

## **GROWTH PARAMETERS OF HEALTHY BABIES FROM ONE DAY TO THIRTY SIX MONTHS IN NAJAF CITY**

**Dr. Majid A.AHameed Al-Kufy**  
**Pediatrics assistant professor**  
**College of medicine**  
**Kufa University**

a

( )

( % , ) ( )

:

(% . ) ( . ) ( ) -

( ) - ( % , )

- ( % ) - ( % ) ( % )

.

( ) - ( % . ) ( % . ) ( % , )

- ( % . ) ( % . ) ( % . ) ( ) -

.

(% . ) ( ) - ( % , ) ( % , )

- ( % . ) ( % , ) ( % , ) ( )

.

(% . ) ( ) - ( % , ) ( % , )

- ( - ) ( % , ) ( % , ) ( )

( - ) ( % . ) ( % . ) ( % . ) ( )

### **ABREVIATION**

WT	-----	weight
OFC	-----	occipitofrontal circumference
MPH	-----	maternity and pediatrics hospital
LT	-----	length
M	-----	male
F	-----	female
CDC	-----	Center for diseases Control and Prevention

### **ABSTRACT**

A cross sectional study was done on 1608 children , (2.12%) of the total population in Annajaf city (76029) ,<sup>(12)</sup> (650 males &958 females) between 1st day to 36 months of age visited our hospital, produced in labor or surgical theater of our hospital, or visited the primary health care center in Najaf city.  
 Numbers and details of the samples

(1)-At birth : 360 females showed that the highest percentage of all growth parameters OFC (96.7%), weight (79.9%) and length (83.4%) were plotted at 25<sup>th</sup>-50<sup>th</sup> percentile, while 250 males showed that the highest percentage of the OFC (92%) & weight (100%) were plotted at 10<sup>th</sup>-50<sup>th</sup> percentile but the length was (100%) from 25<sup>th</sup>-75<sup>th</sup> percentile.

(2)- 1-6 months : 260 females showed that the highest percentage of all growth parameters OFC (78.5%), weight (78.8%) and length (76.8%) were plotted at 10<sup>th</sup>-50<sup>th</sup> percentile, while 140 males showed that the highest percentage of all growth parameters OFC (95.8%), weight (92.7%) and length (82.9%) were plotted at 3<sup>rd</sup>-75<sup>th</sup> percentile.

(3)- 6-12 months : 188 females showed that the highest percentage of all growth parameters OFC (73.3%), weight (76.6%) and length (73.5%) were plotted at 10<sup>th</sup>-50<sup>th</sup> percentile, while 130 males showed that the highest percentage of OFC (89.6%), weight (89.3%) & length (84.6%) from 3<sup>rd</sup>-75<sup>th</sup> percentile.

(4)- 1-3 years : 150 females showed that the highest percentage of all growth parameters OFC (86.5%), weight (89.3%) and length (89.3%) were plotted at 3<sup>rd</sup>-50<sup>th</sup> percentile, while 130 male showed that the highest percentage of all growth parameters OFC (70.7%), weight (73.7%) and length (74.9%) were plotted at 10<sup>th</sup>-75<sup>th</sup> percentile.

### **PATIENT AND METHODS**

This study was done from 1<sup>st</sup> of February to 1<sup>st</sup> of August 2007 in Najaf city involving children visited the out patient or produced in labour room or surgical theater of Alzahraa teaching hospital or visited out patient in primary health care center in Najaf.

Data collected were age, sex, OFC, weight, and length.

### **Measurements:**

Measure the children growth parameters and plot onto growth chart (CDC. Growth chart: United States).

Weight: weigh the babies naked (no nappy).

Length measured by tape measure when child lying down and ask helper to hold baby's head against headboard and made sure the legs are straight with feet at 90 degree before reading of length.

Head circumference measured by using a flexible not stretchable tape measure to measure occipitofrontal circumference three times and take the largest diameter.

Children were excluded from this study if he or she has or presented:

- 1) With sign of malnutrition.
- 2) Chromosomal disease.
- 3) Chronic disease as diabetes mellitus, renal failure, chronic infections, asthma, etc....
- 4) Congenital heart diseases.
- 5) Premature neonates or intrauterine growth retardation.
- 6) Neonates of diabetic mothers.

### **AIM OF THE STUDY**

Our study was dedicated to compare growth parameters of healthy babies from one day to thirty-six month old age in Najaf city with the standards.

### **INTRODUCTION**

Growth in definition is increase in size and numbers of cells in certain tissues.<sup>(1)</sup>

Its progression is mainly structural, and can be measured to some degrees of height, weight, head circumference, skin folds, arm circumference and bone age.<sup>(3,4)</sup>

Concerning development, which is defined as increase complexity, involve both structural and functional with many individual variation, is mainly for description of progression and appearance of milestone, mental status development and IQ.<sup>(5)</sup>

There are several factors affecting growth and development as :<sup>(5)</sup>

- 1) Genetics: as familiar as tall or short stature.
- 2) Sex: male are bigger than females so that chart of both sex are different.
- 3) Race: Asian are short and small in size, Scandinavians are in opposite.
- 4) Nutritional which reflect the socioeconomic standards of community that is an important factor for growth (amount and types of food as protein, carbohydrates, vitamins & minerals) as important elements of growth.
- 5) Emotional factors: neglecting and psychosocial deprivation.
- 6) Cultural factors : as :,  
Position of child in the family.  
His or her interaction with siblings, with parents, or with others.  
Personal concern and need of parents.

- 7) Essential organ integration: liver, intestine, renal, respiratory, endocrine glands.

Growth charts: it is well developed more than 50 years ago.

The ethnics differences depends on the largest measure upon differences in prevalence of malnutrition and infection in various parts of the world that is why the growth charts with no universal standards.<sup>(4)</sup>

The chart show data regarding :<sup>(4)</sup>

- 1) Relationship of distribution of length and weight for age.
- 2) Distribution and relationship between weight and length irrespective for age.

## **PARAMETERS OF GROWTH**

### **1- Length or height**<sup>(1)(2)(6)(7)</sup>

Birth length is range (48 – 51) cm

Doubled ----- four years

Tripled ----- 16 years

at birth male are slightly taller.

Children from high socioeconomics are taller and heavier.

Height gain is maximum in spring and minimal in autumn.

at birth the ratio of the lower to upper segment of both body is measured from pubis is 1:1.7.

Subsequently the legs grow more rapidly than trunks.

At 2 years the midpoint is umbilicus whereas in adulthood the midpoint is slightly below symphysis pubis.

### **2-body weight**<sup>(1) (7)</sup>

It is probably the best index for nutrition and growth. Birth weight range from 3200 gm to 3500 gm but within the first few days of life baby will lose about 5-10 % of its birth weight due to:

Loss of meconium

Urine

Resolving of physiological edema

Less fluid intake

After that, the baby regains the birth weight by the age of ten days.

The increment in weight approximately 30 gm per day during early months of life (first 4 to 5 months) .The birth weight doubled between 4 to 5 month, tripled in the end of first year& quadrupled by the end of second year.

### **3- Head circumference**<sup>(1)(5)(8) (10) (12)</sup>

Occipitofrontal circumference

- a) In normal full term infants, usually 35 cm is approximately 3/4 of its total mature sizes whereas the rest of the body is 1/4 of adult's size.

At age 6 month ----- 44 cm

At age of 1 year ----- 47 cm

At age of 2 year ----- 49 cm

At age of 5 year ----- 51 cm

At age of 12 year ----- 53 – 54 cm (adult size)

- b) There are six fontanels big anterior, posterior, 2 sphenoidal& 2 mastoidal.

Posterior ----- closed by 2 month of age.

Anterior ----- closed by 10 – 14 month.

But may be closed earlier at 3 month or delay remain open until 18 month.

- c) Wherever child has unusually shaped or sized head or old face before you say it is an abnormal you should look to the mother and father because this abnormality may be hereditary, so some degree of asymmetry is common and normal.

### **GROWTH CURVE** <sup>(9)</sup>

For weight, length, height and head circumference are available in percentile values where the 50<sup>th</sup> percentile represent the average and indicate that 50% of normal children below this value.

25<sup>th</sup> , 10<sup>th</sup> , 5<sup>th</sup> and 3<sup>rd</sup> are low normal values while 75<sup>th</sup> , 90<sup>th</sup> , 95<sup>th</sup> ,and 97<sup>th</sup> are high normal values.

Growth curve are useful in tow ways:

1) With single measurement: values below 5<sup>th</sup> percentile or above 95<sup>th</sup> are abnormal, abnormalities include under weight, overweight, short stature, tall stature, small head, or large head

2) With repeated or serial measurement the growth rate or growth velocity can be assessed. Any normal infant or child should fellow his or her own percentile or serial measurements so any deviation from the own percentile is also abnormal

### **RESULTS AND DISCUSSION**

608 babies were included in this study (650 males &958 females) classified according to their ages ,610 Neonates (250 males &360 females) ,400 infant aging one day to 6 months (140 males &260 females) ,318 infant aging 6 – 12 months (130 males &188 females) and 280 child aging 1- 3 years (130 males &150 females)

A- regarding newborns:

We did find that most of the parameters in females ranging on growth chart between 25<sup>th</sup> -50<sup>th</sup> percentile (OFC 96.7 % )(Wt 79.9% ) &(Lt 83.4%) ,while in males of the same age group (OFC 92% & Wt 100%)were plotted on growth chart between (10<sup>th</sup> - 50<sup>th</sup>) percentile but the Lt (100%) plotted on growth chart between(25<sup>th</sup>-75<sup>th</sup>)percentile these results are seen in table no. 1

B-regarding the age group one day- 6 months:

We did find that most of the parameters in females ranging on growth chart between 10<sup>th</sup> -50<sup>th</sup> percentile (OFC 78.5 % )(Wt 78.8% ) &(Lt 76.8%),while in males the (OFC

95.8%) (Wt 92.7%)(Lt 82.9%)were plotted on growth chart between (3<sup>rd</sup> -75<sup>th</sup>) percentile , these results are seen in table no. 2

C-Regarding the age group 6-12 months:

We did find that most of the parameters in females ranging on growth chart between 10<sup>th</sup> -50<sup>th</sup> percentile (OFC 73.3 % )(Wt 76.6% ) &(Lt 73.5%),while in males the (OFC 89.6%) (Wt 89.3%) &(Lt 84.6%)were plotted on growth chart between (3<sup>rd</sup> -75<sup>th</sup>) percentile ,these results are seen in table no. 3

D-Regarding the age group 1-3 years:

We did find that most of the parameters in females ranging on growth chart between 3<sup>rd</sup> -50<sup>th</sup> percentile (OFC 86.5 % )(Wt 89.3%) &(Lt 89.3%),while in males the (OFC 70.7%) (Wt 73.7%) & (Lt 74.9%)were plotted on growth chart between (10<sup>th</sup> -75<sup>th</sup>) percentile as it is seen in table no. 4.

From the above results we see clearly that most of the growth parameters in the age groups included in this study and in both sexes were below the growth charts which are universally used , these differences may be related to racial causes , bad socioeconomic circumstances especially during the last 16 years , bad social relationships among the family members due to life difficulties in our country which will affect the physical as well as mental growth , large families especially in those who are poor which will affect the nutritional state of the mothers as well as their infants and we have not to forget that most of the marriages are in close relatives which will prevent the introduction of new generations with good features.

Therefore, from the above, the conclusion of our study is that the growth parameters of healthy children aging one day – 3 years in Najaf city are below the standard charts in both sexes.

#### **Recommendations:**

- 1- This short small sized study should be followed by wide one including all age groups allover Iraq to be on the correct line.
- 2- We have to put a special growth charts for our population.
- 3- We should follow the causes of these low readings and correct them if there are.
- 4- We should activate the health education programs about this low result in our community & advice them for proper ways to avoid it.

LT for males (%)	LT for females (%)	WT for males (%)	WT for females (%)	OFC for males (%)	OFC for females (%)	Percentile
0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 <sup>rd</sup>
0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 <sup>th</sup>
0 (0)	36 (10)	60 (24)	24 (6.7)	70 (28)	12 (3.3)	10 <sup>th</sup>
70 (28)	108 (30)	110 (44)	132 (36.6)	90 (36)	180 (50)	25 <sup>th</sup>
110 (44)	192 (53.4)	80 (32)	156 (43.3)	70 (28)	168 (46.7)	50 <sup>th</sup>
70 (28)	24 (6.6)	0 (0)	24 (6.7)	10 (4)	0 (0)	75 <sup>th</sup>
0 (0)	0 (0)	0 (0)	24 (6.7)	10 (4)	0 (0)	90 <sup>th</sup>
0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	95 <sup>th</sup>
0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	97 <sup>th</sup>

**Table (1) Growth parameters at birth**

**Table (2) Growth parameters from one to 6 months**

LT for males (%)	LT for females (%)	WT for males (%)	WT for females (%)	OFC for males (%)	OFC for females (%)	Percentile
28 (20)	6 (2.3)	24 (17.1)	8 (3.1)	16 (11.4)	2 (0.77)	3 <sup>rd</sup>
0 (0)	8 (3.1)	10 (7.14)	6 (2.3)	26 (18.6)	8 (3.1)	5 <sup>th</sup>
8 (5.7)	50 (19.2)	26 (18.6)	44 (16.9)	42 (30)	38 (14.6)	10 <sup>th</sup>
16 (11.4)	42 (16.1)	36(25.7)	48 (18.9)	4 (2.8)	32 (12.3)	25 <sup>th</sup>
24(17.1)	108 (41.5)	8 (5.7)	112 (43)	12 (8.6)	134 (51.6)	50 <sup>th</sup>
40 (28.6)	24 (9.2)	26 (18.5)	20 (7.7)	34(24.3)	36(13.8)	75 <sup>th</sup>
0 (0)	8 (3.1)	8 +(5.7)	6 (2.3)	2 (1.4)	6 (2.3)	90 <sup>th</sup>
24 (17.1)	14 (5.4)	0 (0)	16 (6.1)	4 (2.8)	4 (1.5)	95 <sup>th</sup>
0 (0)	0 (0)	2 (1.4)	0 (0)	0 (0)	0 (0)	97 <sup>th</sup>

**Table (3) Growth parameters from 6 months to 1 year**

LT for males (%)	LT for females (%)	WT for males (%)	WT for females (%)	OFC for males (%)	OFC for females (%)	Percentile
18 (13.8)	18 (9.6)	12 (9.2)	16 (8.5)	20(15.4)	14 (7.4)	3 <sup>rd</sup>
0 (0)	6 (3.1)	2 (1.5)	10 (5.3)	16(12.30)	6 (3.2)	5 <sup>th</sup>
4 (3)	56(29.8)	18 (13.8)	56 (29.8)	18(13.8)	56(29.8)	10 <sup>th</sup>
10 (7.6)	24(12.8)	30 (23)	52 (27.7)	2 (1.5)	22(11.7)	25 <sup>th</sup>
36(27.7)	58(30.9)	18 (13.8)	36 (19.1)	16 (12.3)	60(31.9)	50 <sup>th</sup>
42(32.5)	20(10.6)	36(27.7)	10 (5.3)	44(33.8)	18 (9.6)	75 <sup>th</sup>
0 (0)	2 (1.05)	8 (6.1)	4 (2.1)	4 (3)	6 (3.2)	90 <sup>th</sup>
20(15.4)	4 (2.1)	4 (3)	4 (2.1)	10 (7.5)	6 (3.2)	95 <sup>th</sup>
0 (0)	0 (0)	2 (1.5)	0 (0)	0 (0)	0 (0)	97 <sup>th</sup>

**Table (4) Growth parameters from 1 year to 3 years**

LT for males (%)	LT for females (%)	WT for males (%)	WT for females (%)	OFC for males (%)	OFC for females (%)	Percentile
10 (7.7)	20(13.3)	4 (3)	24 (16)	12 (9.2)	8 (5.3)	3 <sup>rd</sup>
0 (0)	12 (8)	4 (3)	8 (5.3)	6 (4.6)	20(13.3)	5 <sup>th</sup>
4 (3.1)	48 (32)	12 (9.2)	50 (33.3)	12 (9.2)	40 (26.7)	10 <sup>th</sup>
6 (4.6)	34(22.7)	8 (6.1)	36 (24)	2 (1.5)	30 (20)	25 <sup>th</sup>
44(33.8)	20(13.3)	14 (10.7)	16 (10.7)	44(33.8)	32 (21.4)	50 <sup>th</sup>
46(33.4)	10 (6.7)	62(47.7)	10 (6.7)	34 (26.2)	18 (12)	75 <sup>th</sup>
0 (0)	4 (2.7)	16 (12.3)	2 (1.3)	10 (7.6)	0 (0)	90 <sup>th</sup>
20(15.4)	2 (1.3)	4 (3)	4 (2.6)	10 (7.6)	2 (1.3)	95 <sup>th</sup>
0 (0)	0 (0)	6 (4.6)	0 (0)	0 (0)	0 (0)	97 <sup>th</sup>

**REFERENCES**

1. Nelsen essential of pediatrics /5th edition 2006 section 2 chapter 5 "page 15"
2. Nelsen essential of pediatrics /5th edition 2006 , section 2 chapter 5 "page 16"
3. Nelsen essential of pediatrics /5th edition 2006 ,section 2 chapter 5"page 20"
4. BEHRMAN RE ,Klingman rm ,JENSON HB (EDS),NELSON Textbook of pediatric 17th edition philaphinWb Saunders 2004 , pp 58-59.
5. BEHRMAN RE ,Klingman rm ,JENSON HB (EDS)NELSON Textbook of pediatric 17th edition philaphinWb Saunders 2004 , pp 59-65.
6. BEHRMAN RE ,Klingman rm ,JENSON HB (EDS)NELSON Textbook of pediatric 17th edition philaphinWb Saunders 2004 , pp 32.
7. BEHRMAN RE ,Klingman rm ,JENSON HB (EDS)NELSON Textbook of pediatric 17th edition philaphinWb Saunders 2004 , pp 38.
- 8.Mohamed Al-Najaer ped. Clinical diagnosis ,4th edition 2002 p(7).
9. Mohamed Al-Najaer ped. Clinical diagnosis ,4th edition 2002P57.
- 10.Regaladom ,Halfor N:primary care services promotive Optimal child development from birth to age 3 years arch Pediatradiolesnt med. 55:1311\_1322\_2001.
- 11.Najaf sector records.
- 12.Clinical pediatrics for post graduate examination 3rd edition 2002 p105.