

Mother's Age Effect on the Boys' Anthropometric Properties in the Region of Tuzla (Bosnia and Herzegovina)

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ABSTRACT

Our objective was to establish if mother's age affects the anthropometric properties their 11 and 16 years old sons, and if the boys' BMI is satisfactory. Cross-sections, questionnaires, and statistics were used for data processing BMI (kg/m²) was presented according to the scale Quetelet's index nutritional status. Twelve anthropometric properties were researched. It was established that mother's age affects anthropometric properties in adolescent boys. The younger mothers' boys come to puberty with significantly higher mean values for most anthropometric parameters. In the course of adolescent jump, older mothers' boys have significantly higher anthropometric measures in comparison to their age boys delivered by younger mothers. After the completion of their intensive growth and development anthropometric measures in both category boys are equal or insignificantly higher in younger mothers' sons. Mother's age affects their sons' anthropometric properties of growth and development, particularly in prepuberty and puberty. After puberty that effect is not significant. According to BMI, the boys coming from the researched region make the group of underfed children. That is probably the outcome of bad living conditions, irregular and insufficient diet, stress, etc. in the course of four year aggression on Bosnia and Herzegovina.

Key words: mother's age, anthropometric parameters, exogenous factors

Introduction

Different exogenous and endogenous factors affect children and youngsters' anthropometric properties. The factors that can be either exogenous or endogenous have such effect as well. They are of different intensity in different phases of ontogenesis. Practically, all these factors effect together the organism, and because of that they are researched in multirrelationships (quazicanonic, canonic, regression correlation analysis) with anthropometric properties. However, each of these growth and development factors can be studied, respectively. It is known that some factors together with others have stronger effect on ontogenesis than acting separately. And conversely, there are factors usually considered insignificant for growth and development, but apart they are more significant than other factors. Many authors researched different growth and development factors in boys and girls.

Menarche and factors effecting menarche were researched by: Campbell and Udry¹, Ellis et al², Ellison³, Frisch and McArthur⁴, Graber et al⁵, Kaprio et al⁶, Kim and Smith⁷, Wolanski⁸ etc.

Growth and development of boys, canals of growth and factors essential for growth and development (socio-economic, health-hygienic, climatic-ecologic, stress) were researched by Živičnjak and Pavičić⁹, Schell¹⁰, Kirchengast and Steiner¹¹, Parizkova and Kabele¹², Marić and Janičević¹³, Hadžihalilović and Hadžiselimović¹⁴, Hadžihalilović¹⁵, Wolanski and Zarembo¹⁶, Jovanovic et al¹⁷, Bodzsar and Zsakai¹⁸, etc.

Nutritional status, BMI, skin wrinkles in children and youngsters were researched by Grgurić et al¹⁹, Prizkova²⁰, Vidović et al²¹, Koziel and Krzemien-Dabrowska²² etc.

Body structure was the research subject of Chumlea²³, Tomazo-Ravnik²⁴, Greil

and Trippo²⁵, Szivoczka et al²⁶, Prokopec²⁷.

In Bosnia and Herzegovina exogenous factors' effect on growth and development was the research subject of Hadžiselimović, Terzić and Berberović²⁸, Hadžiselimović²⁹, Hadžiselimović and Zovko³⁰, Hadžiselimović³¹, Novaković³², Berberović, Hadžiselimović and Dizdarević³³, Berberović and Hadžiselimović³⁴, Adžaić³⁵, Terzić³⁶, Švob and Bravo³⁷, Švob, Švob and Novaković³⁸.

Mother's age (father's as well) and birth order effect were mostly researched in relation to the body height, weight and some other obstetrical variables in the newborns. Few data on these subjects can be found in the literature available.

There are very different opinions on the age limit separating young and old parents. In contemporary medical practice an older pregnant women is considered the one over 35 years old. Among these women we differ old primiparas and old multiparas. Young pregnant woman is considered the one in juvenile or adolescent age³⁹.

The objectives of this paper were to establish to what extent mother's age effects growth and development of her sons (11–16 years old) in Tuzla Region and to establish if significant differences between BMI boys exist in both groups.

Material and Methods

The research was carried out in the Tuzla Region, in 1998/99 school year. Data were collected from two primary and four secondary schools. Cross-regional method was used. The anthropometric measurements were performed according to the IBP regulations, that assures unified measurement methodology and equal data obtained by means of the same criteria, of anthropologic methods⁴⁰, and by standardized instruments constructed

according to the criteria for obligatory properties given in the Martin's anthropologic criteria.

Twelve anthropologic properties were researched: body height, body mass, chest circumference, upper arm circumference, upper leg circumference, sitting height, arm length, leg length, pelvis width, shoulders width, length and width of head.

The sample was randomized and stratified depending on the age of boys and mothers into two categories (category 1 – younger mothers' sons; category 2 – older mothers' sons). The sample division into the age groups was performed on the basis of decimal age calculated out of the data collected on the day, month and the year of birth as follows: from 10.6 – 11.5 years = 11 years; from 11.6 – 12.5 = 12 years; 12.6 – 13.5 = 13 years; from 13.6 – 14.5 = 14 years; from 14.6 – 15.5 = 15 years; from 15.6 – 16.5 = 16 years.

As our sample contains very few women that were delivering after the age of 30 (35) years, we took the age of 25 year as the limit between younger and older mother. Today mother's age at delivery was calculated so that the son's years were subtracted from the mother's years of life. That way we found out that in the to-

tal sample (according to these criteria) 535 of 726 boys were delivered by younger mothers (under 25 years), and only 191 boys were delivered by older mothers (over 25 years). In the total sample mean mothers' age is $\bar{X} = 25.64$ years (Table 1).

After systematization and categorization of the data, we made statistics in the Program Statistics 4.5 for Windows (descriptive statistics and t-test). A significant difference between the mean values of the studied parameters in the two compared categories was established. The results are shown in graphics. Body mass index was calculated according to Quetelet's index of nutritional status, that represents quantitative ratio between the real body mass (g) and body height (h) in cm $(\text{kg}/\text{m}^2)^{40}$.

Results

The t-test results show a significant ($p < 0,05$) effect of mother's age on the studied anthropometric parameters in the course of adolescent jump in boys.

In the age of 11 years, the boys born by younger mothers (till 25 years) had significantly higher values for the body mass and all circumferences (of chest, upper arm and upper leg), then for the arm

TABLE 1
THE SAMPLE STRUCTURE RELATED TO THE AGE OF BOYS AND MOTHERS

		Mothers under 25 years						
Age (years):		11	12	13	14	15	16	Total
N		89	81	97	104	78	86	535
%		72.35	60.90	70.29	74.24	72.22	79.62	73.69
Mean mother's age (years) X		21.77	21.45	21.37	21.67	21.15	21.66	$\bar{X}=21.51$
		Mothers over 25 years						
N		34	33	41	36	30	17	191
%		27.65	39.10	29.71	25.71	27.78	20.38	26.31
Mean mother's age (years) X		29.32	29.70	29.18	29.60	30.26	30.57	$\bar{X}=29.77$
Total:								(100%) 726

length and leg length. The other parameters were of insignificantly higher values (Figure 1).

Twelve years old boys delivered by older mothers have insignificantly higher mean values for almost all the studied parameters (except for the sitting height whose values are significantly different).

Older mothers' sons 13 and 14 years old have statistically significantly higher mean value for all parameters (except for the head width and head length (Figures 2 and 3).

The boys 15 years old are in inverse situation. Younger mothers' sons had insignificantly higher mean values for the studied parameters (except for the leg length and pelvis width).

Younger mothers' sons of 16 years had insignificantly higher average values for almost all studied parameters (except for the body height, sitting height, arm length, leg length and shoulders width) (Figure 4). Younger mothers' sons have statistically significantly longer heads.

The results for BMI show that boys from both categories, 11, 12, and 13 years old are considered as very thin children (scale: 1.40–1.80 very thin). The boys of 14, 15, and 16 years old from both categories on this scale belong to thin children (scale: 1.81–2.14, thin). Comparison of BMI in the two categories show that younger mothers had 11, 15, and 16 years old sons with higher BMI values. Older mothers had 12, 13, and 14 years old sons with higher BMI values (Table 2).

Discussion

Effects of mother's social origin, her age and her children birth order on the somatic development of newborns in Tuzgrad was researched by Darmanović et al⁴¹. This research gave the following results: Male newborns are on the average »longer« and »heavier« than the female ones. City boys are longer than the country ones. The same authors established that mothers under 20 years of age deliver boys whose body length vary depending

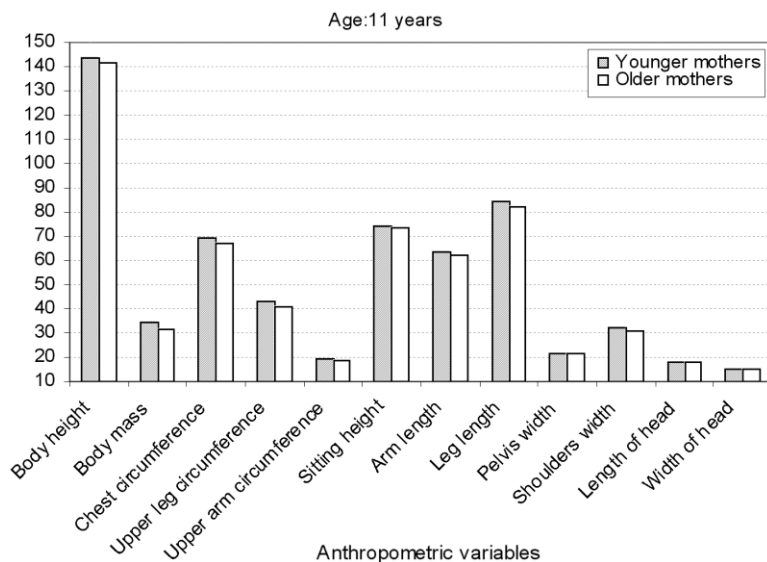


Fig. 1. Mother's age and some anthropometric variables in 11 years old boys in the Region of Tuzla.

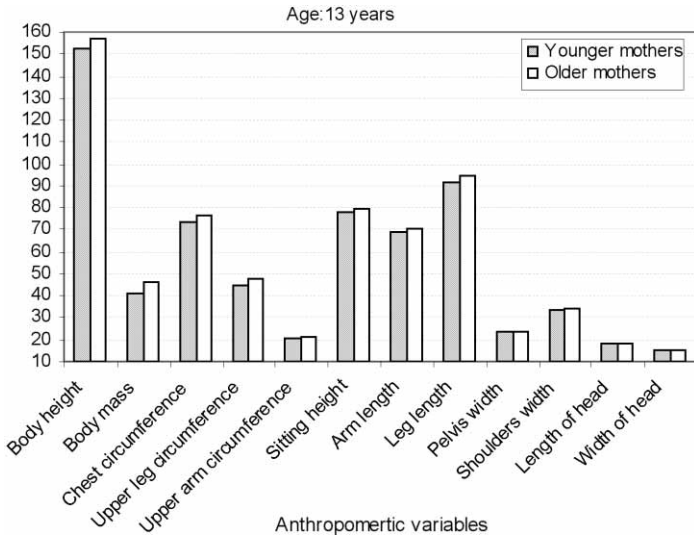


Fig. 2. Mother's age and some anthropometric variables in 13 years old boys in the Region of Tuzla.

on the birth order. Next, the longest boys are delivered by 21–25, and 26–30 years old mothers. The shortest boys are delivered by 20 years old mothers. The heaviest boys are delivered by 26–30 years old country mothers, the heaviest girls are

delivered by 21–25 years old mothers. Mother's age effects the newborn's length and weight, and later in the process of ontogenesis that factor is associated with various effects of exogenous factors. Mikalundra et al.⁴², researching father's

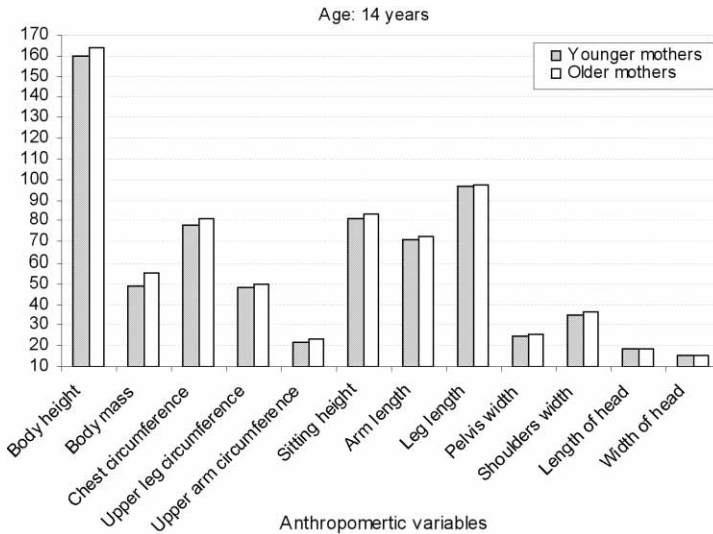


Fig. 3. Mother's age and some anthropometric variables in 14 years old boys in the Region of Tuzla.

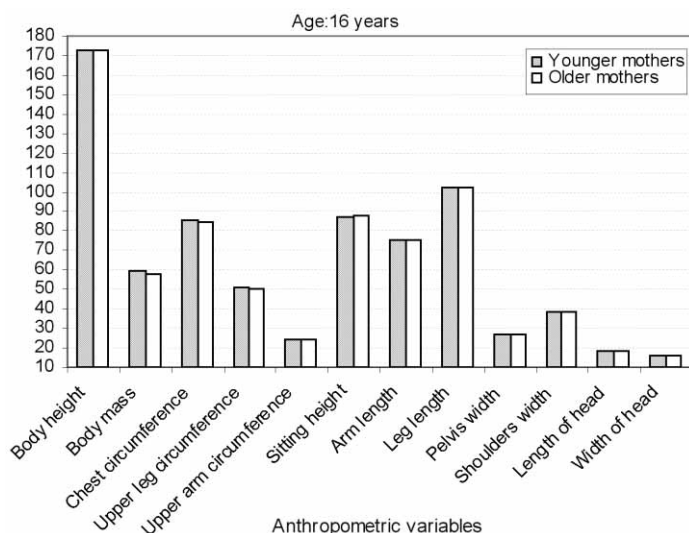


Fig. 4. Mother's age and some anthropometric variables in 16 years old boys in the Region of Tuzla.

TABLE 2
BMI OF YOUNGER MOTHERS' SONS
(CATEGORY 1) AND OLDER MOTHERS'
SONS (CATEGORY 2)

Age	Category 1	Category 2
11	1.68	1.59
12	1.69	1.70
13	1.77	1.87
14	1.90	2.07
15	2.02	1.99
16	2.00	1.95

weight and height effect on the male and female newborn's weight, came to conclusion that parents (father and mother) of male newborns are older than the parents of the female newborns, and that male newborns are heavier than the female ones.

Wolanski and Chrzastek-Spruch⁴³ report that children with smaller body length and weight at birth experience faster body development. All these data show the effect of mother's age on the newborn's body length and weight.

Voljanski and Hervetska's⁴⁴ data on parents' age effect on physical development of their children are very interesting. The best developed children are delivered by 21–25 years old mothers in the country, and by 26–30 years old mothers in town, and by 30–34 years old fathers in town, and over 40 years old in the country. Mothers aged of 16–20 years give the worst developed children in the country, 21–25 years old mothers in town, and 31–35 years old fathers in both groups.

Body height and body mass as the essential indicators of physical growth and development (in the total sample, for both categories) were the subject of Vogt's research, who found that boys do not lag behind the expected body height and mass. But, their BMI is not satisfactory as boys belong to the category of a very thin and thin children. These results speaking about malnutrition, are probably an outcome of bad living conditions due to the four year – aggression on Bosnia and Herzegovina.

Conclusion

The analysis of the Tuzla boys' sample, age of 11–16 years regarding the effect of mother's age on the 12 anthropometric properties gives the following conclusions. In general, it may be said that mother's age effects the anthropologic properties of their sons in the age of 11–16 years. Average age of the younger mothers in total sample was 21.51 years, average age of the older mothers in total sample was 29.77 years, while the average age of all mothers in total sample was 25.64 years, so categorization in the younger (under 25 years) and older mothers (over 25 years) may be discussable. In the group of 11 years old boys, younger mothers gave significantly stronger sons.

Mother's age is in positive correlation with mean values of anthropometric indices in the age of 12–14 years (adolescent jump period) – in this phase of ontogenesis older mothers have more developed sons with significantly higher average values for the studied parameters in the age of 13 and 14 years. After the completion of intensive growth (15 and 16 years) values for most studied parameters are insignificantly higher in the younger mothers' sons (or almost equal) as in their age boys delivered by older mothers. BMI shows that the both categories boys are equally malnourished, what can be explained by the fact that their period of growth in length and width was happening during the bad wartime conditions.

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UTJECAJ DOBI MAJKE NA ANTROPOMETRIJSKE OSOBINE DJEČAKA NA PODRUČJU TUZLE (BOSNA I HERCEGOVINA)

SAŽETAK

Utjecaj starosti roditelja na rast i razvoj djece u prepubertetu, pubertetu i nakon njega nije znatnije istražen. Cilj ovog rada je pokazati utjecaj starosti majki na antropometrijske osobine njihovih 11-ogodišnjih i 16-ogodišnjih sinova, te da li je njihov BMI zadovoljavajući. Za izradu deskriptivne statistike i provođenje t-testa korišten je program Statistics 4.5 za Windows. BMI (kg/m^2) je prikazan na temelju Quetelet skale za indeks uhranjenosti. Promatrali smo dvanaest antropometrijskih karakteristika: tjelesnu visinu, tjelesnu težinu, opseg prsnog koša, opseg nadlaktice, opseg natkoljenice, sjedeću visinu, dužinu ruke, dužinu noge, širinu zdjelice, širinu ramena, dužinu i opseg glave. Utvrdili smo da starost majke utječe na antropometrijske karakteristike adolescentnih dječaka. Dječaci stari 11 godina, rođeni od mlađih majki, ulaze u pubertet sa značajno većim srednjim vrijednostima za većinu promatranih antropoloških osobina. Za vrijeme adolescentnog zamaha rasta, dječaci starijih majki imali su značajno veće vrijednosti antropometrijskih osobina od dječaka koji su rođeni od mlađih majki. Nakon završetka intenzivnog rasta i razvoja (adolescentni zamah) antropometrijske karakteristike u obje kategorije bile su jednake ili neznajčajno veće kod dječaka rođenih od mlađih majki. Starost majke utječe na antropometrijske karakteristike rasta i razvoja muške djece, posebice prije puberteta i za vrijeme puberteta. Taj učinak ne uočava se nakon puberteta. Prema BMI-u, dječaci iz promatranog područja jesu pothranjeni. To je najvjerojatnije rezultat loših uvjeta života, neredovite i nedovoljne prehrane, stresa i drugih čimbenika za vrijeme četverogodišnje agresije u Bosni i Hercegovini.