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Brief Communication

SUPINE LENGTH, WEIGHT AND HEAD CIRCUMFERENCE OF NEONATES AT BIRTH IN URBAN AREAS OF ARAK AND FACTORS AFFECTING THEM

Keywords: Neonates, supine length, head circumference, weight at birth, NCHS
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Supine length, weight and head circumferences of 10241 neonates (5241 boys, 5000 girls, sex ratio 105) born in Arak (central Iran) in 2002 are reported. Mean+SD of boys and girls (p-value for sex difference) supine length (mm), weight (gr) and head circumference (mm) were estimated as 501+30 and 497+31 ($p<0.001$); 3194+586 and 3100+532 ($p<0.001$); 351+18 and 345+18 ($p<0.001$), respectively. Supine length and weight of our subjects were significantly lower than that of their American counterparts ($p<0.01$), but our boys head circumferences were significantly higher than the NCHS reference data ($p<0.01$), while no significant differences was seen among girls.

Anthropometric measurements at birth are significant indicators for predicting neonatal health. Several studies have shown that different anthropometric measurements at birth can be used as valid indicators of low birth weight.[1-3]

Two limited studies were carried out on birth weight in Iran over 30 years ago[4,5] and several others recently.[6-10] The only population based study on healthy neonates was carried out in 1996,[11] which include supine length, weight, arm, chest and head circumferences at birth and provide reference data for sizes at birth in southern Iran.

At present, no data are available on sizes at birth in urban Arak areas (Iran). The present study reports supine length, weight and head circumferences of all neonates born in 2002 in Arak, the main city in the central province of Iran. The paper further compares the data with that of NCHS[12] and south Iranian reference data.[11]

The data relate to a cross-sectional study of all the 10241 live neonates (5241 boys, 5000 girls, sex ratio 1.05) born in 2002 in Arak. Arak is an industrial city with a population of nearly 700,000 of whom a large proportion immigrated from western provinces of Iran. The city is located 270 km south west of Tehran, Iran's capital and is classified as a semi-developed city.

Supine length (SL) and head circumferences (HC) were measured to the nearest 1 mm with non-stretchable plastic coated tapes. Weight (WT) was measured by using baby weighing scales to the nearest 10g. Centile statistics and nonparametric tests were used to compare our data with local and universal reference data. Student's t-tests were used to compare differences between our data and other reference data. Pearson corre-

Table I. Anthropometric measurements at birth of Arak neonates.

Variable	Boys			Girls			P
	Mean	SD	95% CI	Mean	SD	95% CI	
Weight (gr)	3194	586	3178-3210	3100	532	3085-3115	<0.001
Supine Length (mm)	501	30	500-502	497	30	496-497	<0.001
Head Circumference (mm)	351	18	350-351	345	18	345-347	<0.001

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Table II. Centiles of anthropometric measurements at birth of Arak neonates.

	Centiles / Variable	5	10	25	50	75	85	90	95
Boys	Weight (gr)	2250	2500	2900	3250	3500	3700	3800	4000
	Supine Length (mm)	460	470	490	500	520	530	530	540
	Head Circumference (mm)	320	330	340	350	360	365	370	370
Girls	Weight (gr)	2200	2500	2827	3150	3450	3550	3700	3828
	Supine Length (mm)	450	470	490	500	510	520	530	540
	Head Circumference(mm)	320	330	340	350	355	360	360	370

Table III. Anthropometric measurements at birth of Arak neonates & Shiraz study and NCHS.

Study	Variable	Boys				Girls				P
		Mean	SD	95% CI	P*	Mean	SD	95% CI	P**	
Arak	Weight (gr)	3194	586	3178-3210	___	3100	532	3085-3115	___	<0.001
	Supine Length (mm)	501	30	500-502	___	497	30	496-497	___	<0.001
	Head Circumference (mm)	351	18	350-351	___	345	18	345-347	___	<0.001
Shiraz	Weight (gr)	3300	500	2300-4300	<0.001	3150	450	2250-4000	<0.001	<0.005
	Supine Length (mm)	494	23	448-540	<0.001	448	21	446-530	<0.001	<0.05
	Head Circumference (mm)	346	15	316-376	<0.001	342	13	316-368	<0.001	<0.0001
NCHS	Weight (gr)	3309	430	___	<0.001	3239	410	___	<0.001	___
	Supine Length (mm)	500	20	___	0.004	496	18	___	0.202	___
	Head Circumference (mm)	345	18	___	<0.001	341	19	___	<0.001	___

P: p-value for comparing mean of the variables in boys and girls
P*: p-value for comparing of mean of boys in Arak & Shiraz and NCHS
P**: p-value for comparing of mean of girls in Arak & Shiraz and NCHS

NCHS values References: New pediatric growth charts provide a tool toward future weight problems. URL: http:/ /www.cdc.gov/nchs/releases/ 00news/grow.hrt/htm(last reviewd in March 01,2001).

Table IV. Correlation coefficient between anthropometric measurements at birth of Arak neonates.

	Weight	Supine Length	Head Circumference
Weight	____	0.509*	0.552*
Supine Length	0.518*	____	0.471*
Head Circumference	0.536*	0.534*	____

*$p<0.01$.

lation coefficients were applied to find the correlations of the anthropometric measurements.

Table I presents mean (SD) measures at birth of boys and girls and their 95 percent confidence intervals (95% CI). The significance of anthropometric measurement differences between boys and girls is also reported. Boys' measures were significantly greater than girls ($p<0.001$). Centiles of anthropometric measurements at birth of boys and girls are given in Table II. Table III compares our data with that of NCHS[12] and reference data for Shiraz.[11] The correlation between neonate anthropometric measurements at birth is given in Table IV. Anthropometric measurements were correlated to each other significantly ($p<0.001$). However, correlation of head circumference with weight was the highest.

Anthropometric measurements at birth of our subjects were significantly lower than that of NCHS for both sexes ($p<0.001$). Also, anthropometric measurements at birth of our subjects were significantly lower than that of Shiraz for both sexes ($p<0.001$), the reference data at birth for Shiraz, Iran, the most developed city of southern Iran.[11] This trend was observed when we compared our weight data with that of Tabriz,[8] a main developed city located in north west Iran. However, birth weight of Islamshahr (a north Tehran developing city) neonates[10] were significantly lower than ours ($p<0.001$), showing that birth weight may be considered as a good indicator of development. By using multivariate analysis the conjoint vector of height, weight and head circumference in boys was greater than this vector in girls ($p<0.001$).

Birth weight of our neonates were significantly lower ($p<0.001$) than their counterparts in Czechs and Sweden[13] as well as USA,[12] but higher than Nigerian neonates[14] for both sexes. Boys' birth weight had been significantly higher than that of girls' in our study ($p<0.001$), which concurs with other European[15-17] and American studies,[12] apart from Iranian studies cited earlier.[8,10,11]

Birth weight dominates other anthropometric measurements in most studies. We have studied supine length and head circumference at birth of neonates and shown that they were highly significantly correlated with birth weight ($p<0.001$). This justifies that in the absence of a weighing scale and due to technical difficulties in measuring weight in developing societies, one can use head circumference at birth as an alternative valid indicator of low birth weight, as we have achieved here, which concurs with similar results for arm and chest circumferences in other studies.[1,3]

Birth weights and head circumference at birth of neonates whose mothers had normal delivery (57%) were significantly higher ($p<0.001$) than those whose mothers endured caesarian section (43%). However, the difference between their supine lengths was not significant in the two mentioned groups.

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