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IMPACT OF THE TYPE OF DELIVERY ON GROWTH, BODY COMPOSITION AND MOTOR PERFORMANCE OF CHILDREN AND YOUNG PEOPLE

Diego Bessa Dantas[1], João Fernando dos Santos, Vinicius Muller Reis Weber, Sandra Aires Ferreira, Marcos Roberto Queiroga

[1]dantasdb1488@gmail.com, UEL, 0000-0001-8824-3565

Abstract

The aim of this study was to investigate the impact of cesarean delivery (CD) and normal delivery (ND) on growth, body composition and motor performance of children and young people. The study included 114 children and young people (11 to 18 years old) who were divided into two groups (ND and CD). Participants underwent a battery of anthropometric measurements and motor tests. Children and young people born with CD showed greater performance in the trunk elevation test in extension (flexibility), shorter distance covered (m) in the treadmill test (aerobic resistance), greater amount of subcutaneous tissue and endomorphy component than children and young people born from ND. It was observed that children born with CD in this study had a greater amount of body fat, greater trunk flexibility and shorter distance covered on a treadmill, suggesting important advantages for children born with ND in relation to obesity and aerobic capacity. These components of physical fitness related to health are determinant for the development of chronic degenerative diseases. This study reveals that ND should also be encouraged as a health promotion strategy.

Keywords: Child, Growth and Development, Body Composition

1. Introduction

According to the World Health Organization (WHO) (1), the cesarean delivery rate (CD) is a worldwide epidemic, exceeding the recommended levels of 10% to 15% of deliveries. Data indicate that pregnant women, along with their physicians, are opting for cesarean section even when it is not really necessary. There is evidence suggesting negative effects on newborns that may be related to the mode of delivery. This, associated with other conditions, can interfere with the child's health and development (2).

Events that occur in the first months of life may reflect on motor performance throughout life, mainly due to the stimuli given to the newborn, stimuli considered extrinsic factors (3). In addition to motor performance, body composition can also be influenced by several factors, favorable or not, to child development (4). Controlling body composition during childhood can reduce the risks of future comorbidities in adult life (5). Childhood obesity is a multifactorial morbidity that can be aggravated by several factors and subsequently favor the development of chronic diseases (6).

The types of delivery are considered factors that can influence the development of the newborn, but there is little evidence to demonstrate that the mode of delivery is an influencing factor in the process of motor performance and human body composition (3). Understanding the impact of the mode of delivery on human development can lead to changes in clinical practice, can drive public policies that favor the humanization of childbirth, as well as the existence of gaps in the scientific literature. This research aims to compare the impact of the type of delivery on the growth, composition and motor performance of children and young people.

2. Material and methods

2.1 Design and Participants

This study is an observational study with an ecological design that aims to investigate the association between the type of delivery and physical fitness indicators in children and young people. The study includes 114 participants from the city of Rio Claro-SP. Anthropometric measurements were obtained, such as body mass, height, Body Mass Index (BMI), skinfold measurements and waist circumference. The study also evaluated physical fitness, with the sit and reach test, the sit test, the trunk lift test, and arm flexion and extension tests. The intervention protocols used in this study were approved by the Research Ethics Committee of Universidade Estadual Paulista (protocol no. 5093) and followed the norms of Resolution 196/96 of the National Health Council on research involving human beings.

2.2 Data analysis

Variables with normal distribution were shown as mean and standard deviation (±) and the groups compared using the independent t-test, with the effect size measured by Cohen's d. The effect size was estimated using the Hedges'g equation with correction for bias. Asymmetric variables were presented with median values and confidence intervals, and the groups were compared by the Mann-Whitney test with the effect size presented by the r proposed by Cohen.

3. Results and discussion

The results revealed differences for two variables between the CD-born and ND-born groups (Table 1). The sum of the skinfolds and the endomorphy component showed greater differences in the CD group compared to children born from ND, respectively.

Table 1. Comparison Anthropometry between groups for morphological indicators

Anthropometry	ND	CD	P	d
Humerus diameter (cm)	6.2±0.6	6.0±0.4	0.23	0.40
Fêmur diameter (cm)	9.0±0.6	9.0±0.5	0.98	0.00
Contracted arm (cm)	25.5±4.3	25.2±3.4	0.72	0.08
Waist circumference (cm)	70.0±10.0	70.3±11.0	0.84	0.03
Mid-limb circumference (cm)	32.5±3.5	33.0±4.2	0.57	0.12
Body mass (kg)	53.2±14.9	50.2±11.9	0.42	0.24
Fat mass (kg)	13.0±10.3	12.4±8.4	0.86	0.07
Lean mass (kg)	39.0±7.6	40.3±8.6	0.44	0.15
Height (cm)	159.3±11.8	157.6±9.7	0.35	0.17
BMI (kg/m2)	20.3±3.4	20.4±3.9	0.72	0.07
Sum of skinfolds (mm)	20.8±8.8	28.5±16.0	**0.02***	0.52
Endomorphic somatotype	3.3±1.7	4.6±2.2	**0.01***	0.60
Ectomorphic somatotype	2.9±1.5	2.7±1.6	0.55	0.12

*p <0.05; Results presented as mean and standard deviation; ND: Normal delivery; CD: Cesarean delivery

Table 2 shows the comparison between groups for motor performance indicators. The results revealed that the performance in the tests of elevation of the trunk in extension (cm) and in the covered distance (km) in the aerobic test (treadmill), differed significantly between the two groups. The CD group showed greater performance in the trunk extension test and lower performance for the distance covered during the treadmill test, than the ND group.

Table 2. Comparison between groups for motor performance indicators.

Testes		ND	CD	P	r
Sit-and-reach test (cm)		18 (15-23)	21 (18-24)	0.66	0.04
Abdominal Test (rep)		22 (21-24)	22 (19-24)	0.66	0.04
Trunk lift test in extension (cm)		25 (24-27)	28 (27-29)	**0.01***	0.23
Arm flexion and extension test (rep)		5 (3-7)	3 (0-6)	0.38	0.08
Horizontal jump test (cm)		145 (137-151)	133 (115-149)	0.24	0.11
50-meter running test (seg)		9.6 (9.4-10.0)	10.1 (9.7-10.5)	0.53	0.06
Right handgrip test (kgf)		22 (19-26)	24 (21-25)	0.41	0.09
Left handgrip test (kgf)		23 (21-25)	23 (20-27)	0.86	0.03
Treadmill running test	$VO_{2máx}$ (ml.kg-^{1}.min-1)	51.3 (48.7-55.0)	54.2 (50.6-57.6)	0.25	0.05
	Traveled distance (km)	1.0 (0.8-1.7)	0.8 (0.7-0.8)	**0.01***	0.39
	Maximum Borg (6-20)	18 (17-19)	19 (17-19)	0.26	0.11
	Test time (min)	8.3 (7.1-9.2)	7.2 (7.1-7.5)	0.06	0.23

*p <0.05; Results presented as median and confidence interval; ND: Normal delivery; CD: Cesarean delivery

4. Conclusion

It is concluded that the children born in this study who were born with CD had a greater amount of body fat, greater flexibility of the trunk and a shorter distance covered on a treadmill, suggesting important advantages for children born with ND, in relation to obesity and physical capacity aerobic.

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