

SKINFOLD THICKNESSES (TRICEPS AND SUBSCAPULAR) OF INFANTS OF LOW BIRTH WEIGHT COMPARED TO THE REFERENCE DATA FROM BIRTH TO THE AGE OF SIX YEARS

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Abstract: Data of this study came from a national representative longitudinal growth research: "Health and demographic growth study of pregnant women and infants."

Two types of skinfold thicknesses (triceps and subscapular) of 413 infants of low birth weight (185 boys and 228 girls) are included in this report. Means of these measurements are compared to the reference values. Average skinfold thicknesses referring to infants of low birth weight are lower than that of the reference group at all ages between birth and 6 years.

The average skinfold of low birth weight babies are significantly ($p < 0.001$) less than the reference values at triceps for boys of 0–8 months old, at subscapular for 0–4 months old boys. The same significant differences were found also for girls at triceps to the age of 3 months, at subscapular up to 2 months. Size of differences was investigated according to the classification of newborn by birth weight and gestational age (SGA, AGA, LGA).

Key words: Triceps and subscapular skinfold thicknesses; Low birth weight infants; SGA, AGA, LGA infants.

Introduction

In Hungary the measurement of skinfold thickness became a widespread tool for determining the nutritional level of adults and children of various ages in the last decade (Eiben and Pantó 1987/88, Blatniczki et al. 1988). In our paper we intend to complete the public results of the cross-sectional research work with the skinfold reference values of infants and small children.

Material and Methods

The data of this presentation derive from the nation-wide longitudinal representative research program: "Health and demographic growth study of pregnant women and infants", from the section of child growth (Joubert et al. 1986, Joubert and Gárdos 1991).

We report on the skinfold thickness averages of children belonging to the reference group and born with body weights lower than 2500 g according to the conventional birth weight categorization, and the skinfold averages of SGA (Small for Gestational Age), AGA (Appropriate for Gestational Age), LGA (Large for Gestational Age) children compared to each other. The number of investigated children is shown in *Table 1*. The SGA, AGA and LGA groups have been formed considering the 10th and 90th percentile limit values of birth weight by gestational age (Battaglia and Lubchenco 1967, Joubert 1983).

Table 1. Number of investigated boys and girls

		At birth	At the age of 6 years
Number of children for reference data (birth weight 2500–4499 g)		2993 boys 2682 girls	2469 boys 2197 girls
Number of children with low birth weight (birth weight <2499 g)		185 boys 228 girls	144 boys 175 girls
Number of children according to the classification of newborn by birth weight and gestational age	SGA	265 boys 284 girls	202 boys 218 girls
	AGA	2452 boys 2235 girls	2006 boys 1793 girls
	LGA	313 boys 269 girls	257 boys 217 girls

Results

The yearly *triceps* skinfold averages of boys, respectively who are members of the reference group and were born with low body weights are demonstrated in *Fig. 1*. The difference between the averages was calculated by *t*-test in each age examined.

In boys there is a very strongly significant difference from birth to the age of 8 months and at 5 years, but at the age of one year, 15 months and 3 years the averages of the two groups do not differ significantly. In girls the *triceps* averages are very significantly different at birth and in the first 3 months, later this difference becomes ever smaller and in several cases at the age of 0.5, 1.5, 3, 4 and 6 years no statistically evaluable difference can be found (*Table 2*).

Table 2. Results of *t*-test of *triceps* skinfold thickness in Reference groups and in Low birth weight (Lbw) groups

Age	Boys		Girls	
	Reference and Lbw		Reference and Lbw	
<i>Birth</i>		***		***
1 month		***		***
2 month		***		***
3 month		***		***
4 month		***		**
5 month		***		*
6 month		***		n. s.
8 month		**		**
10 month		*		**
12 month		n. s.		**
15 month		n. s.		*
18 month		**		n. s.
21 month		**		*
24 month		**		**
3 year		n. s.		n. s.
4 year		**		n. s.
5 year		***		*
6 year		**		n. s.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n. s. = not significant

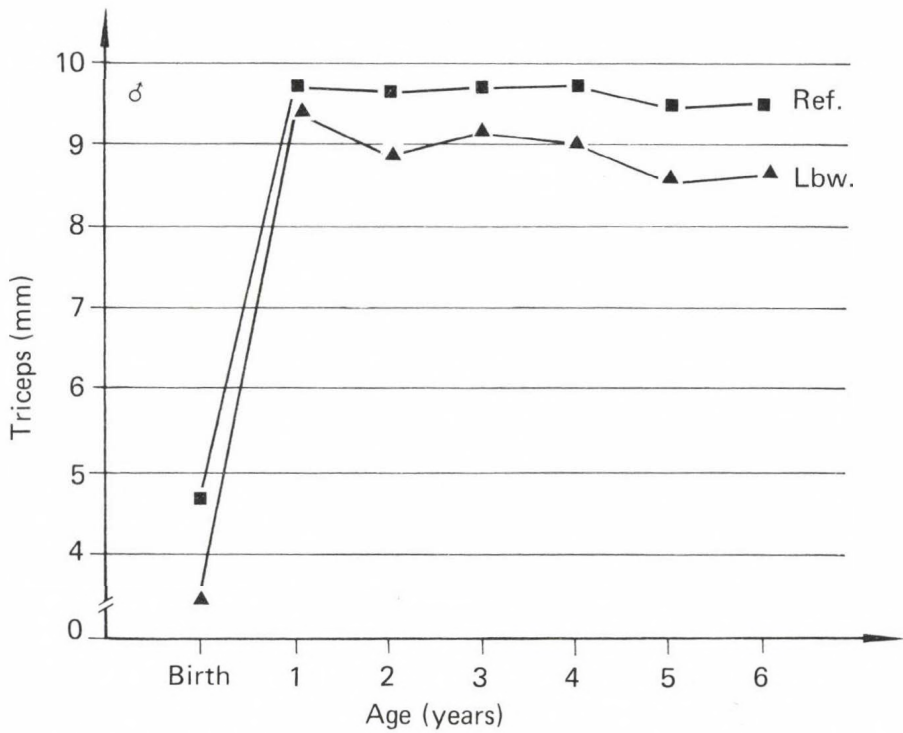


Fig. 1: Comparison of boys' triceps skinfold thickness in reference (Ref.) and low birth weight (Lbw) groups

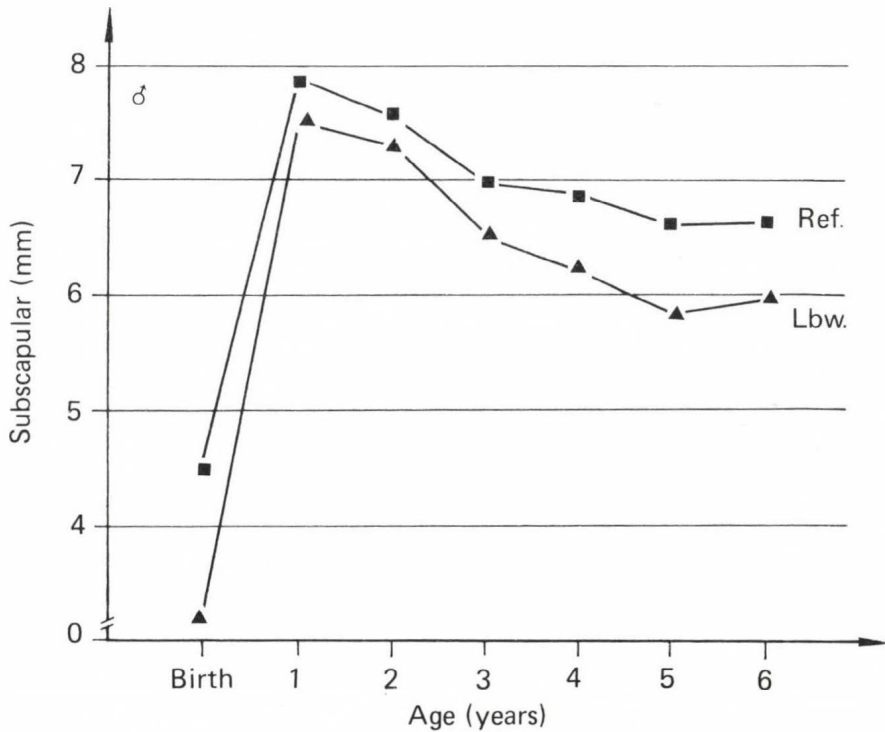


Fig. 2: Comparison of boys' subscapular skinfold thickness in reference (Ref.) and low birth weight (Lbw) groups

The mean *subscapular* values of boys born with low body weight and belonging to the reference group can be seen in *Fig. 2*

In boys the difference of subscapular skinfold thickness averages is strongly significant at birth, at the age of 4 months and 5 years. At other times, however, statistical difference can be experienced only in some cases. The girls' average values differ significantly at birth and in the first 3 months. However, at the age of 4, 5, 6 months and 5, 6 years there is no significant difference between the averages of the groups examined. The average values measured at various ages during the intercurrent time show differences of various levels of significance (*Table 3*).

Table 3. Results of *t*-test of subscapular skinfold thickness in Reference groups and in Low birth weight (Lbw) groups

Age	Boys		Girls	
	Reference and Lbw		Reference and Lbw	
<i>Birth</i>		***		***
1 month		***		***
2 month		***		***
3 month		***		**
4 month		**		n. s.
5 month		*		n. s.
6 month		n. s.		n. s.
8 month		*		*
10 month		n. s.		**
12 month		n. s.		***
15 month		n. s.		*
18 month		n. s.		***
21 month		*		***
24 month		n. s.		***
3 year		*		*
4 year		**		*
5 year		***		n. s.
6 year		*		n. s.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n. s. = not significant

In the following part of our paper we report on the skinfold averages of SGA, AGA and LGA children compared to each other.

The triceps values of boys significantly differ at all ages – only the level of significance is varying – if the SGA and AGA groups are compared. The difference of the AGA and LGA children's averages is significant only at birth and in the next 3 months.

In girls – similarly to the boys – the comparison of SGA and AGA groups from birth to the age of 6 years yields significant difference. The comparison of AGA and LGA averages results in non-significant difference only after the age of one year, while in boys it is non-significant already from 3 months of age (*Table 4*).

The subscapular skinfold thicknesses in boys and girls grouped as SGA, AGA and LGA children are demonstrated in *Fig. 3* and *4*. The related curves of SGA-AGA groups differ from those of triceps only at one time – at the age of 15 months – when the difference does not reach the lower level of significance stated by us. The difference of AGA-LGA comparative values proves to be significant at birth, at the age of 2 and 15 months. In girls born with various body parameters the subscapular skinfold averages measured at various ages show similar correlation as was found with the boys (*Table 5*).

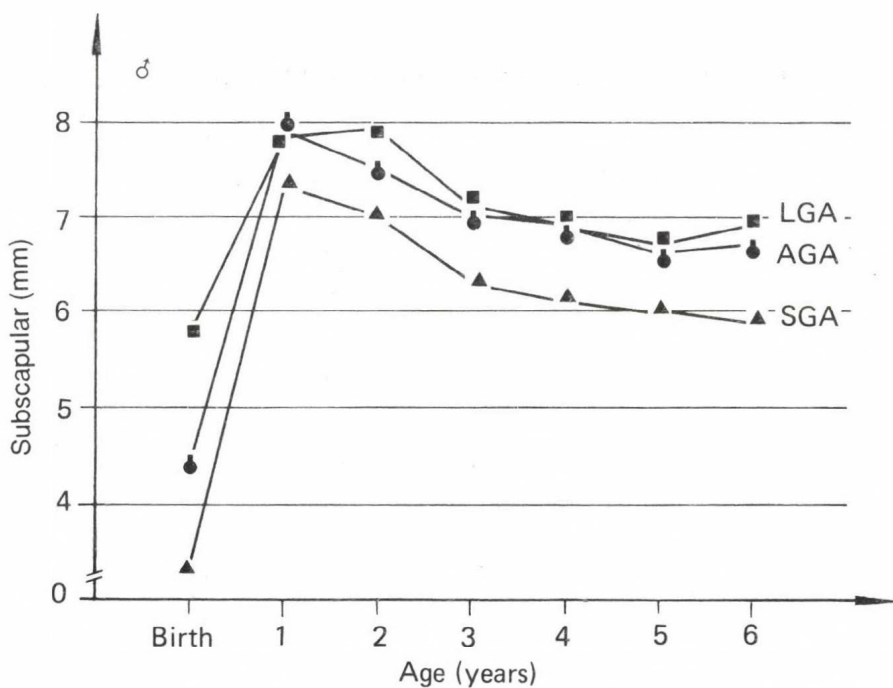


Fig. 3: Subscapular skinfold thickness of boys in LGA, AGA, SGA groups

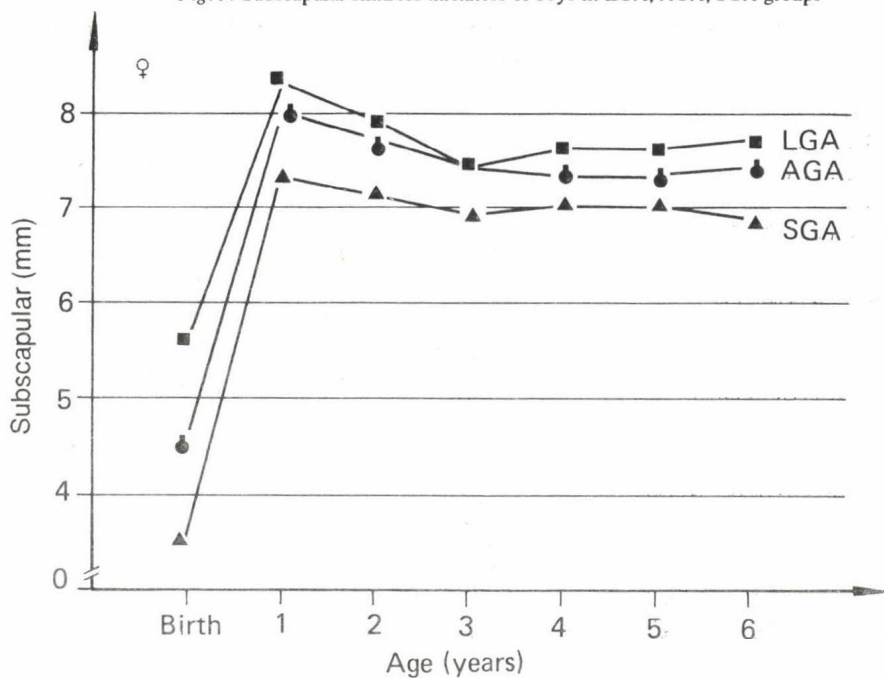


Fig. 4: Subscapular skinfold thickness of girls in LGA, AGA, SGA groups

Table 4. Results of t-test of triceps skinfold thickness in SGA, AGA, LGA groups

Age	Boys			Girls		
	AGA-SGA	AGA-LGA	SGA-LGA	AGA-SGA	AGA-LGA	SGA-LGA
<i>Birth</i>	***	***	***	***	***	***
1 month	***	***	***	***	***	***
2 month	***	***	***	***	**	***
3 month	***	*	***	**	**	***
4 month	***	n. s.	***	**	*	***
5 month	***	n. s.	**	**	*	***
6 month	***	n. s.	**	***	n. s.	***
8 month	***	n. s.	**	***	**	***
10 month	**	n. s.	**	***	n. s.	***
12 month	*	n. s.	n. s.	***	*	***
15 month	*	n. s.	n. s.	**	n. s.	***
18 month	**	n. s.	n. s.	***	n. s.	***
21 month	**	n. s.	*	***	n. s.	***
24 month	***	n. s.	***	***	n. s.	***
3 year	***	n. s.	***	**	n. s.	***
4 year	**	n. s.	***	**	n. s.	***
5 year	*	n. s.	*	**	n. s.	***
6 year	**	n. s.	**	**	n. s.	**

* p < 0.05, ** p < 0.01, *** p < 0.001, n. s. = not significant

Table 5. Results of t-test of subscapular skinfold thickness in SGA, AGA, LGA groups

Age	Boys			Girls		
	AGA-SGA	AGA-LGA	SGA-LGA	AGA-SGA	AGA-LGA	SGA-LGA
<i>Birth</i>	***	***	***	***	***	***
1 month	***	***	***	***	***	***
2 month	***	**	***	***	n. s.	***
3 month	***	n. s.	***	**	n. s.	***
4 month	***	n. s.	***	*	n. s.	n. s.
5 month	*	n. s.	*	*	n. s.	*
6 month	**	n. s.	n. s.	**	n. s.	**
8 month	**	n. s.	**	**	n. s.	**
10 month	*	n. s.	n. s.	***	n. s.	**
12 month	***	n. s.	*	***	n. s.	***
15 month	n. s.	n. s.	n. s.	**	*	***
18 month	*	n. s.	*	***	n. s.	***
21 month	*	n. s.	**	**	n. s.	***
24 month	**	*	***	**	n. s.	**
3 year	***	n. s.	***	**	n. s.	*
4 year	***	n. s.	***	n. s.	n. s.	*
5 year	***	n. s.	**	n. s.	n. s.	*
6 year	***	n. s.	***	*	n. s.	*

* p < 0.05, ** p < 0.01, *** p < 0.001, n. s. = not significant

Both the triceps and subscapular skinfold averages if compared the data of SGA and LGA groups, yield similar correlation as stated when studying the averages of SGA and AGA children.

Discussion

The difference between the skinfold averages of low birth weight children belonging to the reference group is strongly significant from birth to the age of a few months, then this difference is decreasing, though not uniformly, and with the boys remains significant to the age of 6 years. Comparing the difference of skinfold averages of children with various birth weights it can be stated that the SGA and AGA groups differ strongly significantly at each age. It supports the fact we established by the measurement of body weight (mass), body length (height), head and chest circumference that the birth weight calculated for gestational age may have an influence on the body development at least to the age of 6 years.

At the same time the above mentioned relationship give the explanation, why the only parameter of birth weight and the corresponding grouping (low birth weight and reference group) does not give an unambiguous relationship at all ages. Namely, in this case the aspect of grouping is too simple and one-sided compared to the SGA-AGA-LGA system.

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