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Influence of Father's Weight and Height on Weight of Male and Female Newborns

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A B S T R A C T

The study included 1,596 newborns and their parents living in Šibenik County, Croatia. All newborns are born between 37 and 42 weeks of gestation, with no congenital anomalies and from a single pregnancy. Fathers and mothers of male babies are older than those of girl babies ($p < 0.01$). Mean values for weight, height, BMI in parents and the woman's parity are equal ($p = 0.05$). Pregnancy with male baby lasts longer and the babies are heavier ($p < 0.05$). Where the fathers weight between 70 and 79 kg and 80 to 89 kg, and where the fathers are 175 to 179 cm or 180 to 184 cm tall with normal BMI the male babies are heavier than the females at birth ($p < 0.05$). Increased weight, height and BMI in the father increase the birth weight of both male and female babies ($p < 0.00001$). The authors concludes that the parents (father and/or mother) of male babies are older than those of girls, that pregnancy for males babies lasts longer and that male babies are born heavier than girls. With increased weight, and height and BMI in the father, the birth weight of both male and female babies increases.

Introduction

The growth of an embryo and fetus is determined by the fetal genomes at fertilization and by maternal, environmental and placental factors. In the first half of the pregnancy genetic growth control is dominant, through multiple genetic loci, and maternal, environmental and fetal factors are expressed in the later gestational period. The maternal and fetal genotypes also affect the birth weight. The proportion of genetic factors influencing birth is 38% (15% fetal genotype, 20% maternal genotype, 2% fetal gender) whilst the remaining 63% is accounted for by environmental growth factors including maternal factors (age, parity, height,

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weight at conception, weight during pregnancy, birth weight, smoking during pregnancy and socio-economic status)[1–6]. The father influences the birth weight of the newborn trough the autosomal genes of the fetus and its sex[7]. Gestational age also has a significant influence on birth weight.

Materials and Methods

This prospective study, between 1st July 1992 and 31st December 1998, involved 1596 (74.2%) couples and their new born babies, born on the maternity ward of Šibenik General Hospital, taken from a sample of 2150 married couples (where both partners were local people).

The paternal and maternal parameters: weight (kg), height (cm), age (years), were taken from the mother's antenatal records, from conversations with the subjects and from hospital records. The body mass index (BMI) was determined according to Nahum et al[8]. BMI values for the adults are calculated by dividing the weight (kg) by the height (m) squared. BMI up to 19.9 kg/m^2 is low (a thin, poorly nourished person), from 20.0 to 24.9 kg/m^2 is moderate (ideal weight). From 25.0 to 29.9 kg/m^2 is high (overweight) and from 30.0 kg/m^2 or over is very high (obese, very overweight). Live born babies with no congenital anomalies from single full term pregnancies (37 to 42 weeks) were taken. The length of pregnancy was determined by taking the first day of the last menstruation, ultrasound estimate and postnatal assessment according to Farr. At birth the sex of the child, its weight (g) and length (cm) were registered.

Statistical analysis was carried out using t-test, ^{2} test using n m tables for probability, arithmetic means, standard deviation and percentages.

Results

Both the fathers and the mothers of male babies were older than those of girls ($p < 0.01$). Median values for weight, height and BMI for the parents and the woman's parity were equal for male and male babies ($p < 0.05$). Pregnancy is longer for male babies and the babies who are heavier at birth than females ($p < 0.05$) Table 1.

In the group of fathers weighing between 70 and 79 kilos and those from 80 to 89 kilos the male babies are heavier than the female, whilst in the remaining groups there is no difference. Where the weight of the father is greater so the weight of both male and female babies increases ($p < 0.00001$). In the groups of fathers who are 175 to 179 cm tall and the group from 180 to 184 cm tall the male babies are heavier than the females. With increased height in the father the weight of both male and female newborns increases ($p < 0.00001$) Table 2.

Discussion

Hormones (IGF I, IGF II and insulin) play an important part in controlling the growth of the fetus along with genetic, maternal environmental and placenta factors[9–11].

The fathers and mothers of male newborns were older than those of female babies, for which we were not able to find confirmation in literature. There is also no data on the pregnancy lasting longer when the baby is male then when is female, which was shown by our study. Male babies weighed more than girls, which is also in accord with other authors[12–14].

There are very few papers dealing with the influence of the father on the baby's birth weight[13–16] and even fewer relating to the influence of the father's weight and height on the weight of male and female newborns[13].

TABLE 1
AGE, WEIGHT, HEIGHT, BMI OF FATHERS AND MOTHERS OF NEWBORNS, MATERNAL PARITY AND BIRTH WEIGHT OF NEWBORNS

Parameters	Sex of newborn				t – test	p
	Male, N = 828		Female, N = 768			
	X	SD	X	SD		
A) Fathers						
Age (years)	29.4	8.2	28.3	7.3	2.85	< 0.01
Weight (kilos)	81.4	22.1	81.0	22.2	0.36	n.s.
Height (cm)	181.2	18.5	180.6	18.7	0.65	n.s.
BMI (kg/m^2)	24.77	5.62	24.75	5.68	0.70	n.s.
B) Mothers						
Age (years)	28.4	9.3	27.5	8.8	2.08	< 0.01
Weight (kilos)	66.4	12.6	66.5	12.3	0.16	n.s.
Height (cm)	168.3	12.2	168.4	12.6	0.16	n.s.
BMI (kg/m^2)	23.5	3.6	23.6	3.8	0.54	n.s.
Parity (%) (n)						
0	36.7 (304)		39.2 (301)		0.63	n.s.
1	42.0 (348)		40.0 (307)		0.53	n.s.
2	15.0 (124)		15.0 (115)		–	–
3	4.2 (35)		3.9 (30)		0.06	n.s.
4 and more	1.2 (17)		2.0 (15)		0.02	n.s.
C) Duration of pregnancy	282.4	9.3	281.2	8.4	2.74	< 0.01
D) Weight of newborn	3724	19.9	3623.2	512.4	3.91	< 0.01

Most authors[13–18] find that the father's weight and height positively correlate with the weight of the baby. However Lazar[19] stated that the father's weight and age have a significant affect on birth weight, whilst height does not correlate with the baby's birth weight. Our study showed that the father's greater height and weight increased the birth weight of both male and female newborns. Where the father's BMI is normal, male newborns are heavier than females (3,703 523 : 3,629 449 g; $p < 0.02$) whilst in the remaining groups there is no difference in the BMI. According to data from literature[12,14–16], with an increased BMI in the father there is an increase in the newborn's birth weight, and our study showed that the weight of both male and female babies increased.

In conclusion we may stay that the parents (father and/or mother) of male babies are older than those of girls, that pregnancy is longer for male baby and male newborns are heavier than females. Where the father's weight and height and BMI are greater, the weight of both male and female babies increases.

TABLE 2
FATHER'S WEIGHT, HEIGHT, BMI
AND BIRTH WEIGHT OF NEWBORNS IN RELATION TO SEX

Parameter	N	Sex of newborn				t – test	p
		Male (n)		Female (n)			
Father's weight (kg)							
– 59	34	3,646	382 (18)	3,565	420 (16)	0.50	n.s.
60 – 69	210	3,665	492 (109)	3,545	475 (101)	1.79	n.s.
70 – 79	480	3,680	530 (248)	3,580	516 (232)	2.10	<0.05
80 – 89	564	3,740	524 (293)	3,625	518 (271)	2.62	<0.01
90 – 99	208	3,792	521 (107)	3,730	540 (101)	0.84	n.s.
100 – 109	64	3,845	546 (34)	3,778	562 (30)	0.48	n.s.
110 and more	36	3,890	580 (19)	3,795	510 (17)	0.61	n.s.
		^{2} = 753.39 p < 0.00001 st. sl. 6		^{2} = 689,11 p < 0.00001 st. sl. 6			
Father's height (cm)							
– 169	80	3,602	463 (42)	3,529	423 (38)	0.45	n.s.
170 – 174	211	3,623	493 (111)	3,542	472 (100)	0.77	n.s.
175 – 179	542	3,702	523 (280)	3,617	483 (262)	1.97	0.05
180 – 184	465	3,749	499 (240)	3,634	490 (225)	2.37	0.02
185 – 189	172	3,816	593 (89)	3,711	570 (83)	1.19	n.s.
190 – 194	86	3,943	587 (44)	3,750	575 (42)	1.55	n.s.
195 and more	40	4,000	663 (22)	3,881	606 (18)	0.49	n.s.
		^{2} = 414.35 p < 0.00001 st. sl. 6		^{2} = 370.49 p < 0.00001 st. sl 6			
Father's BMI kg/m^2							
– 19.9	88	3,583	442 (40)	3,483	450 (48)	1.16	n.s.
20.0 – 24.9	1105	3,703	523 (571)	3,629	449 (534)	2.41	0.02
25.0 – 29.9	390	3,813	570 (208)	3,753	548 (182)	1.06	n.s.
30 and more	13	3,908	618 (9)	3,831	591 (4)	–	–
		^{2} = 1309.61 p < 0.00001 st. sl. 3		^{2} = 1202.36 p < 0.00001 st. sl. 3			

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UTJECAJ TJELESNE MASE I VISINE OCA NA TJELESNU MASU MUŠKE I ŽENSKE NOVOROĐENČADI

S A Ž E T A K

U radu je promatrano 1596 parova i njihove novorođenčadi (rođene između 37 i 42 tjedna gestacije) koja nisu imala kongenitalnih anomalija i koja su rođena iz jednoplodne trudnoće. Očevi i majke muške novorođenčadi su stariji nego oni u ženske novorođenčadi ($p < 0.01$). Srednja vrijednost za tjelesnu masu, duljinu, BMI u roditelja, kao i majčin paritet je jednak ($p = 0.05$). Trudnoća sa muškom djecom je trajala dulje i muška novorođenčad su bila teža ($p < 0.05$). U slučajevima gdje su očevi bili teški od 70 do 79 kg, i 80 do 89 kg, i gdje su očevi visine 175 do 179 cm, ili 180–184 cm, sa normalnim BMI, muška novorođenčad su teža od ženske novorođenčadi ($p < 0.05$). Povećanjem tjelesne mase, duljine i BMI u očeva veća je porođajna težina i muške i ženske novorođenčadi ($p < 0.00001$). Autori zaključuju da su roditelji (otac i/ili majka) muške novorođenčadi stariji nego u ženske novorođenčadi, da trudnoća s muškom djecom traje dulje, te da je muška novorođenčad teža od ženske. Povećanjem tjelesne mase, duljine i BMI u očeva veća je porođajna težina i muške i ženske novorođenčadi.