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Research Article

The Neonates' Body Length and Body Weight in Two Different Periods of Time

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Abstract

The morphometric measurements (Birth Body Length, Birth Body Weight, Head Circumference, and Abdominal Circumference) are irreplaceable in general health assessments and the nutritional condition of newborn babies. Many defined and undefined internal and external factors significantly affect the neonates' bodyweight and birth length. The purpose of this paper was to investigate the impact of the time span of 17 years on the body length and weight of newborns, the average age of the mother and the number of births.

Birth Body Length and Birth Body Weight were measured in 214 neonates from Kosovo in two different timelines: 105 neonates born in 2001 and 109 neonates born in 2018. The obtained data were analyzed through descriptive parameters, T-test, and Canonical Discriminant Analysis.

According to the canonical discriminative analysis data, it can be concluded that in 2018 women older gave birth to children with greater body length and weight, compared to 2001 when younger women gave birth to children with smaller body length and body weight.

Among many defined and undefined factors, the difficult socio-economic situation in afterwar Kosovo (2001) has been the main factor for the smaller morphometric dimensions of the children born this period than the children born in 2018.

Keywords: Neonates; Birth Body Length; Birth Body Weight

Introduction

As in adults and newborn babies, the morphometric measurements are irreplaceable in general health assessments. For a long time, the morphometric variables are practised to be measured in newborn babies (neonates) are Birth Body Height, Birth Body Weight, Head Circumference, and Abdominal Circumference. According to these measurements can be assessed the nutritional condition of newborn babies.

According to Yokoyama., *et al.* (2005), gestational age, maternal pregravid body mass index (BMI), and the neonates' sex are significant factors that affect the neonates' birthweight, birth length, and head circumference [1].

Low body weight of the neonates is a significant public health problem in developing countries determined by many factors, including maternal diet and nutritional status, exposure to smoke and diseases during pregnancy before and during pregnancy [2].

Vega., *et al.* (1993) have determined eight risk factors significantly associated with low birth weight and intrauterine growth retardation (number of pregnancies, previous adverse outcome, previous low birth weight, maternal weight during pregnancy, number of prenatal visits, month of first prenatal visit, smoking, and intrahepatic cholestasis of pregnancy). Among these risk factors, only two of them (prepregnancy weight and divorced mother) were significantly associated with low birth weight in the preterm group [3].

Malnutrition (nutritional status) combined with underlying factors such as socio-demographic, anthropometric, health service received during pregnancy, poverty and women's status (maternal education) may significantly affect the body weight and length of the neonate [4,5].

According to Amina and al-Awardi (1991), mothers from high-income families (obese mothers) had heavier babies when compared with a low-income group. Meanwhile, educated and employed mothers were more liable to delivere slightly smaller babies than illiterate or unemployed mothers [6].

The study findings of Goisis., *et al.* (2017) indicate that advanced maternal age was not associated with the neonates' low birth weight. According to them, several unobserved factors are related to the probability of neonates' low birth weight [7].

The purpose of this paper was to investigate the impact of the timespan of 17 years on the number of births at the state level, body length and body weight of newborns, the average age of the mother and the number of births.

Materials and Methods

Research design

This study as a part of the project "Morphological characteristics of the Kosovo Albanian population" was carried out at the Institute of Sports Anthropology in Prishtina, Kosovo, during the period of time 2007-2016.

By its nature, this research is an observational and cross-sectional descriptive study.

Site of study and sampling

Two morphometric variables (Birth Body Length and Birth Body Weight) were measured in 214 neonates from Kosovo in two different timelines: 105 neonates born in 2001 (48 female neonates; 57 male neonates) and 109 neonates born in 2018 (54 female neonates; 55 male neonates).

Measuring tools and data collection

In conformity with the International Biological Program (IBP) the following morphometric variables were measured:

- **Birth Body Length (BBL):** The body height of neonates has been measured with the Harpenden Infantometer with the measuring range-millimetres: 300 mm to 910 mm (with accuracy 0.1 cm).

- **Birth Body Weight (BBW):** Was performed using electronic baby scale WPT 6/15D, with accuracy +/- 0.5grams.

BBH and BBW measurements were made by the midwives/neonatal nurses within a time no longer than 1 hour following birth. These measurements were not performed with the purpose of studying but as the routine daily activity.

Data analysis

The statistical analyses of the collected data were performed with the IBM SPSS Statistics software package, version 20. The obtained data were analyzed in term of the descriptive statistical parameters: Minimum, Maximum and Mean values, and Standard Deviation. The significance of the differences between two measurements done in different time-period was tested via T-test and Discriminative Canonical Analysis.

Ethical considerations

This project was approved by the Ethics Committee of the Institute of Sports Anthropology.

The authors declare no conflict of interest and no financial or commercial benefits for this study's performance.

Results and Discussion

Table 1 show the essential descriptive statistical findings (Mean values and their Standard Deviation) regarding the mother's age, the number of births, number, and gender of examined neonates, the neonates' body length and weight. According to this table's data, the systematic differences between all variables evidenced in two different time periods (2001/2018) can be noticed.

In general, our findings reflect the previously reported results. Male and female newborns born in 2018 are characterized by greater body length than newborns in 2001 (males 1.96cm; females 0.54cm), while body weight is similar. Similar results have been encountered by other authors, who justify these changes mainly by the influence of socio-economic factors (Alessie., *et al.* 2018; Baxter-Jonnes., *et al.* 1999; Silva., *et al.* 2012).

There is also an age difference between mothers of neonates in 2018 (approximately 29 years old) and mothers of neonates in

2018 (about 26 years old). Also, based on the results of table 1, systematic differences in body weight and body length can be ascertained between male newborns and female newborns in both periods. Male newborns in 2001 were taller than female newborns by 0.40cm and heavier by 43.76 gr. Meanwhile, male newborns in 2018 were taller than female newborns by 1.62 cm and heavier by 239.17 gr. Similarly, with our results, Yokoyama., *et al.* (2005) have found that male neonates had a higher birth weight, longer birth length and greater head circumference than female neonates. The first description of the morphometric differences between male and female neonates have been described by Clarke (1978). He has reported significant morphometric differences between male infants and female infants (Clark, 1786).

Groups of neonates:	Variables:	Mean	Std. Deviation
Female neonates-2001 Nr = 48	Age of mother	25.65	4.37
	Nr of birth	1.71	1.52
	Birth Body Length	51.46	2.60
	Birth Body Weight	3280.63	478.03
Male neonates-2001 Nr = 57	Age of mother	26.63	4.35
	Nr of birth	2.07	1.45
	Birth Body Length	51.86	2.58
	Birth Body Weight	3334.39	492.33
Female neonates-2018 Nr = 54	Age of mother	29.70	5.07
	Nr of birth	2.09	1.07
	Birth Body Length	52.00	2.87
	Birth Body Weight	3280.19	541.42
Male neonates-2018 Nr = 55	Age of mother	28.40	5.79
	Nr of birth	2.15	1.22
	Birth Body Length	53.62	2.52
	Birth Body Weight	3572.36	482.39

Table 1: General information.

The descriptive statistical findings (Mean, Minimum and Maximum values, and Standard Deviation), T-test value and probability, calculated for each variable measured in two different periods, are shown in table 2.

T-test confirms statistically significant differences in almost all variables measured in two different periods of time (time difference 17 years), except the number of births that is almost the same in two periods.

	Grupet	N	Min	Max	Mean	Std. Deviation	t	p
Age of mother	2001	105	18.00	37.00	26.18	4.37	-4.23	0.00
	2018	109	17.00	40.00	29.05	5.46		
Nr of birth	2001	105	1.00	10.00	1.91	1.48	-1.19	0.24
	2018	109	1.00	5.00	2.12	1.14		
Birth Body Length	2001	105	45.00	57.00	51.68	2.59	-3.09	0.00
	2018	109	53.00	58.00	52.82	2.81		
Birth Body Weight	2001	105	2000.00	4300.00	3309.81	484.26	-1.69	0.09
	2018	109	1750.00	5000.00	3427.62	530.79		

Table 2: Group statistics and t-test.

The multidimensional differences between two groups of independent variables measured in two different periods of time have been determined by Canonical Discriminant Analysis (Table 3). This statistical analysis has derived one significant discriminative function ($p = 0.000$) with eigenvalue $\lambda = 0.14$; the canonical correlation of this discriminative function with the system of independent variables was $Rc = 0.615$. The discriminative force of the measured variables has been assisted by Wilks 'λ = 0.35, whereas the statistical significance of the discriminative equation has been tested by Bartlet X2-test X2 = 27.99.

Function	λ	Rc	Wilks'λ	Bartlet X^2-test	p	Group centroids Neonates/2001	Neonates/2018
1	0.14	0.35	0.87	27.99	0.000	-0.38	0.37

Table 3: Canonical discriminative function and group centroids.

Group centroids (Table 1) represent the means of the discriminant function scores by the group for the function calculated.

Structure Matrix (Table 4), known as the canonical structure of the derived discriminant function, represents the correlations between the independent variables (age of mother, birth body length, birth bodyweight, nr. of birth) and the discriminant function.

Variables	Function
Age of mother	0.77
Birth Body Length	0.56
Birth Body Weight	0.31
Nr of birth	0.22

Table 4: Structure matrix.

Based on the values of group-centroids and the structural matrix, the variables that significantly discriminate two groups, measured in different periods of time, can be identified.

According to the canonical discriminative analysis data, it can be concluded that in 2018 women older gave birth to children with greater body length and weight, compared to 2001 when younger women gave birth to children with smaller body length and body weight.

Conclusion

Kosovo has the youngest population in the region, where 70% of the demographic trunk is under 30. If Kosovo is compared to European countries, it still stands higher in the level of births. But comparing the birth rate with previous decades, in Kosovo, for various reasons (difficult economic conditions, flight of young people from Kosovo, family planning, etc.), the birth rate is marking significant roots from year to year. According to the Statistical Office of Kosovo, in 2000, 38687 births were registered in Kosovo, while in 2018, 29080 births were registered (9607 births less) [8-12]. Also, after the two-year war/conflict (1998/1999), the socio-economic situation in Kosovo in 2001 has been more difficult compared to 2018. The high unemployment rate has made the average age of women who have given birth in 2001 to be younger (26 years old) than women (29 years old) who gave birth to children in 2018. Also, due to the severe economic situation (malnutrition or insufficient nutrition of the mother) of 2001, children born in this period are characterized by smaller values of body length and body weight compared to children born in 2018.

Future Research

In addition to this study, other important measurements and analyses have been made within this project, such as analysing the first baby cry.

Practical Application

The gained results may be used and applied in different medical (clinical, neonatological, nutritional) and anthropological contexts.

Disclosure Statement

The authors declare that they have no conflicts of interest.

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Bibliography

1. Yokoyama Y., *et al.* "Analysis of factors affecting birthweight, birth length and head circumference: study of Japanese triplets". *Twin Research and Human Genetics* 8.6 (2005): 657-663.

2. Martorell R and Gonzales-Cossio T. "Maternal Nutrition and Birth Weight". Yearbook of physical anthropology. Food Research Institute, Stanford University, Stanford, California 30 (1987): 195-220.

3. Vega J., *et al.* "Factores de riesgo para bajo peso al nacer y retardo de crecimiento intrauterino en Santiago de Chile [Risk factors for low birth weight and intrauterine growth retardation in Santiago, Chile]". *Revista Médica de Chile* 121.10 (1993): 1210-1219.

4. Kader M and Perera NK. "Socio-economic and nutritional determinants of low birth weight in India". *North American Journal of Medicine and Science* 6.7 (2014): 302-308.

5. Ramakrishnan U. "Nutrition and low birth weight: from research to practice". *The American Journal of Clinical Nutrition* 79.1 (2019): 17-21.

6. Amine EK and al-Awadi F. "Factors affecting birth weight in Kuwait. Part I, Maternal, dietary and socioeconomic factors". *The Journal of the Egyptian Public Health Association* 66.5-6 (1991): 625-648.

7. Goisis A., *et al.* "Advanced Maternal Age and the Risk of Low Birth Weight and Preterm Delivery: a Within-Family Analysis Using Finnish Population Registers". American Journal of Epidemiology 186.11 (2017): 1219-1226.

8. Kastrati A., *et al.* "Estimation, Kosovo Population in 2018 (2019)". Prishtina, Kosovo.

9. Alessie R., *et al.* "Economic downturns and infant health". *Economics and Human Biology* 30 (2018): 162-171.

10. Baxter-Jones ADG., *et al.* "Influence of socioeconomic conditions on growth in infancy: the 1921 Aberdeen birth cohort". *Archives of Disease in Childhood 81* (1991): 5-9.

11. Silva LM., *et al.* "Children of low socioeconomic status show accelerated linear growth in early childhood; results from the Generation R Study". *PLoS One* 7.5 (2012): e37356.

12. Clarke JD." Observations on some causes of excess mortality of males above that of females". *Philosophical Transactions of the Royal Society of London* 76 (1786) :349-364.