

ANTHROPOMETRIC PROFILES OF YOUNG RHYTHMIC GYMNASTIC ATHLETES ACCORDING TO THEIR PARENTAL NUTRITIONAL BEHAVIOR

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Abstract

Rhythmic gymnastics is a sport that is supported by strength, speed and endurance with an emphasis on flexibility and coordination. It is assumed that low fat percentage, normal height, low body weight, and elegant and thin structure influence the performance of the athletes because it provides an aesthetically advantage in this sports branch. The aim of the study was to reveal the anthropometric properties in rhythmic gymnastics athletes, and to examine the changes and relationships of these parameters according to their parents' diet. A questionnaire with socio-demographic information, Parental Feeding Style Questionnaire, was used to gather data. The data on children's BMI, waist circumference and upper middle arm circumference were also included; these measurements were all taken by the same researcher. It was determined that the scores obtained from the parent feeding style scale differed according to the waist circumference of the child ($p < 0.05$). It can be concluded that the scores obtained from the parent feeding style scale and its sub-dimensions of promoting to eat /encouraging feeding and instrumental feeding differ according to the child's upper middle arm circumference ($p < 0.05$). As a result of the research, some sociodemographic and anthropometric features seem to affect the parents' feeding style of their children. The results obtained from this study can be used as a guide when creating forward-looking nutrition models for children engaged in rhythmic gymnastics, and planning the nutritional education for their parents.

Keywords: *rhythmic gymnastics, athletes, anthropometry, parental feeding style.*

INTRODUCTION

Gymnastics is defined as a sports branch that includes a high level of strength, flexibility, speed, coordination as well as muscular and cardiovascular endurance. It has positive effects on children's motor skills and self-confidence, especially in the development age (Mitchell et al., 2002). The age when children start gymnastics is lower compared to other sports branches. The main purpose of this is to emphasize the

aesthetic and flexible appearance of the body and to provide basic education (Koç, 1996). Rhythmic gymnastics is a sport where flexibility and coordination are at the forefront (Jastrjemskaia & Titov, 1999). It is defined as “displaying the techniques of instruments with different features within a certain rule, in harmony with aesthetics and elegance, with free body movements, accompanied by music, and fluently” (Yayla, 2009). It seems that

low fat percentage, normal height, low body weight, elegant and thin structure have an effect on the performance of the athletes because it provides an aesthetically advantage in this sports branch (Alexander, 1991). In general, the achievement of a high level of performance and efficiency in any sport branch depends on both the hereditary abilities of the individual engaged in that sport and the skills learned for the sport (Dündar, 1996). Factors such as motor development, heredity, environmental factors, socio-economic level, intelligence and eating habits play a role in starting and maintaining sports. Children's growth rates, growth rate of their height and time to reach the maximum level, bone maturity, etc., are determined by genes. In this context, heredity becomes important in terms of gaining some skills (Özer & Özer, 2005; Toivo & Jaak, 2000). Factors such as family's attitude toward children, cultural and socioeconomic levels as the immediate environment in which children live are extremely important for the motor development of children. The results of the research conducted by Lazarou et al. show that eating habits in children are introduced by the family (Lazarou et al., 2008). For example, it is known that consuming more fatty foods in the family also causes the child to consume more fatty foods; consuming more junk food has similar effects on children (Oliveria et al., 2008).

As with all sports, nutrition plays an important role in rhythmic gymnastics. Adequate and balanced intake of all nutrients is essential for the ability to grow, develop, and maintain health, training and performance (Ersoy & Paker, 1991). The highest efficiency obtained in rhythmic gymnastics is associated with acquiring good nutritional habits and ensuring the quality of nutrition. It is known that rhythmic gymnasts tend to consume less calorie foods to keep their physical performance optimal (Benardot et al., 1989).

METHODS

The presented study was designed as descriptive and cross-sectional study. The aim of the study was to reveal the anthropometric properties in rhythmic gymnastics athletes, and to examine the changes and relationships of these parameters according to their parents' diet.

The study included 128 athletes between the ages of 6 and 16 who engage in rhythmic gymnastics as amateurs in the relevant gymnastics club, and their parents. According to the calculation results, the lowest number of samples was determined as 97. Within the scope of the study, 105 athletes and their parents were surveyed. The research was carried out between January-March 2020 in a private gymnastic sports club operating in the Anatolian Side of Istanbul.

To obtain the nutritional habits data from the participants, a questionnaire with socio-demographic information, Parental Feeding Style Questionnaire, was used. The data on children's BMI, waist circumference and upper middle arm circumference were also included in the information form and these measurements were all made by the same researcher. The body composition measures were taken before the training session started: body mass, height, and waist circumference. The protocol established by the International Society for Advancement of Kinanthropometry (Esparza, 1993) was applied for all measures. The standing height of the children was measured to the nearest 0.1 cm with a stadiometer, and their weight using an electronic scale to the nearest 50g.

We used specialised software prepared by the World Health Organisation (WHO) – 'WHO Anthro' (for children under six years of age) and 'WHO Anthro Plus' (for children over six years of age), to assess children's height, weight, and BMI (World Health Organization, 2007). For each variable we calculated the Z-

score and percentile score for the relevant age.

The Parental Feeding Style Questionnaire was developed by Wardle et al. The scale, which consists of 27 items in the 5-point Likert type, has 5 sub-dimensions, including strict control, tolerant control, emotional feeding, promoting to eat / encouraging feeding, and instrumental feeding (Wardle et al., 2002). The Turkish validity and reliability study of the scale was conducted by Özçetin et al. (Özçetin et al., 2010). The 1st, 11th, 16th and 23rd items of the scale consist of inverse questions and were inverted before the analysis. The 5th, 17th, 20th and 26th items constitute the strict control sub-dimension. The 1st, 11th, 14th, 16th and 23rd questions of the scale constitute the tolerant control sub-dimension, the 2nd, 13th, 15th, 21st and 25th items constitute the emotional feeding sub-dimension, the 3rd, 4th, 6th, 8th, 10th, 12th, 19th and 27th items constitute the promoting to eat / encouraging feeding sub-dimension and finally the 7th, 9th, 18th and 22nd items the sub-dimension of the instrumental feeding.

IBM SPSS 22 Program was used for data analysis. In order to decide on the method for data analysis, it was first checked whether the data complied with the normal distribution conditions. In the results of the Kolmogorov Smirnov Normality Test conducted in this context, the data from the Parental Feeding Style Questionnaire do not fit into the normal distribution. In this context, it was decided to use non-parametric analysis methods. The Mann Whitney U Test was used in the analysis of the difference between the two groups, and in the case of more than two groups, the Kruskal Wallis Test was used. In addition, in the case of more than two

groups, Bonferonni Comparative Mann Whitney U Test was performed to find out from which group the difference originated. Finally, Pearson Correlation Analysis was conducted to analyze the relationship between child feeding behavior and their parents' feeding style. The significance level was accepted as 0.05 for all analyses.

RESULTS

The distribution of the socio-demographic data of the athletes participating in the research is given in Table 1. As can be seen, 10.5% (n = 11) of athletes are 6 and 7 years old, 32.4% (n = 34) are 8-9 years old, 30.5% (n = 32) are 10-11 years old, 17.1% (n = 18) are between 12-13 years old and 9.5% (n = 10) are between the ages of 14 and 16.

Waist and upper middle arm circumference of the athletes were measured. Data on the distribution of these values are given in Table 2. When the data on the waist circumference of the athletes are analyzed, the majority of the waist circumference (46.7% , n = 49) is between 51 and 55 cm. The proportion of athletes with a waist circumference of 61 cm and above is only 8.6% (n = 9). The average of waist circumference was 53.01 ± 6.36 . Finally, the upper middle arm circumference was measured. 18.1% (n = 19) of athletes have the upper arm circumference in the range of 13 and 16 cm, this range is 17 and 20 cm for 62.9%, and 21 and 24 cm for 19% (n = 20). The upper arm circumference measurement mean was 18.41 ± 2.49 for the athletes participating in the research.

Table 1
Age distribution of athletes.

		n	%	Average
Age	6-7	11	10.5	10.14±3.32
	8-9	34	32.4	
	10-11	32	30.5	
	12-13	18	17.1	
	14+	10	9.5	

Table 2
Distribution and averages of anthropometric measurements of athletes.

	Value range	n	%	Average
Waist Circumference (cm)	35-40	2	1.9	53,01±6.36
	41-45	9	8.6	
	46-50	17	16.2	
	51-55	49	46.7	
	56-60	19	18.1	
	61+	9	8.6	
Upper Middle Arm Circumference (cm)	13-16	19	18.1	18,41±2.49
	17-20	66	62.9	
	21-24	20	19.0	

Table 3
Average of parental feeding style levels.

	n	Average	SS
Parental Feeding Style	105	73.95	9.53
Strict Controlled	105	14.41	3.31
Tolerant Control	105	16.62	2.41
Emotional Nutrition	105	7.93	3.44
Promoting to eat / encouraging feeding	105	27.80	5.75
Instrumental Feeding	105	6.10	2.74

Table 4
Average of some parameters of athletes by age.

	Age	n	Average	SS	Chi-square	p
Parental Feeding Style Questionnaire	6-7	11	3.03	0.18	11.007	<u>0.026*</u>
	8-9	34	2.94	0.31		
	10-11	32	2.74	0.39		
	12-13	18	2.79	0.43		
	14+	10	2.68	0.33		
Strict Controlled	6-7	11	4.06	0.80	9.840	<u>0.043*</u>
	8-9	34	3.7	0.61		
	10-11	32	3.35	0.92		
	12-13	18	3.63	0.89		
	14+	10	3.25	0.74		
Tolerant Control	6-7	11	3.31	0.41	1.721	0.787
	8-9	34	3.39	0.45		
	10-11	32	3.24	0.57		
	12-13	18	3.35	0.45		
	14+	10	3.30	0.38		
Emotional Nutrition	6-7	11	1.76	0.97	2.005	0.735
	8-9	34	1.56	0.60		
	10-11	32	1.66	0.71		
	12-13	18	1.37	0.57		
	14+	10	1.58	0.68		
Promoting to eat / encouraging feeding	6-7	11	3.82	0.54	8.555	0.073
	8-9	34	3.60	0.74		
	10-11	32	3.29	0.67		
	12-13	18	3.45	0.73		
	14+	10	3.25	0.81		
Instrumental Feeding	6-7	11	1.39	0.57	2.809	0.590
	8-9	34	1.62	0.73		
	10-11	32	1.58	0.76		
	12-13	18	1.38	0.55		
	14+	10	1.40	0.57		

Kruskal Wallis Test * p<0.05; **p<0.01

Table 5

Height for age of the athletes and average of some parameters.

	Height for Age	n	Average	SS	Chi- square	p
Parental Feeding Style Questionnaire	Short	3	2.93	0.17	1.04	0.594
	Normal	89	2.82	0.37		
	Too long	13	2.93	0.30		
Strict Control	Short	3	3.50	0.66	0.33	0.848
	Normal	89	3.61	0.85		
	Too long	13	3.53	0.72		
Tolerant Control	Short	3	3.53	0.11	2.40	0.301
	Normal	89	3.33	0.51		
	Too long	13	3.23	0.21		
Emotional Nutrition	Short	3	1.86	1.02	1.34	0.510
	Normal	89	1.52	0.58		
	Too long	13	1.95	1,08		
Promoting to eat / encouraging feeding	Short	3	3.50	0.21	1.83	0.399
	Normal	89	3.43	0.72		
	Too long	13	3.71	0.71		
Instrumental Feeding	Short	3	1,58	0.62	0.775	0.679
	Normal	89	1.53	0.68		
	Too long	13	1.44	0.72		

Table 6

BMI for age of the athletes and the average of some parameters.

	BMI For Age	n	Average	SS	Chi- square	p
Parental Feeding Style Questionnaire	Too weak	3	2.59	0.41	2.74	0,433
	Weak	55	2.86	0.39		
	Normal	44	2.82	0.34		
	Fat	3	2.98	0.14		
Strict Control	Too weak	3	3.58	0.38	0.59	0,919
	Weak	55	3.55	0.81		
	Normal	44	3.63	0,87		
	Fat	3	3.91	0.76		
Tolerant Control	Too weak	3	3.60	0.34	4.85	0.182
	Weak	55	3.23	0.46		
	Normal	44	3.39	0.47		
	Fat	3	3.66	0.83		
Emotional Nutrition	Too weak	3	1.06	0.11	2.77	0.424
	Weak	55	1.68	0.77		
	Normal	44	1.51	0.58		
	Fat	3	1.33	0.23		
Promoting to eat / encouraging feeding	Too weak	3	2.95	1.27	2.67	0.443
	Weak	55	3.52	0.74		
	Normal	44	3.41	0.65		
	Fat	3	3.83	0.40		
Instrumental Feeding	Too weak	3	1.16	0.28	2.12	0.545
	Weak	55	1.59	0.69		
	Normal	44	1.48	0.70		
	Fat	3	1,25	0,43		

Table 7

Average of some parameters of athletes according to waist circumference measurements.

	Waist Circumference (cm)	n	Average	SS	Chi- square	p
Parental Feeding Style Questionnaire	35-40	2	3.00	0.41	11.546	<u>0.042*</u>
	41-45	9	3.05	0.13		
	46-50	17	2.81	0.36		
	51-55	49	2.89	0.36		
	56-60	19	2.67	0.40		
	61+	9	2.72	0.33		
Strict Controlled	35-40	2	4.12	0.17	8.607	0.126
	41-45	9	3.72	0.78		
	46-50	17	3.73	0.36		
	51-55	49	3.70	0.89		
	56-60	19	3.13	0.95		
	61+	9	3.55	0.64		
Tolerant Control	35-40	2	3.20	0.00	3.565	0.614
	41-45	9	3.22	0.,29		
	46-50	17	3.34	0.39		
	51-55	49	3.32	0.55		
	56-60	19	3,25	0.43		
	61+	9	3.55	0.51		
Emotional Nutrition	35-40	2	2.30	1.88	8.236	0.144
	41-45	9	1.93	0.76		
	46-50	17	1.37	0.73		
	51-55	49	1.57	0.59		
	56-60	19	1.70	0.74		
	61+	9	1.31	0.41		
Promoting to eat / encouraging feeding	35-40	2	3.50	0.17	10.336	0.066
	41-45	9	3.97	0.48		
	46-50	17	3.41	0.92		
	51-55	49	3.54	0.67		
	56-60	19	3.16	0.48		
	61+	9	3.33	0.95		
Instrumental Feeding	35-40	2	1.62	0.88	7.318	0.198
	41-45	9	1.44	0.58		
	46-50	17	1.55	0.72		
	51-55	49	1.58	0.68		
	56-60	19	1.59	0,81		
	61+	9	1.08	0.25		

Kruskal Wallis Test * p<0.05 ; **p<0.01

Table 8

Average of some parameters of athletes according to the upper middle arm circumference.

	Arm Circumference (cm)	n	Average	SS	Chi-square	p
Parental Feeding Style Questionnaire	13-16	19	3.00	0.24	9.278	<u>0.010*</u>
	17-20	66	2.84	0.38		
	21-24	20	2.67	0.34		
Strict Controlled	13-16	19	3.71	0.59	2.586	0.274
	17-20	66	3.64	0.85		
	21-24	20	3.35	0.89		
Tolerant Control	13-16	19	3.20	0.29	3.388	0.184
	17-20	66	3.33	0.54		
	21-24	20	3.40	0.39		
Emotional Nutrition	13-16	19	1.84	0.94	2.708	0.258
	17-20	66	1.56	0.61		
	21-24	20	1.42	0.59		
Promoting to eat / encouraging feeding	13-16	19	3.88	0.65	9.823	<u>0.007*</u>
	17-20	66	3.42	0.68		
	21-24	20	3.24	0.75		
Instrumental Feeding	13-16	19	1.53	0.69	6.224	<u>0.045*</u>
	17-20	66	1.60	0.72		
	21-24	20	1.23	0.44		

*Kruskal Wallis Test * p<0.05 ; **p<0.01*

Parental feeding levels were analyzed. The averages of the scores obtained from the scales used in this context are given in Table 3. The average score obtained from the parent feeding style scale filled in by the parents was 73.95 ± 9.53 . According to the results of the analysis made in terms of sub-dimensions, it was found that the parents received an average of 14.41 ± 3.31 points from the strict control sub-dimension, 16.62 ± 2.41 points from the tolerant control sub-dimension, 7.93 ± 3.44 points from the emotional feeding sub-dimension, 27.80 ± 5.75 points from the promoting to eat / encouraging feeding sub-dimension, and finally 6.10 ± 2.74 points from the instrumental feeding sub-dimension.

Our analysis of parent feeding styles according to the age of the athletes is shown in Table 4. In this context, firstly, analysis was made according to the age of the athletes. Parental feeding behavior and the scores obtained from strict control sub-

dimensions, which indicate that parents used pressure in order to increase children's food consumption, were found to differ according to the age of the athlete ($p < 0.05$). According to the results of Bonferonni Comparative Mann Whitney U Test conducted to determine from which group the difference originated, the scores obtained by the parents in the 6-7 age group and 8-9 age group from the Parental Feeding Style Questionnaire were statistically significant in comparison to the scores received by the parents of other age groups. It was found that the parents in the 6-7 age group adopt the strict controlled feeding style more than the parents in other age groups; in other words, they put more pressure on their children to consume more healthy food.

It was analyzed whether nutritional behavior and parental feeding styles differ according to the height for age. The results of the Kruskal Wallis Test carried out in this context are given in Table 5. As can be

seen, the scores of athletes from the child feeding behavior scale do not differ according to the height for age ($p > 0.05$). Similarly, it was determined that the scores obtained from the parental feeding style questionnaire and its sub-dimensions did not differ according to the height for age of the child ($p > 0.05$).

We analyzed whether nutritional behavior and parental feeding styles differ according to the BMI for age value. The results of the Kruskal Wallis Test carried out in this context are given in Table 6. As can be seen, the scores obtained by the athletes from the child nutrition behavior scale do not differ according to the BMI for age ($p > 0.05$). Similarly, it was found that the scores obtained from the parental feeding style questionnaire and its sub-dimensions did not differ according to the child's BMI for age ($p > 0.05$).

It was analyzed whether the parental feeding styles differ according to the waist circumference of the child. The results of the Kruskal Wallis Test carried out in this context are given in Table 7. It was determined that the scores obtained from the parent feeding styles scale differed according to the waist circumference of the child ($p < 0.05$). However, there is no similar difference for the sub-dimensions of the scale ($p > 0.05$). According to the results of Bonferonni Comparative Mann Whitney U Test conducted to determine from which group the difference originated, the scores received by the parents of the athletes with a waist circumference between 41 and 45 cm were statistically significantly higher than the scores received by the parents of other athletes.

It was analyzed whether parental feeding styles differ according to the child's upper middle arm circumference. The results of the Kruskal Wallis Test carried out for this analysis are given in Table 8. It was concluded that the scores obtained from the parent feeding styles scale and its sub-dimensions of promoting to eat / encouraging feeding and

instrumental feeding differ according to the child's upper middle arm circumference ($p < 0.05$). According to the results of the Bonferonni Mann Whitney U Test conducted to determine from which group the difference originated, the scores obtained by the parents of the children whose arm circumference was between 13-16 cm for the parent feeding style scale and its promoting to eat / encouraging feeding sub-dimensions were higher than for the other two groups. The scores obtained by the parents of children with circumference between 21-24 cm were lower than for the other two groups. In other words, promoting / encouraging eating styles, defined as parents being the nutritional role model, are used less frequently by the parents of athletes with thicker arms. Similarly, it was concluded that the instrumental feeding style, defined as providing unhealthy foods as a reward, was adopted by the parents of athletes with arm circumference of 21-24 cm more than in the other two groups.

DISCUSSION

The average BMI of athletes engaged in rhythmic gymnastics was calculated as $14.88 \pm 3.27 \text{ kg/m}^2$. Similarly, as a result of the research conducted by Kankal with athletes performing rhythmic gymnastics between the ages of 9-12, it was concluded that the average BMI was $15.24 \pm 0.79 \text{ kg/m}^2$ (Kankal, 2008). As a result of the study carried out by Bulca and Ersöz with the participation of 12 rhythmic gymnastics with average age of 10.1 years and engaged in active sports for 4 years, the average BMI of the athletes was calculated as $14.8 \pm 1.0 \text{ kg/m}^2$ (Bulca & Ersöz, 2004). As a result of the research conducted by Sarıtaş et al. in basketball players with average age of 11.86 years, it was concluded that the average BMI of the athletes participating in the study was $20.11 \pm 0.76 \text{ kg/m}^2$ (Sarıtaş et al., 2017). In a different study conducted by Ağbuba et al., the average BMI of students between

the ages of 8-12 was found to be 21.90 ± 5.35 kg/m² (Ağbuğa et al., 2007). Within the framework of these findings, the average BMI of children who are interested in gymnastics is quite low compared to their peers who are interested in other sports or do not do sports.

It was concluded that the average waist circumference measurements of the athletes was 53.01 ± 6.36 cm, and the average upper arm circumference was 18.41 ± 2.49 cm for the athletes participating in the research. Similarly, the average waist circumference of students who are engaged in rhythmic gymnastics in the age range of 9-12 is calculated by Kankal as 53.43 ± 2.54 cm, and the average of arm circumference is 16.82 ± 1.012 cm (Kankal, 2008). Academic studies also show that individuals engaged in gymnastics have a lower body fat ratio and therefore a thinner waist and arm circumference compared to the normal population (De Bourdeaudhuij et al., 2008; Wimbush et al., 2000). In this context, it is evaluated that the findings regarding the waist and arm circumference of the athletes are compatible with the literature.

The mean score obtained from the parent feeding style scale filled in by the parents of the athletes was found to be 73.95 ± 9.53 . According to the results of the analysis made in terms of sub-dimensions, it was observed that parents received 14.41 ± 3.31 points in the strict control sub-dimension, 16.62 ± 2.41 points in the tolerant control sub-dimension, 7.93 ± 3.44 points in the emotional feeding sub-dimension, 27.80 ± 5.75 points in the promoting to eat / encouraging feeding sub-dimension, and, finally, 6.10 ± 2.74 points in the instrumental feeding sub-dimension. When the related literature is analyzed, it becomes clear that there is a limited number of studies on parental feeding styles. Feeding habits of parents of children with and without attention deficit have been investigated by Yıldırım (Yıldırım, 2019). In this research study, parents got 11.16 ± 3.83 points in the

emotional feeding sub-dimension, 7.70 ± 2.68 points in the instrumental feeding sub-dimension, 28.97 ± 4.52 points in the promoting to eat / encouraging feeding sub-dimension, 14.45 ± 2.82 points in the strict control feeding sub-dimension, and 16.66 ± 2.08 points in the tolerant feeding sub-dimension. As a result of the research conducted by Muslu et al. on the parents of 3-6 year-old children who attend a kindergarten in İzmir province, it was observed that parents got 15.2 points in the strict control sub-dimension, 17.3 points in the tolerant control sub-dimension, 10.8 in the emotional feeding sub-dimension, 31.6 points in the encouraging feeding sub-dimension, and 8.7 points in the instrumental feeding sub-dimension (Muslu et al., 2014). When the findings are compared, it seems that the emotional and instrumental feeding styles are used less by the parents of rhythmic gymnasts than the parents of children who are not athletes, while there is no difference in terms of using strict control, tolerant control, and promoting to eat / encouraging feeding styles. It is known that “emotional feeding” behavior, which is defined as trying to calm a restless or crying child down by providing unhealthy foods, and the “instrumental feeding” behavior (Wardle et al., 2002) defined as giving unhealthy foods in exchange for consuming healthy foods, negatively affect the nutritional behavior of children in the long run (Yiğit, 2011; Savage & Birch, 2017; Heller & Mobley, 2019; Roberts et al., 2018). It seems that the fact that these feeding styles are adopted by parents of children who are interested in rhythmic gymnastics to a lesser extent compared to the general population is due to their high level of education and awareness of healthy nutrition.

It was found that the scores obtained from the strict control sub-dimensions of the parental feeding style differ according to the age of the athlete. Specifically, it was determined that the strict controlled feeding style was used more by the parents

of athletes aged 6-7 years. This situation may be due to the belief that parents should be in control of their children more because the age group in question is smaller and / or due to high sensitivity since the age group in question has just started sports. However, academic studies show that strict controlled feeding style decreases the rate at which these children consume healthy foods, such as fruits and vegetables, and increases the probability of these children becoming food addicts (Burrows et al., 2017; Blissett, 2011). This shows that it is extremely important for parents to be informed about the potential benefits and harms of athlete's nutrition and feeding styles once the child starts sports.

It was determined that parental feeding styles did not differ according to the BMI of the child but differed according to the waist circumference and upper arm circumference. When the results related to the waist circumference are examined, the scores obtained from the parental feeding styles scale decrease depending on the increase in the waist circumference of the child. This may be due to the age-related physical development of athletes, as well as a decrease in the sensitivity of the parents of older children, or a decrease of control opportunities of the parents whose children attend school. Regarding the upper arm circumference, it was observed that the promoting / encouraging feeding behavior decreased as the arm circumference thickness increased; in other words, the encouraging feeding behavior was used less by the parents of athletes with higher arm circumference. On the other hand, the instrumental feeding behavior was used less by the parents of athletes with arm circumference of 21-24 cm than the parents of athletes with thinner arm circumference. These research findings related to the upper arm circumference, which increases in proportion to the body weight, contradict the findings of the research that weak children are less encouraged to eat by their

parents (Wardle et al., 2002). These findings that address the general population may not apply to athletes and their parents, and parents who are aware that success in sports is related to physical development may be more likely to encourage their children to eat if the children are weak (Wardle et al., 2002).

CONCLUSION

This study was carried out with the aim to determine the relationship between the eating behaviors of children performing amateur rhythmic gymnastics in a private gymnastic sports club operating in Istanbul province and their parents' feeding style. A total of 105 athletes between the ages of 6 and 16 and their parents participated in the study.

As a result of the research, it was determined that some sociodemographic and anthropometric features affect the parents' feeding style of their children. The distribution of data on the nutritional behavior of the athletes and parental feeding styles were analyzed and examined. The findings from this study are summarized below.

- The promoting to eat / encouraging feeding behavior are used less frequently by parents of athletes with a thicker arm circumference. Similarly, it was concluded that the instrumental feeding style was adopted more by the parents of athletes with arm circumference of 21-24 cm compared to the other two groups.

- It was concluded that the scores obtained by the parents of athletes with a waist circumference between 41 and 45 cm on the Parental Feeding Style Questionnaire were statistically significantly higher than the scores received by the parents of athletes in the other groups.

- The results obtained from this study can be used as a guide for creating forward-looking nutrition models for children doing rhythmic gymnastics and

planning the nutritional education for their parents.

- This study that deals with children engaged in rhythmic gymnastics, contributes to both local and international literature.

RECOMMENDATIONS

Recommendations arising from the results of this study are as follows:

- It is necessary to build social awareness among all adults about the responsibility and care for children who engage in sports activities through written and visual media; ,

- Counselling on nutrition and healthy development for children and their parents should be carried out by multidisciplinary teams of sports physicians, physiotherapists, athletes dietitians, sports psychologists and coaches;

- Nutritional programs of athletes should be prepared and followed by dietitians specialized in this field. Training on sports nutrition and its importance should be planned both for athletes and their families.

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ETHICS APPROVAL

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by Istanbul Okan University, Health Sciences Research Ethics Committee with the decision no 11, dated 11/12/2019. Written consent was obtained from the participants in accordance with the principles of the Helsinki Declaration.

REFERENCES

- Ağbuğa, B., Yılmaz, I., Köklü, Y., Alemдарoğlu, U. (2007). Examination of the relationship between aerobic capacity and body mass indexes of children aged 8-12. *Spor Bilimleri Dergisi*, 18(3), 137-146.
- Alexander, M.J.L. (1991). A comparison of physiological-characteristics of elite and subelite rhythmic gymnasts. *Journal of Human Movement Studies*, 20(2), 49-69.
- Benardot, D., Schwarz, M., & Heller, D. W. (1989). Nutrient intake in young, highly competitive gymnasts. *Journal of the American Dietetic Association*, 89(3), 401-404.
- Blissett, J. (2011). Relationships between parenting style, feeding style and feeding practices and fruit and vegetable consumption in early childhood. *Appetite*, 57(3), 826-831.
- Bulca, Y., Ersöz, G. (2004). The effects of exercise and nutrition on growth in rhythmic gymnasts. *Gazi Journal of Physical Education and Sports Sciences*, 9(2), 11-20.
- Burrows, T., Skinner, J., Joyner, M. A., Palmieri, J., Vaughan, K., & Gearhardt, A. N. (2017). Food addiction in children: Associations with obesity, parental food addiction and feeding practices. *Eating behaviors*, 26, 114-120.
- De Bourdeaudhuij, I., te Velde, S., Brug, J., Due, P., Wind, M., Sandvik, C., ... & Klepp, K. I. (2008). Personal, social and environmental predictors of daily fruit and vegetable intake in 11-year-old children in nine European countries. *European Journal of Clinical Nutrition*, 62(7), 834-841.
- Dündar U. (1996). Antrenman Teorisi. Kültür Ofset. Ankara. 16-19.
- Ersoy, G., Paker, S. (1991). Evaluation of nutrition and some hematological findings of female runners. *Journal of Sport Sciences*, 2(3), 6-10.
- Heller, R. L., & Mobley, A. R. (2019). Instruments assessing parental responsive

feeding in children ages birth to 5 years: A systematic review. *Appetite*, 138, 23-51.

Jurimae, T., & Jurimae, J. (2001). Growth, physical activity, and motor development in prepubertal children. *CRC Press*, 51-55.

Kankal, M. B. (2008). Comparison of physical, physiological and performance characteristics of 9-12 age group aerobic gymnastics and rhythmic gymnastics athletes. BA Thesis. Ankara University. Ankara.

Koç, H. (1996). Administrative and Financial Structure of the Gymnastics Federation, Examining Athletes, Trainers, Referees, Materials. Bolu Province Example. BA Thesis. Marmara University. İstanbul.

Lazarou, C., Kalavana, T., & Matalas, A. L. (2008). The influence of parents' dietary beliefs and behaviours on children's dietary beliefs and behaviours. The CYKIDS study. *Appetite*, 51(3), 690-696.

Mitchell, D., Davis, B., & Lopez, R. (2002). Teaching fundamental gymnastics skills. *Human kinetics*, 1-312.

Muslu, G. K., Beytut, D., Kahraman, A., Yardımcı, F., & Başbakkal, D. Z. (2014). Examination of parental feeding style and influencing factors. *Turkish Archives of Pediatrics*, 49, 224-30.

Nadejda, J., & Titov, Y. (1999). Rhythmic Gymnastics. *Human Kinetics USA Gymnastics*, 194-208.

Oliveria, S. A., Ellison, R. C., Moore, L. L., Gillman, M. W., Garrahie, E. J., & Singer, M. R. (1992). Parent-child relationships in nutrient intake: the Framingham Children's Study. *The American journal of clinical nutrition*, 56(3), 593-598.

Özçetin, M., Yılmaz, R., Erkorkmaz, Ü., & Esmeray, H. (2010). Validity and reliability study of parent feeding style questionnaire. *Turkish Archives of Pediatrics*, 45(2), 24-31.

Özer, D., Özer, K. (2005). Motor Development in Children. Nobel Publication Distribution.120.

Roberts, L., Marx, J. M., & Musher-Eizenman, D. R. (2018). Using food as a reward: An examination of parental reward practices. *Appetite*, 120, 318-326.

Sarıtaş, N., Yıldız, K., Hayta, Ü. (2017). Comparison of some motoric and physiological characteristics of primary school students. *CBU Journal of Physical Education and Sport Sciences*, 12(2), 117-127.

Savage, J. S., & Birch, L. L. (2017). WIC mothers' depressive symptoms are associated with greater use of feeding to soothe, regardless of perceived child negativity. *Pediatric Obesity*, 12(2), 155-162.

Wardle, J., Sanderson, S., Guthrie, C. A., Rapoport, L., & Plomin, R. (2002). Parental feeding style and the inter-generational transmission of obesity risk. *Obesity research*, 10(6), 453-462.

Wimbush, F. B., & Peters, R. M. (2000). Identification of cardiovascular risk: Use of a Cardiovascular-Specific Genogram. *Public Health Nursing*, 17(3), 148-154.

Yayla, E. (2009). Investigation of the Effect of Basic Training Model Applied in the Basic Training Period in Rhythmic Gymnastics on the Development of Flexibility. BA Thesis. Trakya University. Edirne.

Yıldırım, K. (2019). Investigation of feeding behavior, parent feeding style and anthropometric measurements in preschool children diagnosed with attention deficit and hyperactivity disorder. BA Thesis. İnönü University. Malatya.

Yiğit, R. (2011). The role of the nurse in the management of childhood obesity. *Cumulative Index to Nursing and Allied Health Literature*, 13(1), 72-80.

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