

Anthropometric measurements of term neonates from a state hospital in Turkey

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القياسات البشرية للولدان في تمام الحمل في إحدى مستشفيات ولاية تركية
برين تيلاتار، سرداد جومرت، آيچافترينك، أدهم أديجوز

الخلاصة: حدّد الباحثون في هذه الدراسة كلاً من الوزن والطول ومحيط الرأس ومحيط الصدر عند ولادة 3688 من المواليد في إحدى مستشفيات ولاية أناتولية تابعة لإسطنبول، في تركيا، وذلك للتعرف على قيم الشرائح المئوية (المئين) الخاصة بالمنطقة ومقارنتها بالمنحنيات التي تستخدم حالياً على الصعيد الوطني والدولي. وقد بلغ وسطي الوزن عند الولادة 3334 غرام (بانحراف معياري 494)، ووسطي الطول عند الولادة 48.3 سنتيمتر (بانحراف معياري 2.2) ووسطي محيط الرأس 34.4 سنتيمتر (بانحراف معياري 1.3) ووسطي محيط الصدر 32.8 سنتيمتر (بانحراف معياري 1.9). وقد وجد الباحثون أن المنحنيات الوطنية التركية الحالية تبالغ في تقديرات كل من الوزن والطول ومحيط الرأس عند الولادة في الشريحة المئوية العاشرة (المئين العاشرة) لكل من الذكور والإناث. وبالنسبة للذكور، فإن كلا من المنحنيات الوطنية والمنحنيات في الولايات المتحدة الأمريكية ذات تقديرات منخفضة لوزن المواليد فوق الشريحة المئوية التسعينية (المئين التسعيني).

ABSTRACT to determine regional percentile values and compare them with currently used national and international curves, we determined the birth weight, height and head and chest circumference of 3688 term neonates born in a state hospital in the Anatolian part of Istanbul, Turkey. Mean birth weight, height and head and chest circumference were 3334 (SD 494) g, 48.3 (SD 2.2) cm, 34.4 (SD 1.3) cm and 32.8 (1.9) cm respectively. For both boys and girls, the current Turkish national percentile curves overestimate the birth weight, height and head circumference at the 10th percentile. For boys, the national curves and those from the USA underestimate birth weight of neonates above the 90th percentile.

Mesures anthropométriques chez des nouveau-nés à terme dans un hôpital public en Turquie

RÉSUMÉ Cette étude a permis de déterminer le poids, la taille et les périmètres crânien et thoracique à la naissance de 3 688 enfants nés à terme dans un hôpital public de la partie anatolienne d'Istanbul (Turquie), afin d'établir les valeurs régionales des centiles et de les comparer aux courbes nationales et internationales actuellement utilisées. Le poids, la taille et les périmètres crânien et thoracique moyens à la naissance étaient respectivement de 3 334 g (E.T. 494), 48,3 cm (E.T. 2,2), 34,4 cm (E.T. 1,3) et 32,8 cm (1,9). Pour les garçons comme pour les filles, les courbes de centiles nationales utilisées aujourd'hui en Turquie surestiment le poids, la taille et le périmètre crânien à la naissance au 10^e centile. En ce qui concerne les garçons, les courbes nationales et celles des États-Unis sous-estiment le poids à la naissance des nouveau-nés au-dessus du 90^e centile.

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Introduction

Anthropometric studies in children are important: the periodic measurement of anthropometric variables in different populations and regions of a country reflect changes in children's nutrition and health status and are a reliable tool to evaluate social health [1,2]. Fetal, maternal, placental and environmental factors may all influence fetal growth [3,4]. Among the environmental factors, geographic location also plays a role. For example, infants born in New Guinea have an average birth weight of 2400 g, compared with 3800 g in the West Indies and 3238 g in Israel [4,5].

The need for population specific curves of fetal growth and locally-based, periodically updated, birth weight data is emphasized in many studies [6]. Although the World Health Organization (WHO) advises a single international growth standard for developing countries, the ideal is to establish local national growth charts reflecting each country's own genetic characteristics, and prepared according to the features outlined by WHO [7,8].

The aim of our study was to measure the birth weight, height and head and chest circumference of term neonates born in a state hospital in Istanbul, Turkey, to determine the percentile values in this sample and to compare the results with the current national and international values.

Methods

The study was planned as a cross-sectional study.

The sample included all 3688 term neonates delivered over the 2-year period January 2004–January 2006 in the obstetrics clinic of Dr Lutfi Kırdar Kartal Education and Research Hospital. Babies born during weekends, preterms (less than 37

weeks gestational age), babies hospitalized in neonatal intensive care and those with congenital anomalies were not included in the study. The hospital is located in the Anatolian part of Turkey's biggest city, Istanbul. The majority of patients are migrants from rural parts of the country who have low socioeconomic status.

The measurements were obtained within 24 hours of birth. Birth weight was recorded by a nurse in the delivery room using a manual balance; height was recorded with a manual ruler by a paediatrician and head and chest circumference were recorded with a tape measure by the same doctor. Two paediatricians and 2 nurses participated in the data collection.

The mean, standard deviation (SD) and percentile values for all children were determined. The data coding was managed using Microsoft *Excel* program; *SPSS*, version 8.0 was used for analysis.

Results

Of the 3688 neonates 1918 (52.0%) were male and 1770 (48.0%) female. The mean birth weight, height and head and chest circumference for boys were 3387 (SD 499) g, 48.6 (SD 2.1) cm, 34.6 (SD 1.3) cm and 32.9 (SD 2.0) cm respectively. Corresponding values for girls were 3276 (SD 482) g, 47.9 (SD 2.1) cm, 34.1 (SD 1.2) cm and 32.6 (SD 1.9) cm respectively (Table 1).

The percentile values for male and female neonates are shown in Table 2. We compared the percentile values with those from a Turkish national study from 1978 [9] and from the United States of America (USA) [10]. Plotting birth weights, height and head circumference for boys and girls of our population against currently used Turkish national percentile curves would generally overestimate the values below the

Table 1 Birth weight, height, head and chest circumference values of term neonates in a state hospital in Istanbul

Variable	Boys (n = 1918)		Girls (n = 1770)		Total (n = 3688)	
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
Height (cm)	48.6 (2.1)	40.4–56.4	47.9 (2.1)	40.2–53.6	48.3 (2.2)	40.2–56.4
Weight (g)	3387 (499)	1900–5300	3276 (482)	1750–5000	3334 (494)	1750–5300
HC (cm)	34.6 (1.3)	29.8–39.5	34.1 (1.2)	28.5–37.8	34.4 (1.3)	28.5–39.5
CC (cm)	32.9 (2.0)	29.0–36.5	32.6 (1.9)	29.0–36.3	32.8 (1.9)	29.0–36.5

SD = standard deviation; HC = head circumference; CC = chest circumference.

10th percentile. The values for birth weight, height and head circumference of our sample at the 3rd percentile were similar to values from the USA. Although the birth weights of girls at the 97th percentile were similar in the 3 studies, plotting birth weights, height and head circumference of boys against the Turkish national and the USA curves would underestimate birth weights above the 90th percentile (Figures 1, 2 and 3).

Discussion

Genetic differences exist among races regarding growth and body composition. In a population the most important factors affecting growth of children are the frequency of nutritional and infectious disorders and

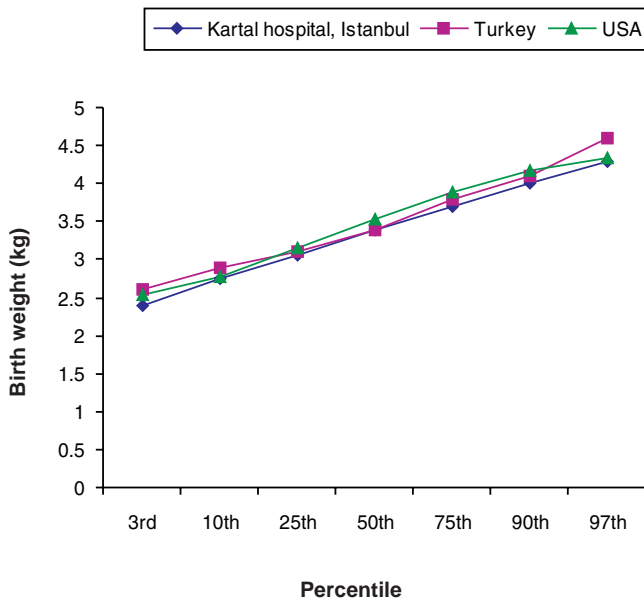
environmental status [2]. Data on birth weight clearly indicate the important role of geographic location as an environmental factor on fetal growth [4]. For this reason the ideal way to evaluate the growth status of a population's children is to organize regional individualized growth charts for each population. Regional national growth charts prepared according to the features advised by WHO would create ideal references for every country [7].

The first standard WHO advises for the growth indexes is that the population chosen should be composed of "normal" children who have good nutritional status and grow in "optimal" conditions [8]. In the study of Kalanda et al., the birth weight, height and head circumference of babies in

Table 2 Birth weight, height and head and chest circumference percentiles for term neonates from a state hospital in Istanbul

Variable	Percentile						
	3rd	10th	25th	50th	75th	90th	97th
<i>Boys (n = 1918)</i>							
Height (cm)	44.2	46.0	47.4	48.7	50.0	51.4	52.7
Weight (g)	2400	2750	3050	3400	3700	4000	4300
Head circumference (cm)	32.0	33.0	33.8	34.7	35.5	36.4	37.0
Chest circumference (cm)	29.0	30.5	31.5	33.0	34.4	35.5	36.5
<i>Girls (n = 1770)</i>							
Height (cm)	44.0	45.2	46.7	48.0	49.3	50.5	52.0
Weight (g)	2300	2700	3000	3250	3600	3900	4200
Head circumference (cm)	31.5	32.5	33.3	34.0	35.0	35.5	36.4
Chest circumference (cm)	29.0	30.0	31.5	32.8	34.0	35.0	36.4

(a) Males



(b) Females

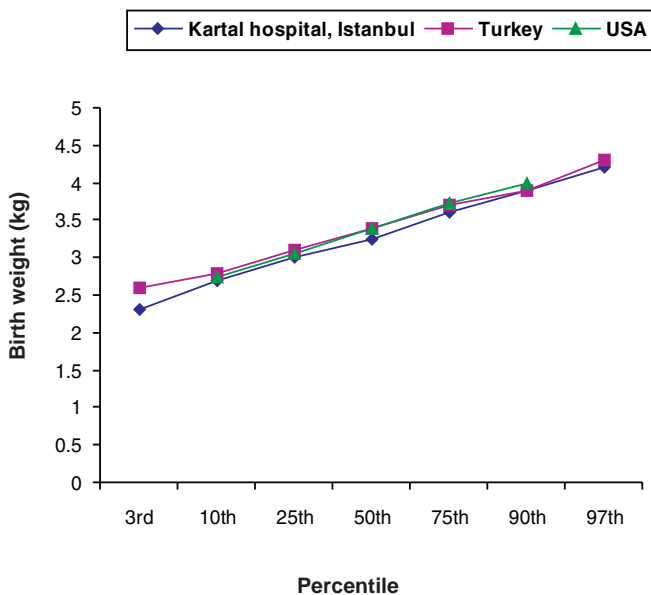
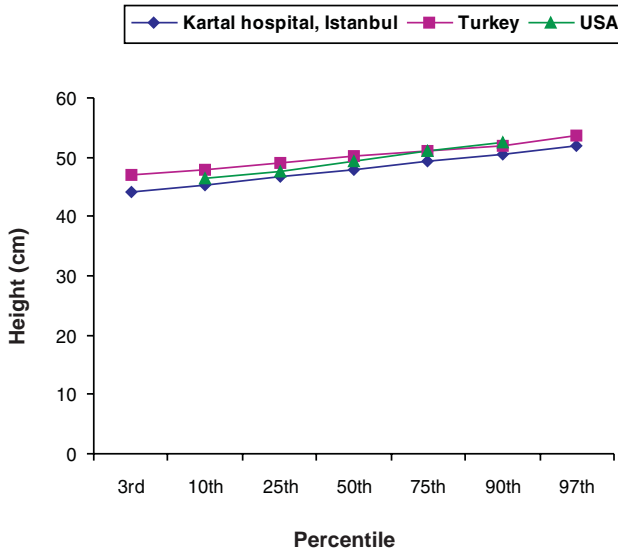


Figure 1 Comparison of weight percentiles for term neonates in a state hospital in Istanbul with data from a national study in Turkey [9] and from the United States of America [10]

(a) Males



(b) Females

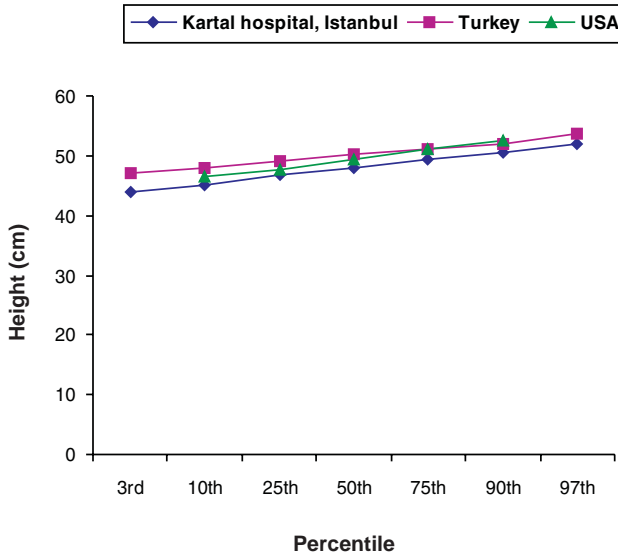
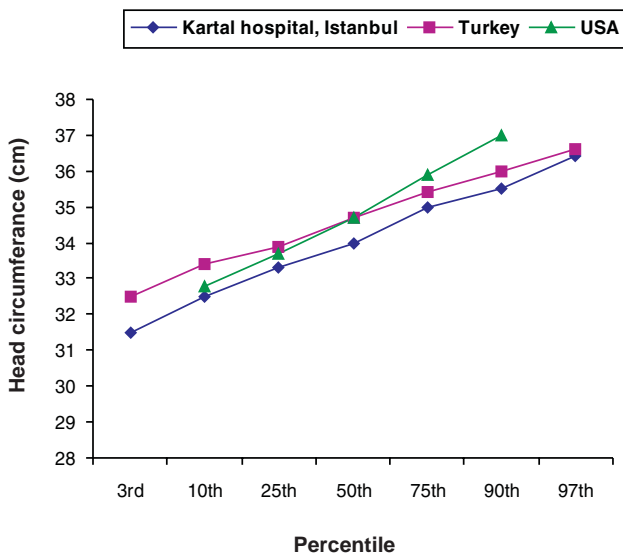


Figure 2 Comparison of height percentiles for term neonates in a state hospital in Istanbul with data from a national study in Turkey [9] and from the United States of America [10]

(a) Males



(b) Females

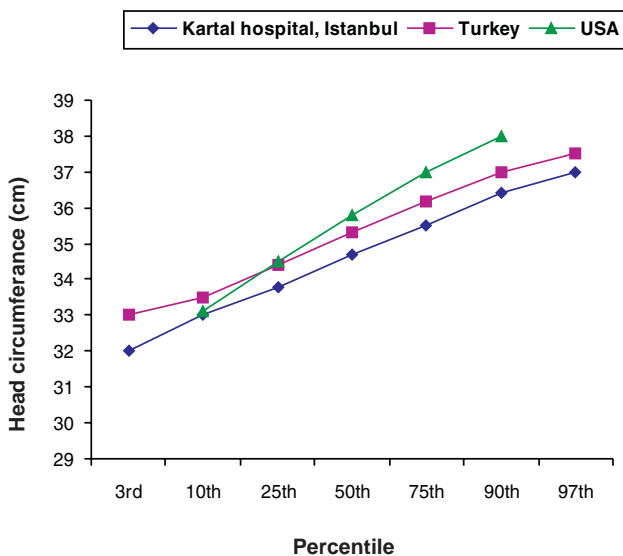


Figure 3 Comparison of head circumference percentiles for term neonates in a state hospital in Istanbul with data from a national study in Turkey [9] and from the United States of America [10]

Malawi with gestational age 35–41 weeks were lower at all percentiles compared with babies from a developed country [11]. In the study of Britton et al. in Arizona, birth weight, height and head circumference of male term babies were greater than those of girls and the values were higher than the results of previous studies, indicating that interpretation according to old values could be misleading [12].

Among the few studies of neonatal anthropometric measurements in Turkey, the most accepted and widely used growth charts are from the study of Neyzi, Binyıldız and Alp in 1978 [9]. In this study, as recommended by WHO, the children were chosen from high socioeconomic families with optimal conditions. Plotting birth weights, height and head circumference for boys and girls of our population against these currently used national percentile curves would generally overestimate the values at less than the 10th percentile. The children in our study group mostly belonged to families of low socioeconomic status living in economically deprived parts of Istanbul, which may explain the discrepancy between our values and currently used national charts.

Mean birth weight, height and head circumference in our population were 3334 (SD 494) g, 48.3 (SD 2.2) cm and 34.4 (SD 1.3) cm respectively. Türkmen et al. evaluated the anthropometric measurements of 1060 term babies born in a university hospital in Turkey and recorded values of 3316 (SD 446) g, 49.9 (SD 1.7) cm and 34.6 (SD 2.4) cm respectively [13]. Leiberman et al. in Israel in 1993 found the mean birth weight of male infants was 3238 g and of female infants 3117 g and concluded that there was a need for locally based infant birth weight data due to differences between population curves [5]. The mean birth weights for our male and female neonates were higher than the mean values of neonates from Israel.

The limitation of our study is that the percentile values we obtained reflect the results of only one hospital and a limited population, indicating that generalization to the Turkish population cannot be made. But although an international unique growth chart for developing countries is generally advised, regional percentile values collected in this study may help to interpret the anthropometric measurements of neonates in our population more efficiently.

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World Health Day 2010

World Health Day 2010 will focus on urbanization and health. With the campaign "1000 cities - 1000 lives", events will be organized worldwide calling on cities to open up streets for health activities. Stories of urban health champions will be gathered to illustrate what people are doing to improve health in their cities.

The goal of the campaign is:

1000 cities – for 1000 cities to close off portions of streets to traffic for activities promoting better health.

1000 lives - to collect 1000 stories of urban health champions who have taken action to improve health in their cities.