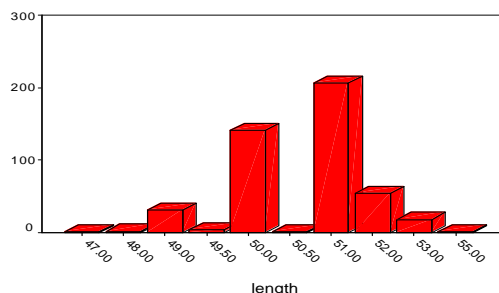
**Figure(1) : Shows the relation between male babies' number and their length values.**



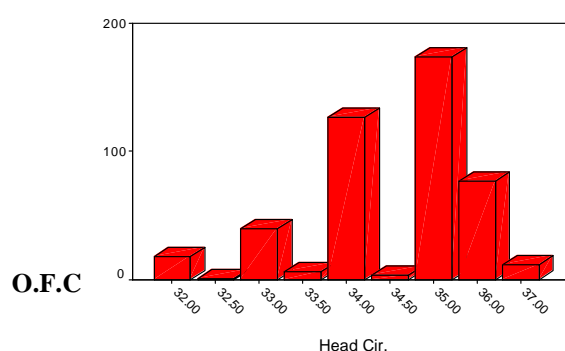
**Figure(2) : Shows relation between numbers of male babies and OFC. Values.**



**Figure(3): Shows the relation between number of male babies and birth weight values.**



Figure(4): Shows the relation between number of female babies and their length in cm.



Figure(5): Shows the relation between number of female babies and their OFC values

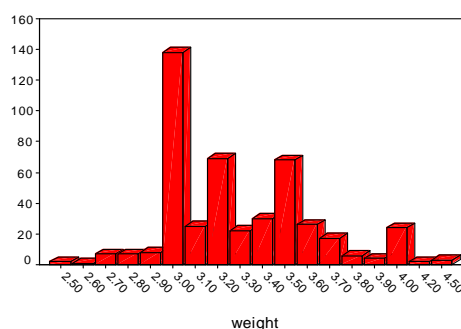


Figure (6): Shows relation between number of female babies and their birth weight values.

## DISCUSSION:

The mean birth weight (male & female) in the study group was 3.291(+/-0.346) kg, Similar result was found by ALKhafaji ZH. in Baghdad 1998,<sup>(14)</sup> she found that the mean birth weight for normal newborn was 3.3(+/-0.5) kg. our results were also close to Hanoudi BH. & Hassan R.in Baghdad 2006,<sup>(18)</sup> when they found that the mean (male & female) birth weight for normal newborn 3.344( +/- 0.479) kg, (male : female was 3.422(+/-0.496)kg : 3.249(+/- 0.441) kg ). Our results were heavier than the results of Fok T.F. , et al.<sup>(19)</sup>, when they found that the mean Chinese newborns birth weight(male

& female) was 3.192 (+/- 0.322) kg. (Male: female 3.415(+/- 0.4): 3.278 (+/- 0.388) kg .) , but lighter than the results of Roberts CL& Lancaster PA.<sup>(20)</sup> when they found that the mean birth weight of Australian male newborn 3.412 kg and the female 3.437 kg. , and Skjaerven R, et al.<sup>(21)</sup> , results , when they found that mean birth weight of the Norwegian male newborn was 3. 562 kg. and the female was 3.537 kg , but were close to Yudkin PL, et al.<sup>(22)</sup> , results , when they found that the mean birth weight of the British male newborn was 3.307 kg and female was 3.292 kg.

This study showed that the mean OFC(male & female) at birth was 34.678(+/-1.189) cm ( male :female ,34.719(+/- 1.1305) cm : 34.621(+/-1.074)cm ) respectively .Similar results were found by Basil M. Hanoudi & Rabab Hassan <sup>(18)</sup>, in Baghdad in 2006 when they found that the mean (male & female ) OFC was 34.480(+/-1.281) cm , ( male : female34.810(+/- 1.261) cm : 34.073(+/-1.190) cm .) Also it was close to the mean Chinese newborns OFC at birth 34.4(+/- 1.2) cm (male :female 34.7(+/-1.2) :34.0(+/-1.1) cm) by Fok T.F.,et al.<sup>(19)</sup>. In this study the mean length at birth (male & female) was 50.888 (+/- 1.1004) cm, which was close to the mean Chinese newborns length at birth (male & female) 50.6(+/-1.7) cm by. Fok T.F. , et al <sup>(19)</sup>.

## CONCLUSION:

The study concluded that the mean length at birth (male & female) was 50.888 (+/- 1.1004) , The mean OFC(male & female) was 34.678(+/-1.189) cm . The mean birth weight(male & female) was 3.291(+/-0.346)kg .

## RECOMMENDATION:

I recommend doing national study to have Iraqi growth charts for intrauterine growth assessment

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## ANTHROPOMETRIC MEASUREMENTS

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