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# Relation between Maternal Age and Stature at Child's Birth and Anthropometrical Status in Neonates

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The foetus's development depends on the parental factors, including morpho-dynamic status of the mother and father, birth order, socioeconomic living conditions, etc. The **aim** is to examine the influence of maternal age and stature on four basic anthropometrical features in fullterm babies. During 2001 a total of 219 (110 boys and 109 girls) healthy, fullterm neonates born in Sofia (38 to 42 weeks of gestation, with a body weight of more than 2500 g) were studied. Z-values of crown heel length (stature), weight, head and chest circumferences are included in the analysis. We can summarize that the maternal age and stature influence on the anthropometrical characteristic in newborn infants: the neonates from both genders, whose mothers are at the age of 20-30 years and above 170 cm in height, have biggest body sizes.

*Key words:* maternal age, maternal stature, fullterm neonates, basic anthropometrical features.

## Introduction

The formation of child in mature individual depends on harmonically interaction between exogenous (environmental, socio-economical, urbanization, etc.) and endogenous (genetic, hormonal, metabolic) factors [3, 12]. The foetus's development depends on the parental factors, including morpho-dynamic status of the mother and father, socioeconomic living conditions, etc. Some authors consider that the maternal factor, characterized mainly by age, weight and stature of mother, birth order, etc. are most important for the foetus, than the father's characteristics [4].

The **aim** is to examine the influence of maternal age and stature at child birth on four basic anthropometrical features in fullterm babies.

## Material and Methods

During 2001 a total of 219 (110 boys and 109 girls) healthy, fullterm neonates born in Sofia (38 to 42 weeks of gestation, with a body weight of more than 2500 g) were studied. The babies were examined within 24 hours after birth. The gestational age was determined according to the date of mother's last regular menstruation. The anthropometrical data were collected in the section of Neonatology at II Hospital of

Obstetrics and Gynaecology "Sheynovo". Thirty-eight anthropometrical features were measured by Martin – Saller's classical methods [6], in lying position of the child, from the right side of the body. Z-values of stature, weight, head and chest circumferences are included in the analysis. The crown heel length (stature) of the neonates is taken with the baby lying nude on a horizontal measuring table resembling a stadiometer to the nearest 0.5 cm. The infant's head is held in the vertical "Frankfurt plane". The body weight is measured with a beam balance to the nearest 0.01 kg and the circumferences are measured by plastic type to the nearest 0.5 cm.

The statistical analysis of the data is realized using statistical software for Windows - SPSS 11.0. Z-score transformation was applied to variables for easier comparison of the anthropometrical features independently of their measure units and different scales. For assessment of the influence of maternal age and stature on newborns' anthropometrical status, one-way ANOVA analyses and post hoc Tukey Honestly Significant Difference Test (HSD-test for unequal N) were applied.

According to the maternal age and stature the studied newborn infants are distributed in following groups (Table 1).

Table 1. Groups of neonates according to the maternal age and stature

| Groups / Factors | I | II | III | IV |
|---|---|---|---|---|
| Mother's age | ≤ 20 years | 21-25 years | 26-30 years | > 30 years |
| Mother's stature | ≤ 160 cm | 161-170 cm | > 170 cm | |

## Results

*Age of mothers*

The mothers in the study are aged 16-43 years.

The newborn boys of mothers aged over 26 years (III and IV groups) have values of the features above the means and boys who have younger mothers (I and II groups) have body sizes under or near to the means (Table 2, Fig. 1). The maternal age influenced significantly only the body weight and chest circumference.

The newborn girls whose mothers are aged 21-25 years (II group) have biggest body sizes (Table 2, Fig. 1). The girls whose mothers are under 20 and over 30 years of

Table 2. Differences in Z-score values of anthropometrical features in neonates according to maternal age

| Mother's age | Z-score values of anthropometrical features | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | boys | | | | girls | | | |
| | crown heel length | weight | head circumf. | chest circumf. | crown heel length | weight | head circumf. | chest circumf. |
| I group (≤ 20 y) | 0.044 | -0.247 | -0.319 | -0.235 | -0.82 | -0.983 | -0.380 | -0.655 |
| II group (21-25 y) | -0.184 | -0.268 | -0.150 | -0.190 | 0.183 | 0.331 | 0.175 | 0.291 |
| III group (26-30 y) | 0.164 | 0.284 | 0.200 | 0.129 | -0.003 | 0.026 | -0.020 | 0.039 |
| IV group (>30 y) | 0.206 | 0.355 | 0.233 | 0.504 | 0.027 | -0.254 | -0.080 | -0.279 |
| Test for multiple comparisons | – | – | – | – | I/II* | I/II* I/III* | – | I/II* |

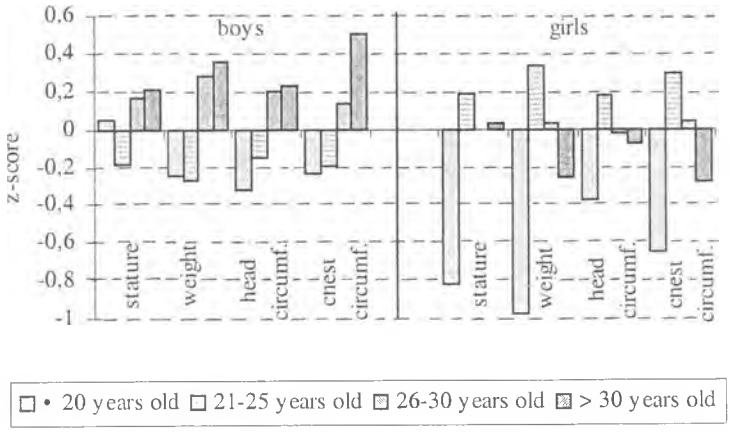


Fig. 1. Z-score values of basic anthropometrical features in neonates according to maternal age

age (I and IV groups) have values of the studied anthropometrical features lower than the means.

The pairwise multiple comparisons test shows significant differences between first and second groups of girls (with mothers younger than 20 years and mothers aged 21-25 years) in crown heel length, body weight and chest circumference. Significant differences in body weight are observed also between girls from first and third groups.

In some studies a tendency to increment of newborns' body weight and crown heel length with enhancement of maternal age is reported [1, 5, 11, 13]. Numerous authors recorded also that the younger and older mothers give birth to babies who are lighter and shorter [10, 14]. According to S e r e j s k i [9] and R o u s h a m & G r a c e y [8] mothers aged 15-18 years give birth to babies with retarded intrauterine development more frequently and consider that this maternal age could be a risk factor for low birth weight.

*Stature of mothers*

The stature of mothers varies between 150.0 cm and 184.0 cm.

The boys born to mothers under 160.0 cm (I group) and above 170.0 cm high (III group) have values of the anthropometrical features above the means, as these whose mothers are above 170.0 cm high have bigger values of the crown heel length and chest

T a b l e 3. Differences in Z-score values of anthropometrical features in neonates according to maternal stature

| Mother's stature (cm) | Z-score values of anthropometrical features | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | boys | | | | girls | | | |
| | crown heel length | weight | head circumf. | chest circumf. | crown heel length | weight | head circumf. | chest circumf. |
| I group (≤ 160) | -0.03 | 0.153 | 0.156 | 0.048 | -0.491 | -0.333 | -0.341 | -0.101 |
| II group (161-170) | -0.08 | -0.132 | -0.104 | -0.060 | 0.065 | -0.02 | 0.117 | -0.060 |
| III group (> 170) | 0.363 | 0.146 | 0.032 | 0.078 | 0.401 | 0.332 | 0.095 | 0.237 |
| Test for multiple comparisons | – | – | – | – | I/II* I/III* | – | – | – |

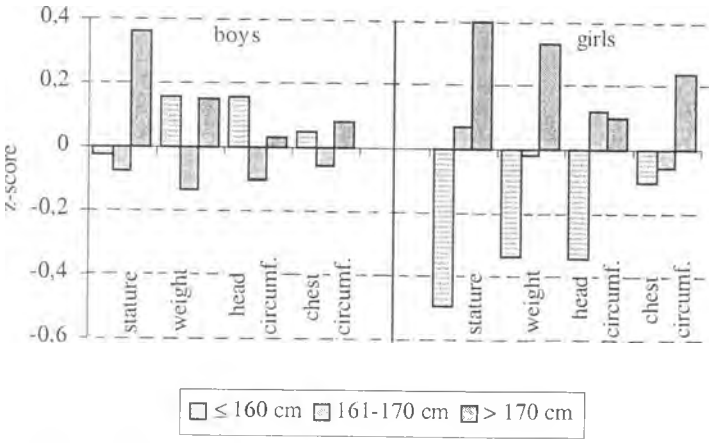


Fig. 2. Z-score values of basic anthropometrical features in neonates according to maternal stature

circumference (Table 3, Fig. 2). The values of all anthropometrical features of boys from the second group (with stature of mothers between 161.0 and 170.0 cm) are lower than the means.

The dependence between anthropometrical status of newborn girls and stature of their mothers also is stronger in these whose mothers are above 170.0 cm high (III group) (Table 3, Fig. 2). The girls of the third group have the highest values of the anthropometrical features. These values are over the mean, with exception of the head circumference ones, which are higher in the girls from the second group. As distinct from boys, the girls born to mothers with stature under 160.0 cm (I group) have values of the anthropometrical features lower and near to the means. The maternal stature influenced significantly only the crown heel length of the newborn girls.

According to the pairwise multiple comparisons test, significantly intergroup differences are observed: the girls from first group (with mothers' stature up to 160.0 cm) have significantly shorter crown heel length than girls whose mothers are taller.

The question of dependence between parental stature (mainly of the mother) and neonates' body sizes is discussed by many authors [1, 2, 7, 13]. They found that the increment of maternal stature leads to considerable increment of body weight and stature at birth. Voigt et al. [11] maintain that the mothers' stature has a twice stronger effect than the fathers' one.

## Conclusions

We can summarize that the maternal age and stature at child's birth influence the anthropometrical characteristic in newborn infants:

- The neonates' body sizes growing up with increasing of maternal age, as the boys and girls, whose mothers are at the age of 20-30 years have biggest sizes. The neonates from both genders, whose mothers are under 20 and girls whose mothers are over 30 years of age, have values of the anthropometrical features lower than the means.
- With increasing of mothers' stature (above 170 cm in height), the neonates from both genders have biggest body sizes.

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